

SERVICES AND UTILITIES INFRASTRUCTURE REPORT

APPENDIX AA





Sydney Metro City & Southwest

Pitt Street South Over Station Development:

Services and Utilities Infrastructure Report

Applicable to:	Sydney Metro City & Southwest
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1.0 Purpose of this report

1.1 Background

This report supports a concept State Significant Development Application (concept SSD Application) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The concept SSD Application is made in accordance with Section 4.22 of the EP&A Act.

Sydney Metro is seeking to secure concept approval for a building envelope above the southern portal of Pitt Street Station, otherwise known as the over station development (OSD). The concept SSD Application seeks consent for a building envelope, maximum building height, land use options, pedestrian and vehicular access, circulation arrangements and associated car parking as well as the strategies and design parameters for the future detailed design of development.

Sydney Metro proposes to procure the construction of the OSD as part of an integrated station development package, which would result in the combined delivery of the station, OSD and public domain improvements. The station and public domain elements form part of a separate planning approval for Critical State Significant Infrastructure (CSSI) approved by DPE on 9 January 2017.

As the development is associated with railway infrastructure and is for residential or commercial premises with a Capital Investment Value of more than \$30 million, the project is a State Significant Development (SSD) pursuant to Schedule 1, Clause 19(2)(a) of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). The full extent of the proposed development can also be considered to be SSD by virtue of Clause 8(2) of the SRD SEPP.

This report has been prepared to specifically respond to the Secretary's Environmental Assessment Requirements (SEARs) issued for the concept SSD Application for Pitt Street South on 30th November 2017 which state that the Environmental Impact Statement (EIS) is to address the following requirements:

Services and Utilities Infrastructure Report

1.2 Overview of the Sydney Metro in its context

The New South Wales (NSW) Government is implementing *Sydney's Rail Future*, a plan to transform and modernise Sydney's rail network so that it can grow with the city's population and meet the needs of customers in the future. Sydney Metro is a new standalone rail network identified in *Sydney's Rail Future*.

Sydney Metro is Australia's biggest public transport project, consisting of Sydney Metro Northwest, which is due for completion in 2019 and Sydney Metro City & Southwest, which is due for completion in 2024.

Sydney Metro West is expected to be operational in the late 2020s (refer to Error! Reference source not found.).



Figure 1: Sydney Metro alignment map

Sydney Metro City & Southwest includes the construction and operation of a new metro rail line from Chatswood, under Sydney Harbour through Sydney’s Central Business District (CBD) to Sydenham and on to Bankstown through the conversion of the existing line to metro standards.

The project also involves the delivery of seven new metro stations, including at Pitt Street. Once completed, Sydney Metro will have capacity for 30 trains an hour (one every two minutes) through the CBD in each direction - a level of service never seen before in Sydney.

On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham application lodged as a Critical State Significant Infrastructure project (reference SSI 15_7400), hereafter referred to as the CSSI Approval.

The CSSI Approval includes all physical work required to construct the CSSI, including the demolition of existing buildings and structures on each site. Importantly, the CSSI Approval also includes provision for the construction of below and above-ground structures and other components of the future integrated station development (including building infrastructure

and space for future lift cores, plant rooms, access, parking and building services, as relevant to each site). The rationale for this delivery approach, as identified within the CSSI Application, is to enable the integrated station development to be more efficiently built and appropriately integrated into the metro station structure.

The EIS for the Chatswood to Sydenham component of the Sydney Metro City & Southwest project identified that the OSD would be subject to a separate assessment process.

Since the CSSI Approval was issued, Sydney Metro has lodged four modification applications to amend the CSSI Approval as outlined below:

- Modification 1- Victoria Cross and Artarmon Substation which involves relocation of the Victoria Cross northern services building from 194-196A Miller Street to 50 McLaren Street together with inclusion of a new station entrance at this location referred to as Victoria Cross North. 52 McLaren Street would also be used to support construction of these works. The modification also involves the relocation of the substation at Artarmon from Butchers Lane to 98 – 104 Reserve Road. This modification application was approved on 18 October 2017.
- Modification 2- Central Walk which involves additional works at Central Railway Station including construction of a new eastern concourse, a new eastern entry, and upgrades to suburban platforms. This modification application was approved on 21 December 2017.
- Modification 3 - Martin Place Station which involves changes to the Sydney Metro Martin Place Station to align with the Unsolicited Proposal by Macquarie Group Limited (Macquarie) for the development of the station precinct. The proposed modification involves a larger reconfigured station layout, provision of a new unpaid concourse link and retention of the existing MLC pedestrian link and works to connect into the Sydney Metro Martin Place Station. This modification application was approved on 22 March 2018.
- Modification 4 - Sydenham Station and Sydney Metro Trains Facility South which incorporated Sydenham Station and precinct works, the Sydney Metro Trains Facility South, works to Sydney Water's Sydenham Pit and Drainage Pumping Station and ancillary infrastructure and track and signalling works into the approved project. This modification application was approved on 13 December 2017.

Given the modifications, the CSSI Approval is now approved to operate to Sydenham Station and also includes the upgrade of Sydenham Station.

The remainder of the City & Southwest project (Sydenham to Bankstown) proposes the conversion of the existing heavy rail line and the upgrade of the existing railway stations along this alignment to metro standards. This portion of the project, referred to as the Sydenham to Bankstown Upgrade, is the subject of a separate CSSI Application (No. SSI 17_8256) for which an Environmental Impact Statement was exhibited between September and November 2017 and a Response to Submissions and Preferred Infrastructure Report was submitted to the NSW Department of Planning & Environment (DPE) in June 2018 for further exhibition and assessment.

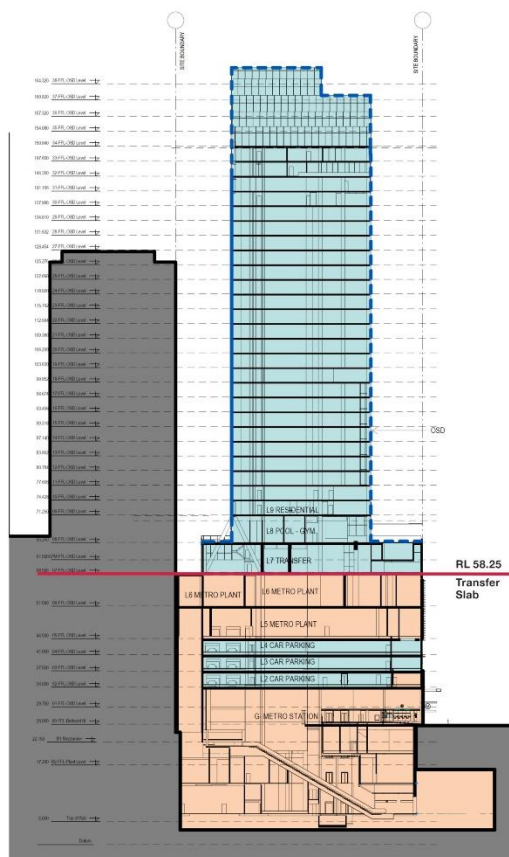
1.3 Planning relationship between Pitt Street Station and the OSD

While the southern portal of Pitt Street Station and the OSD will form an integrated station development, the planning pathways under the *Environmental Planning and Assessment Act 1979* involve separate approval for each component of the development. In this regard, the approved station works (CSSI Approval) are subject to the provisions of Part 5.1 of the EP&A Act (now referred to as Division 5.2) and the OSD component is subject to the provisions of Part 4 of the EP&A Act.

For clarity, the approved station works under the CSSI Approval included the construction of below and above ground structures necessary for delivering the station and also enabling construction of the integrated OSD. This included but is not limited to:

- demolition of existing development
- excavation
- station structure including concourse and platforms
- lobbies
- retail spaces within the station building
- public domain improvements
- station portal link (between the northern and southern portals of Pitt Street Station)
- access arrangements including vertical transport such as escalators and lifts
- structural and service elements and the relevant space provisioning necessary for constructing OSD, such as columns and beams, space for lift cores, plant rooms, access, parking, retail and building services.

The vertical extent of the approved station works above ground level is defined by the 'transfer slab' level (which for Pitt Street South is defined by RL 58.25), above which would sit the OSD. This delineation is illustrated in Error! Reference source not found. below.



Section North-South - CSSI Podium Approval below RL 58.25

Figure 2: Delineation between station and OSD

The CSSI Approval also establishes the general concept for the ground plane of Pitt Street Station including access strategies for commuters and pedestrians. In this regard, pedestrian access to the station would be from Bathurst Street and the OSD lobby would be accessed from Pitt Street.

Since the issue of the CSSI Approval, Sydney Metro has undertaken sufficient design work to determine the space planning and general layout for the station and identification of those spaces within the station area that would be available for the OSD. In addition, design work has been undertaken to determine the technical requirements for the structural integration of the OSD with the station. This level of design work has informed the concept proposal for the OSD. It is noted that ongoing design development of the works to be delivered under the CSSI Approval would continue with a view to developing an Interchange Access Plan (IAP) and Station Design Precinct Plan (SDPP) for Pitt Street Station to satisfy Conditions E92 and E101 of the CSSI Approval.

The public domain improvement works around the site would be delivered as part of the CSSI Approval.

1.4 The Site

The Pitt Street South OSD site is located near the corner of Pitt Street and Bathurst Street, comprising four individual allotments but excluding the Edinburgh Castle Hotel, above the southern portal of the future Pitt Street Station. The context of the site is demonstrated at Error! Reference source not found. below.

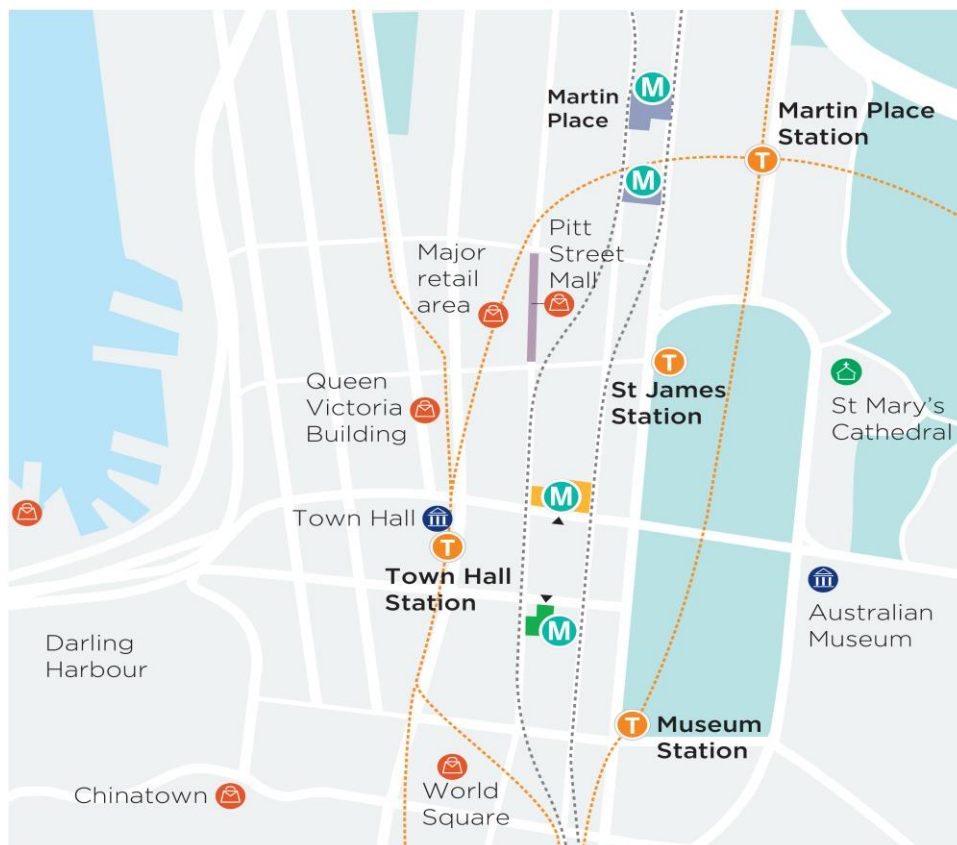


Figure 3: Pitt Street Station location plan

The site is located in the City of Sydney Local Government Area. The site (refer to **Figure 4** below) is irregular in shape, has a total area of approximately 1,708 square metres and has street frontages of approximately 32 metres to Pitt Street and 24 metres to Bathurst Street.

The Pitt Street South site comprises a number of individual properties which front Bathurst Street and Pitt Street. Specifically, the site comprises the following:

- 125-129 Bathurst Street, Sydney (Lot 1 in DP60293)
- 131-135 Bathurst Street, Sydney (Lot 1 in DP59101)
- 296-300 Pitt Street, Sydney (Lot 1 in DP436359)
- 302 Pitt Street, Sydney (Lot 1 in DP62668)

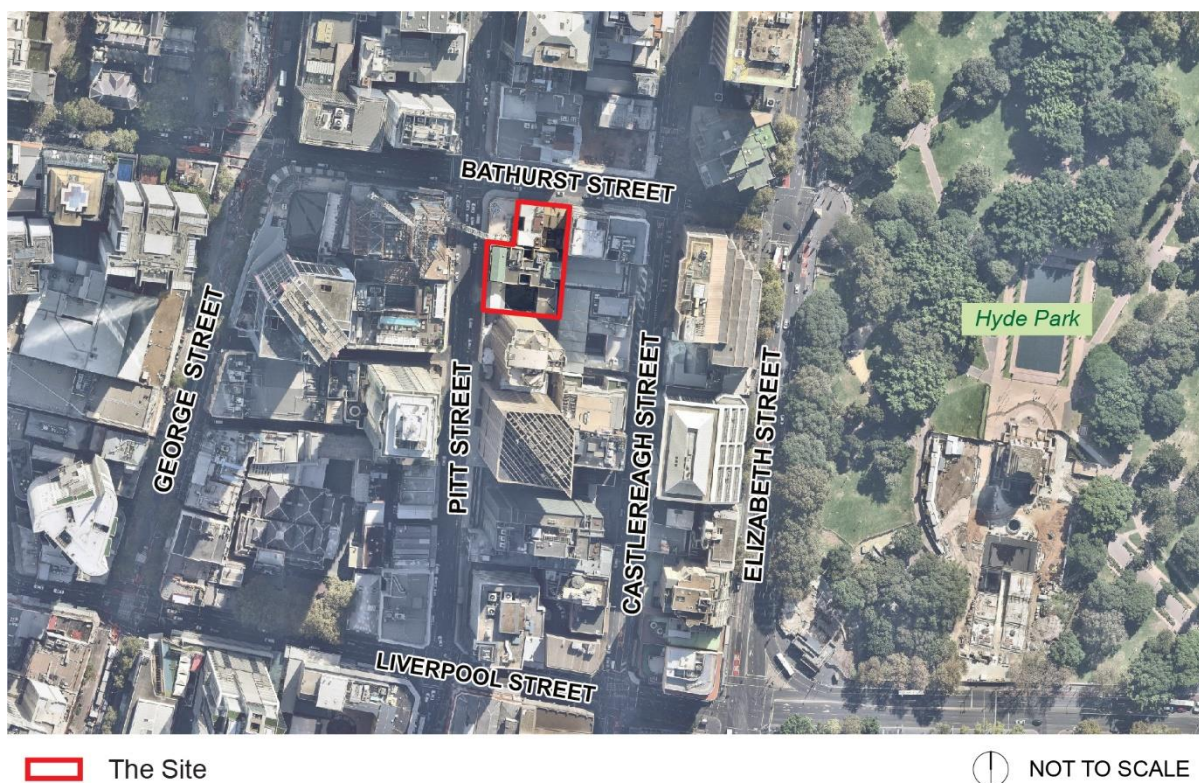


Figure 4: Aerial photo of Pitt Street South

1.5 Overview of the proposed development

This concept SSD Application comprises the first stage of the Pitt Street South OSD project. It will be followed by a detailed SSD Application for the design and construction of the OSD to be lodged by the successful contractor who is awarded the contract to deliver the integrated station development.

This concept SSD Application seeks approval for the planning and development framework and strategies to inform the future detailed design of the OSD. It specifically seeks approval for the following:

- a building envelope
- a maximum envelope height of Relative Level (RL 171.6) which equates to approximately 35 storeys, including the podium height of RL 71.0 which equates to approximately 8 storeys above ground
- use for the OSD component of the development for uses, subject to further detailed applications, which could include:
 - residential accommodation; or
 - commercial premises
 - use of the conceptual OSD space provisioning within the footprint of the CSSI Approval (both above and below ground), including the OSD lobby areas, podium car parking, storage facilities, services and back-of-house facilities

- car parking for a maximum of 34 spaces located across three levels of the podium
- loading, vehicular and pedestrian access arrangements from Pitt Street
- strategies for utilities and service provision
- strategies for the management of stormwater and drainage
- a strategy for the achievement of ecologically sustainable development
- indicative future signage
- a strategy for public art
- a design excellence framework
- the future subdivision of parts of the OSD footprint (if required)

As this concept SSD Application is a staged development pursuant to section 4.22 of the EP&A Act, future approval would be sought for detailed design and construction of the OSD. Concept indicative designs showing potential residential and commercial building form outcomes at the site have been provided as part of this concept SSD Application at Appendix E and Appendix F, respectively.

Pitt Street Station is to be a key station on the future Sydney Metro network, providing access to the Sydney CBD. The proposal combines the metro station with an OSD component. The OSD would assist in strengthening the role of Central Sydney as the key centre of business in Australia and would contribute to the diversity, amenity and sustainability of the CBD.

It is noted that Pitt Street Station northern portal OSD is subject to a separate application and does not form part of this concept SSD Application.

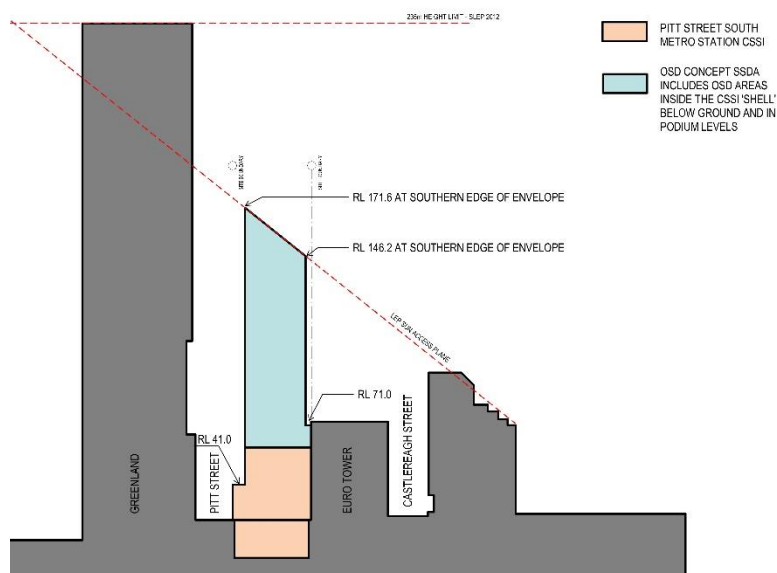


Figure 5: Pitt Street South OSD envelope, including OSD components (Blue) and station box (Orange)

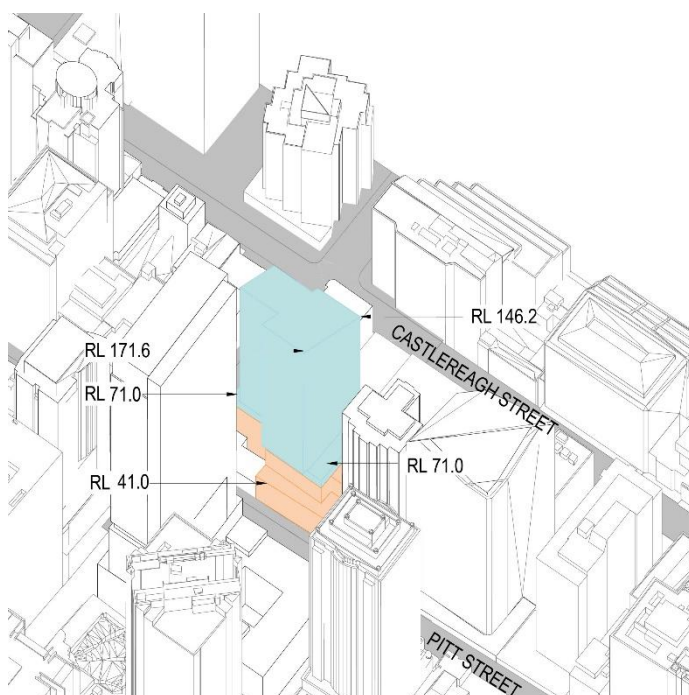


Figure 6: Pitt Street South OSD axonometric diagram, as seen from the south-west

1.6 Staging and framework for managing environmental impacts

Sydney Metro proposes to procure the delivery of the Pitt Street South integrated station development in one single package, which would entail the following works:

- station structure
- station fit-out, including mechanical and electrical
- OSD structure
- OSD fit-out, including mechanical and electrical.

Separate delivery packages are also proposed by Sydney Metro to deliver the excavation of the station boxes/shafts ahead of the integrated station development delivery package, and line-wide systems (e.g. track, power, ventilation) and operational readiness works prior to the Sydney Metro City & Southwest metro system being able to operate.

Three possible staging scenarios have been identified for delivery of the integrated station development:

1. Scenario 1 – the station and OSD are constructed concurrently by constructing the transfer slab first and then building in both directions. Both the station and OSD would be completed in 2024.
2. Scenario 2 – the station is constructed first and ready for operation in 2024. OSD construction may still be incomplete or soon ready to commence after station construction is completed. This means that some or all OSD construction is likely to still be underway upon opening of the station in 2024.

3. Scenario 3 – the station is constructed first and ready for operation in 2024. The OSD is built at a later stage, with timing yet to be determined. This creates two distinct construction periods for the station and OSD.

Scenario 1 represents Sydney Metro's preferred option as it would provide for completion of the full integrated station development and therefore the optimum public benefit at the site at the earliest date possible (i.e. on or near 2024 when the station is operational). However, given the delivery of the OSD could be influenced by property market forces, Scenarios 2 or 3 could also occur, where there is a lag between completion of the station component of the integrated station development (station open and operational), and a subsequent development.

The final staging for the delivery of the OSD would be resolved as part of the detailed SSD Application(s).

For the purposes of providing a high level assessment of the potential environmental impacts associated with construction, the following have been considered:

- Impacts directly associated with the OSD, the subject of this SSD Application
- Cumulative impacts of the construction of the OSD at the same time as the station works (subject of the CSSI Approval)

Given the integration of the delivery of the Sydney Metro City & Southwest metro station with an OSD development, Sydney Metro proposes the framework detailed in Error! Reference source not found. to manage the design and environmental impacts, consistent with the framework adopted for the CSSI Approval.

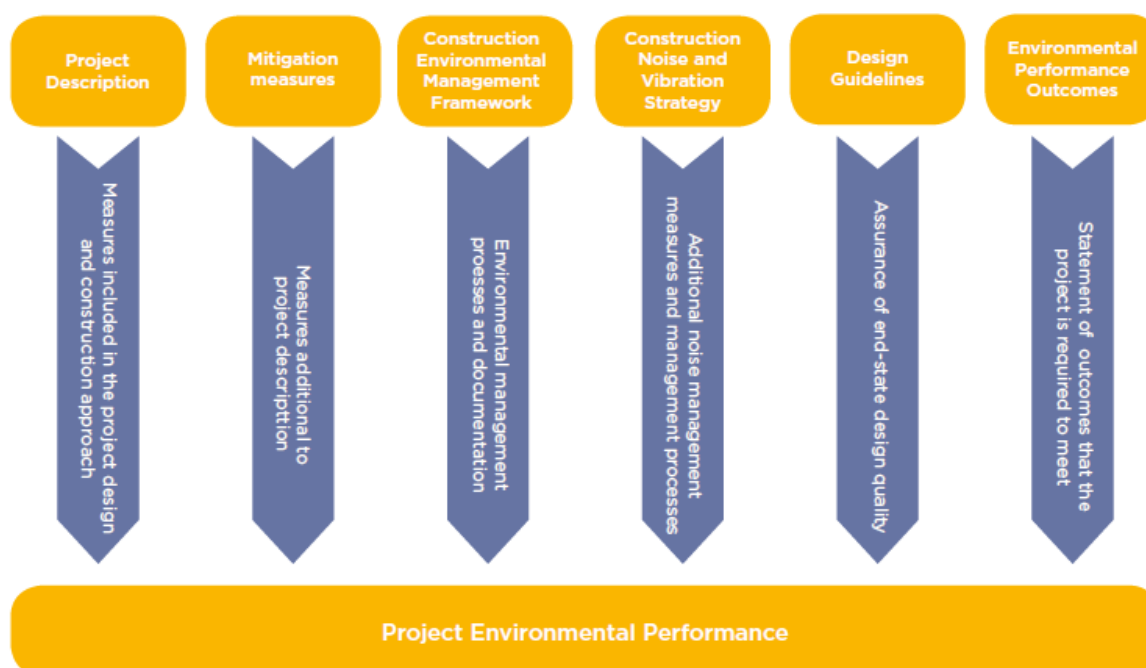


Figure 7: Project approach to environmental mitigation and management

Sydney Metro proposes to implement a similar environmental management framework where the integrated delivery of the CSSI station works and the OSD occur concurrently. This would ensure a consistent approach to management of design interface and construction-related issues.

Sydney Metro proposes this environmental management framework would apply to the OSD until completion of the station and public domain components of the integrated station development delivery contract (i.e. those works under the CSSI Approval). Should the OSD be constructed beyond the practical completion and opening of the station, standard practices for managing construction related environmental impacts would apply in accordance with the relevant guidelines and Conditions of Approval for the detailed SSD Application(s).

1.7 Compliance

The building services shall comply with the *National Construction Code (NCC 2016)* and the following referenced standards:

Mechanical Services

- AS 1668.1 -2015 *Fire and Smoke Control in Buildings*;
- AS 1668.2 -2012. *Mechanical Ventilation in Buildings*;

- AS 2107 -2016. *Acoustics –Recommended design sound levels and reverberation times for building interiors;*
- AS 4254. *Part 1 and 2 – 2012. Ductwork for Air Handling Systems in Buildings*
- AS 3666.1 -2011 *Air handing and Water Systems in Buildings – Microbial Control. Design, Installation and Commissioning;*

Electrical and communications systems

- AS 1680, *Interior Lighting*
- AS 1768:2007, *Lightning Protection;*
- AS 2293, *Exit and Emergency Lighting;*
- AS 3000:2007, *The Wiring Rules;*AS/NZS 3080:2013, *Information Technology – Generic cabling for customer premises*
- *NSW Service and Installation Rules*
- *Ausgrid Network Standards*
- *NBNCo Standards and Guidelines*
- *Mobile Carriers Forum DAS Design Specification*

Hydraulic systems

- AS/NZS 3500.1: 2015, *Plumbing and drainage Part 1: Water services*
- AS/NZS 3500.2: 2015, *Plumbing and drainage Part 2: Sanitary plumbing and drainage*
- AS/NZS 3500.3: 2015, *Plumbing and drainage Part 3: Stormwater drainage*
- AS/NZS 3500.4 :2015, *Plumbing and drainage Part 4: Heated water services*
- AS 5601: 2013, *Gas installations Part 1: General installations*

Fire Services

- AS 1221: 2003 *Fire hose reels*
- AS 2118.6: 2012 *Automatic fire sprinkler systems, Part 6: Combined sprinkler and hydrant systems in multistorey buildings*
- AS2419.1-2005 *Fire Hydrants*
- AS 2441: 2005, *Fire hose reel system*
- AS 2941: 2002, *Fixed fire protection installations – Pumpset systems*
- AS 2444: 2001, *Portable fire extinguishers*
- AS 1670.1: 2015, *Fire Detection*
- AS 1851: 2012 *Maintenance of fire protection systems and equipment*
- AS 1668.1: 2015 *The use of ventilation and air conditioning in buildings- fire and smoke control in multi compartment buildings*
- ISO 14520.1:2009 *Gaseous fire extinguishing systems – Physical properties and system design*

Pool system

- *AS 2610.2: 2007, Spa pools – Private spas*
- *AS 1926.3: 2010, Swimming pool safety – water recirculation systems*
- *HB 241: 2002, Water Management for Public Swimming Pools and Spas*
- *AS 5200, Technical specification*
- *AS/NZS 3136: 2001, Approval and test specification*
- *Pools and Spas – Construction Set:2017*
- *AS 2416: 2010, Water Safety signs and beach safety flags*
- *AS 4276, Water microbiology*
- *AS 3780: 2008, The storage and handling of corrosive substances*
- *Public Swimming Pool and Spa Pool Advisory Document (2013)*

2.0 Infrastructure

Inquiries to the relevant infrastructure providers have been initiated as part of a previous DA application and were based on a reference design for a 63-storey residential building.

After multiple consultations with relevant stakeholders, the reference design and building envelope has been revised from a 63-storey to a 36-storey building with a possible residential or commercial use. With the proposed reduction in building floor area and volume, the associated infrastructure requirements for water, sewer, gas, electricity and communications are expected to be reduced.

In view of the reduction, the infrastructure requirements for the previous reference design for a 63-storey building included in the further sections of this report are considered to also satisfy the infrastructure requirements for a smaller building as per the current proposal, irrespective of the proposed building use.

Infrastructure requirements take into consideration both possible building uses (residential accommodation or commercial premises) as described in section 1.5. For each infrastructure service listed below the worst case for the infrastructure requirements was used for the assessment.

2.1 Water & Sewer

A feasibility study was initiated with the Authority, Sydney Water (SWC) to ascertain general information about existing infrastructure and, if required, augmentation. This process was also undertaken to understand if and to what extent the existing infrastructure is to be augmented for the new development

For each portion of the development (station and oversite development), the process was initiated to ensure that each portion is able to be independently connected to the infrastructure services.

Sydney Water's comments are stated in Feasibility Letter (Case No. 165998, dated 6 November 2017) and attached to this report in **Appendix A**.

It states that additional works to the infrastructure of Sydney Water are currently not required and Sydney Water will confirm this after the Development Application.

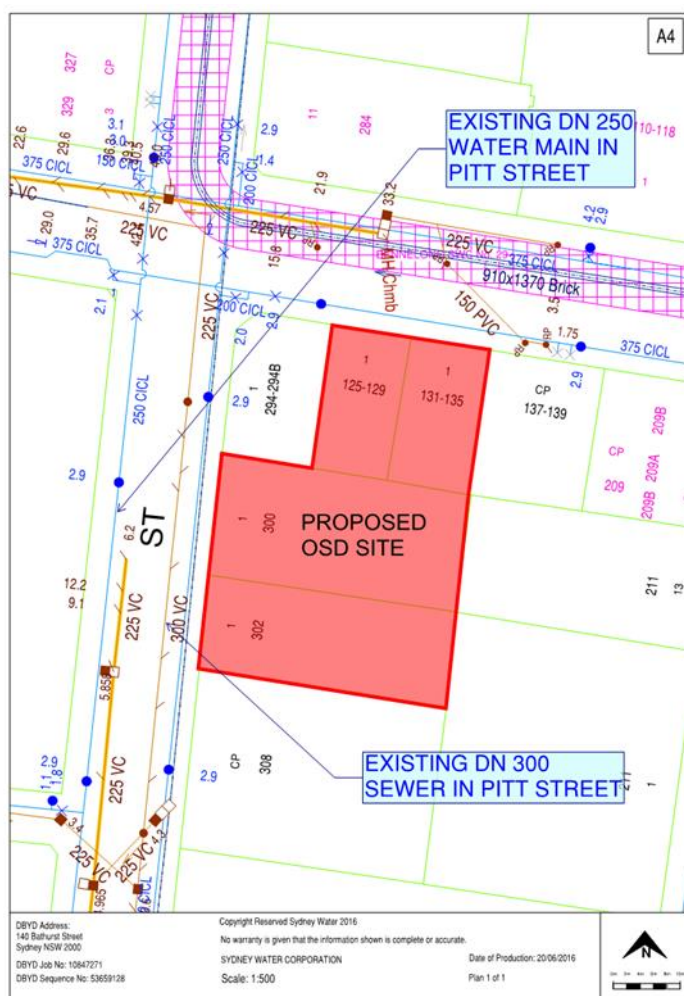


Figure 8: Existing Sydney Water network as per Dial Before You Dig information

2.2 Sewer

Discharge flows to sewer are directly linked to the usage of the building (residential or commercial). Based on the indicated and anticipated sewer discharge Sydney Water confirmed that the existing 300mm VC (vitrified clay) Sewer will service the proposed OSD.

Preliminary calculations indicate that the proposed OSD under residential use will require a DN300 sewer connection to the sewer located in Pitt St.

For a commercial use of the building a sewer connection of DN225 will be required.

The design of the connection to the sewer is subject to the final building layout and is will require approval by Sydney Water.

2.3 Water Services

The feasibility study confirmed that the Oversite Development portion is to be connected to the existing 250mm water main in Pitt Street.

The proposed OSD will require a dedicated domestic water tapping as well as a separate fire service tapping to the existing water main in Pitt Street.

2.3.1. Domestic Water Supply

The water demand of the proposed OSD depends on its use.

Preliminary calculations indicate that the proposed OSD under a residential use will require a DN150 water connection and meter.

For a commercial use the required water connection is expected to be DN100.

The design of the water connection and tapping are subject to the final building layout and will require approval by Sydney Water.

2.3.2. Combined Fire Water Supply

A fire water supply for the proposed OSD will be required. This fire water supply will be in the form of a single water connection for a combined fire hydrant and sprinkler system as outlined in AS2118.6-2012.

Additional fire water storage tanks will be required to satisfy statutory requirements.

The fire services system demand is based on the highest hazard occupancy within the OSD development.

There will be some minor differences in the fire services layout depending of a commercial or a residential use of the building but the overall fire water demand will not be affected by that in a larger scale.

- Preliminary calculations indicate the following key design figures:
- DN150 water connection to town's main with back flow prevention device and Fire Brigade booster assembly for each pressure zone of the OSD (pending confirmation of available water flow).
- Fire onsite storage tanks (2 off) with an indicative tank volume of 250m³ (pending confirmation of available water flow).
- Diesel driven booster pumps that provide the required pressure and flow of the system.
- Additional diesel driven relay pumps for each pressure zone, connected to booster ports of each pressure zone.

The number of pressure zones and location of the fire storage tanks are subject to the final building layout.

2.4 Gas

Jemena is the gas Authority of the area and has been approached to provide a statement of possible upgrade works that might be required to accommodate the new development.

A copy of the email trail is attached in **Appendix B**.

Jemena has advised that at this stage an upgrade of the infrastructure is not envisaged.

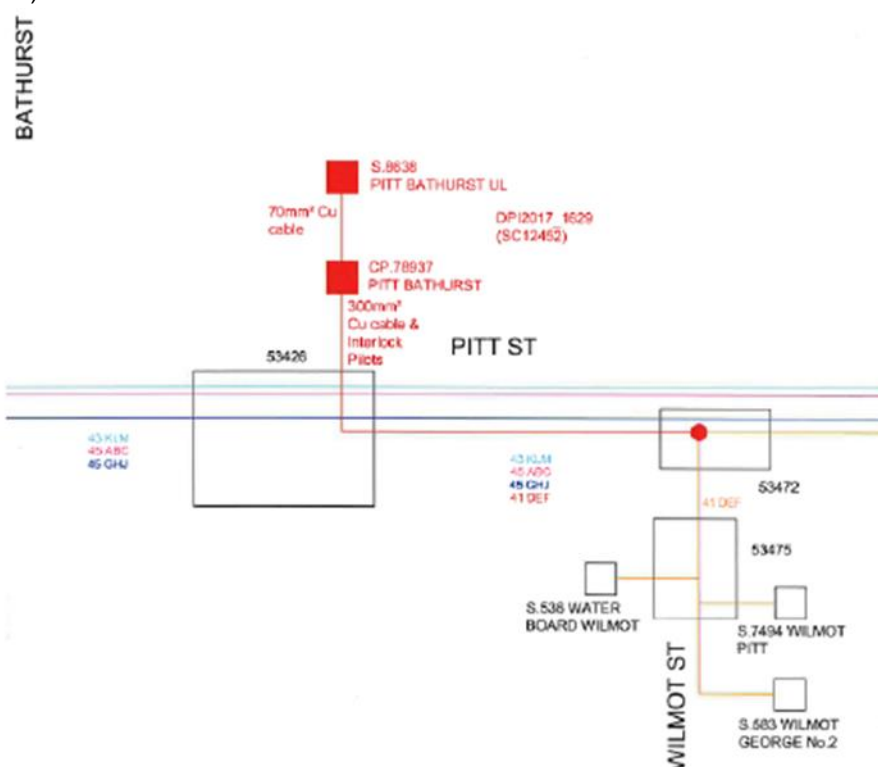
2.5 Electricity

Ausgrid is the electricity Authority of the area and has been approached to provide a statement of upgrade works required to accommodate the new development.

A copy of the Design Information Package received from Ausgrid is attached in **Appendix C**.

Preliminary maximum demand calculations indicate a supply of 2,083MVA (3,000A/phase) is sufficient for the proposed development. The proposed location for the new indoor substation will include (subject to Accredited Service Provider Level 3 Design) a High Voltage connection point located on level 1 with 24hr access directly from Pitt St. The substation and Low Voltage connection point will be located on a level above. To facilitate the removal of transformers should it be required, a removable wall section will be provided to allow hoisting to Pitt St.

It is proposed that the new incoming electricity supply to the substation will be supplied Underground (U/G) from Pitt St.



2.6 Telecommunication

The development shall be provided with incoming telecommunications U/G infrastructure. The network service could be provided by NBN or Telstra. Suitably rated fibre optic and/or copper cabling shall be provided via the basement to serve the new development.

2.7 Stormwater

Sydney Water has further instructed that onsite detention will be required.

Sydney Water requests that discharging to kerb and gutter is to be investigated or any available council stormwater system. A connection to the Sydney Water Stormwater system is expected to be the last option.

Refer to Appendix Q – PSS Concept SSDA Flooding and Stormwater Management Plan for proposed detention sizes and connection details.

The development is to demonstrate an improvement of stormwater quality with the reduction of stormwater pollutants as stated below:

Table 1: Discharged Stormwater Quality Targets

Pollutant	Pollutant load reduction objective (%)
Gross Pollutants (>5mm)	90
Total Suspended Solids	85
Total Phosphorus	65
Total Nitrogen	45

The stormwater quality targets can be achieved with the installation of proprietary treatment devices such as the Stormwater 360 Jellyfish Filter or Humes' Humeceptor filter.

3.0 Mechanical Services

3.1 General

The general approach and design criteria for the mechanical services for the OSD are detailed in the following sections and comprise:

- Air conditioning systems to serve all normally occupied areas in the building;
- Mechanical ventilation to plant rooms, car parks, toilets, kitchens and other plant areas as necessary;
- Smoke hazard management systems including smoke exhaust and stair pressurisation systems;
- Associated electrical services; and
- Building management systems to control and monitor the mechanical equipment.
- Details are included for both the commercial and residential options.

3.2 Design Conditions

3.2.1. External Conditions

Outside 'summer' and 'winter' dry bulb design temperatures shall be determined in accordance with local climatic influences and the latest or equivalent version of the AIRAH Air conditioning design manual. Comfort conditions for fully occupied areas shall be:

- Summer: 31.1, 22.7 (°C DB, ° WB)
- Winter: 7.2 (°C DB)

3.2.2. Internal Conditions

Internal thermal design conditions shall be:

- Summer: 24° CDB, ± 1.5° CDB, 50%RH Nominal
- Winter: 21° CDB, ± 1.5° CDB

3.2.3. Outside Air

Outside air intake and exhaust systems shall comply with AS 1668 Part 2.

3.2.4. Exhaust Air

Design conditions for exhaust air shall be as follows:

- Common area toilets: 10l/s/m² or 25 l/s per fixture whichever is greater.
- Residential Bathrooms: 25 l/s for each bathroom.
- Residential Laundries: 20 l/s for each laundry.
- Residential Kitchens: domestic style range hood –ducted type 100 l/s.

3.2.5. Acoustics

Control of noise generated by the mechanical plant is required. Plant shall be designed to maintain noise levels in the building to not exceed noise levels as prescribed in AS2107

3.3 Mechanical Services – Residential Option

3.3.1. Proposed Air Conditioning Systems

A water cooled VRF system is proposed for the building. The system shall be the heat recovery type which shall allow for simultaneous heating and cooling and provide heat recovery between the fan coil units.

Water cooled condensing units are connected to a central condenser water loop and shall reject the heat to the water loop during the cooling cycle and absorb heat from the water loop during the heating cycle. The temperature of the water loop shall be maintained between 15°C and 35°C. The heat rejection from the water loop shall be via closed circuit cooling towers located on the roof. It is proposed to use the natural gas fired boilers which shall provide domestic hot water heating and heating water for the condenser water loop. The boilers shall be located on the roof and be connected via a heat exchanger to the condenser water loop.

It is proposed to have separate condenser water loops for the high rise section of the building and the low rise section to limit the maximum hydrostatic pressure in the system. The water loops shall be separated using heat exchangers.

A power monitoring system shall be incorporated to enable the power usage of the individual apartments to be monitored.

Each apartment shall be provided with treated and filtered fresh air from the central Air Handling Unit's located within the low and high level plant rooms.

The outside air shall be reticulated to each floor via risers in the riser shafts.

Each apartment shall be air conditioned using direct expansion fan coil units located in the ceiling space and connect to ceiling or wall diffusers via sheetmetal and flexible ductwork. Each fan coil unit shall be connected via refrigeration pipework to the water cooled condensing units located in the core of each apartment level and provided with separate on/off and temperature controls.

3.3.2. Mechanical Ventilation Systems

Mechanical ventilation systems will be provided to the following areas:

- Car park levels
- OSD back of house areas
- Toilet and laundries in the public areas and apartments
- Kitchens in the apartments
- Loading dock
- Waste room
- Plant rooms
- Car lifts

3.3.3. Smoke Hazard Management

The smoke hazard management systems shall need to be confirmed as part of the Fire and Life Safety Report. The initial proposals for the smoke hazard management systems include the following:

- Stair pressurisation system serving each fire escape stair.
- Corridor exhaust system to exhaust the fire affected floor and the floor above the fire affected floor of the apartment levels using motorised smoke dampers in the ceiling level.
- Carpark exhaust system which operates to provide smoke exhaust

Stair pressurisation fans shall draw fresh air in from outside and discharge it into a vertical masonry riser adjacent to the staircase with discharge grilles at landing levels within the stairwell.

3.3.4. Building Management System

The building is to be provided with a Building Management System (BMS), which shall provide comprehensive building automation functionality available for use by the Facility Maintenance staff.

The system shall be based on the non-proprietary open industry protocol and network standards. Control and monitoring functions of the BMS shall be used to automatically control, monitor and provide alarms for all the building services.

3.4 Mechanical Services – Commercial Option

3.4.1. Proposed Air Conditioning Systems

The type of air conditioning system to serve the office levels will be reviewed as part of design development. The initial proposals are to use either a chilled water beam solution or a low temperature VAV system.

All options would include the provision of a central chilled water system comprising chillers located in a low level plant room connected to closed circuit cooling towers located at roof level. Chilled water would be reticulated to air handling units and chilled water beams where provided. Heating would be provided from natural gas fired boilers or heat pump chillers with heating water pipework reticulated to the air handling units.

The chilled water beam option would comprise the installation of chilled water beams in the office area connected to a secondary chilled water pipework network on all levels. Air handling units at roof level and low level would provide tempered ducted outside air to all levels.

The VAV option would comprise ducted air handling units located in plant rooms located at low level and roof level with supply and return air duct risers serving all levels. The office levels would be air conditioned using VAV boxes which can provide both cooling and heating.

3.4.2. Mechanical Ventilation Systems

Mechanical ventilation systems will be provided to the following areas:

- Car parks and bike parking areas
- OSD back of house areas
- Toilets in the public areas
- Loading dock
- Plant rooms
- Supplementary outside air and exhaust systems for tenant use

3.4.3. Smoke Hazard Management

The smoke hazard management systems shall need to be confirmed as part of the Fire and Life Safety Report. The initial proposals for the smoke hazard management systems include the following:

- Stair pressurisation system serving each fire escape stair.
- Zoned smoke control system to serve the office levels
- Carpark exhaust system from the car park areas

Stair pressurisation fans shall draw fresh air in from outside and discharge it into a vertical masonry riser adjacent to the staircase with discharge grilles at landing levels within the stairwell.

3.4.4. Building Management System

The building is to be provided with a Building Management System (BMS), which shall provide comprehensive building automation functionality available for use by the Facility Maintenance staff.

The system shall be based on the non-proprietary open industry protocol and network standards. Control and monitoring functions of the BMS shall be used to automatically control, monitor and provide alarms for all the building services.

4.0 Electrical and Communication Services

4.1 General

The general approach and design criteria for the electrical services are discussed in the following sections and comprises:

- M.V power distribution & substations;
- L.V power distribution;
- Tariff metering schemes;
- Indoor normal & emergency lighting;
- External lighting;
- Lighting control system;

- Earthing & lightning protection systems;
- Communications and data systems; and
- Electronic Security including CCTV.

Details are included for both the retail and commercial options.

4.2 Power Supply and Distribution

4.2.1. Origin of Supply

It is expected that the OSD shall be supplied by an Ausgrid substation fed from the CBD triplex system. However, at the time of writing of this brief Ausgrid had not confirmed the supply arrangement. In particular the Earthing and Bonding issues which may be prevalent with the Ausgrid substation being Earthed within the same structure as the Sydney Metro electrical distribution network shall need to be considered (also refer to Appendix C).

It is expected that the supply system shall be 400V, 3 phase 4 wire MEN system from a new Ausgrid chamber substation with a triplex (redundant 11kV supply) arrangement. The chamber substation is currently proposed to be an “upper level substation” as defined by Ausgrid Network Standards, located on level 2. A High Voltage Control Point chamber is proposed to be located on level 1 directly beneath the substation. Both the Control Point and Substation chambers are currently accessed via a dedicated stair with access directly to Pitt St. The High Voltage cable reticulation is currently proposed for connection to Pitt St via a dedicated riser on the Pitt St façade.

The customer connection point shall be the Low Voltage terminals of the 400V circuit breakers within the chamber substation.

4.2.2. Consumer’s Mains and Main Switchboard

Consumer’s mains dedicated to the OSD shall be provided from the Ausgrid substation to a main switchroom located on the sky lobby level 8. The rising submain shall generally reticulate and be accessible from the OSD core and plant areas. Consumer’s Mains shall have appropriate fire rating performance in accordance with AS3013 to satisfy AS3000.

The OSD Main Switchboard (MSB) shall be located within the main switchroom located on the sky lobby level, fire rated in accordance with NCC and AS3000 requirements, and shall distribute power as follows:

- A tenant’s side of the board shall provide supply to the apartments or commercial office via unmetered rising mains. The submains shall run into a dedicated electrical services riser. Power shall then be delivered to the customers via tee-off points and metering panels on each floor. Bulk metered tenants may be
- A house services section of the MSB shall be provided with dedicated supply authority metering. This shall supply all common general lighting and power for the building, including:
 - Common area lighting and power;
 - Carpark and ground floor lobby lighting and power;
 - Fire and safety services including lifts;
 - Hydraulics services and central plant (as required); and
 - House mechanical services and central plant (as required).

Due to the elevated location of the MSB and technical challenges in providing a dedicated Earth electrode for the OSD MSB MEN connection, it is proposed to utilise the substation Earth grid in accordance with AS 3000 section 5 Figure 5.2.

The location of all large load switchboards and rising mains should be considered for Electromagnetic radiation (EMR) compliance. In particular, the main switchboard, main electrical riser and mid-level main distribution board should be specifically assessed for EMR compliance with international guidelines.

4.2.3. Metering

Retail metering shall be provided as per Ausgrid requirements. Meter panels shall be located within the electrical riser cupboard on each floor for apartments or commercial tenants, and the main switchroom for house services.

The metering arrangement for the electric car recharge points located in the carpark areas has not been confirmed.

4.2.4. Lightning/Surge Protection

Lightning protection shall be provided in accordance with AS 1768 Lightning Protection. All lightning protection system elements located from below the sky lobby level, including down conductors, Earth electrodes and test points, shall be provided as part of the station construction. The OSD down conductors shall connect at the sky lobby level. At the time of writing this brief, it is unknown if the down conductors within the station structure shall be dedicated cables or utilise the column reinforcement.

4.2.5. 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. Any UPS requirements shall be provided integral or dedicated to the specific equipment if required.

4.2.6. General Power

Common Areas

House Distribution Boards shall be readily accessible in switchrooms, riser cupboards, or plant rooms specifically designed for the purpose. Outgoing circuits shall be protected by circuit breakers. General power requirements shall be coordinated with the architect including outlet types, mounting arrangements and reticulation details. Electric car recharging points shall be provided in the carpark. Cleaner's power outlets shall be provided along corridors at regular intervals. RCD protection shall be provided to all power circuits as required by AS 3000.

Tenancies or Apartments (as applicable)

Dedicated distribution boards shall be provided for each tenant/apartment. Distribution boards shall be located such that items cannot be stored in front of the distribution board as required by AS 3000. General power requirements shall be coordinated with the architect including outlet types, mounting

arrangements and reticulation details. RCD protection shall be provided to all power circuits as required by AS 3000.

4.2.7. Backup Power

As part of detailed design to implement the commercial office option, a backup power supply (diesel generator or similar) may be preferred. The generator, switchgear, and associated fuel system has not been included in the design at the time of writing this brief.

Backup Power is not proposed for the residential option.

4.2.8. Cable Reticulation

Where possible, all cabling shall be concealed within ceilings and wall cavities. Major submains from the MSB to risers within the building are to be via cable ladder. Risers have been provided for:

- Apartment / Tenant Rising mains and house services cabling;
- Essential services riser for the reticulation of lift rising mains, and
- Dedicated communications riser for accommodation of:
 - Communications backbone cabling and NBN distribution equipment
 - Foxtel/Free to Air (FTA) Cabling; and
 - Distributed Antenna System (DAS) Cabling.

Sufficient detail shall be provided on the electrical documentation to adequately capture intended cable reticulation methods.

4.3 Lighting

4.3.1. Common Area 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, marketing drawings and inclusions lists, and shall be designed to suit each particular area.

Carpark lighting to be installed to provide levels compliant with AS 1680.1.

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 inclusions list.

4.3.2. Common Area Lighting Controls

Lighting controls shall be provided throughout the project in accordance with NCC requirements for energy efficiency (Section J). Compliance with these requirements shall typically dictate the need to incorporate a level of automatic, occupancy based control into the system as described below.

Car parks, including lift lobbies and garbage enclosures

Lighting shall be controlled by occupancy sensor. Lighting shall operate upon sensing motion and switch off lighting when no movement is sensed after 15 minutes. Allow for a minimum of one luminaire in the garbage enclosure and lift lobbies to remain operational for 24 hours per day to ensure that occupants do not enter the space in complete darkness.

Corridors, including the main lobby

Lighting shall be controlled by occupancy sensor or timeclock. Lighting shall operate upon sensing motion and switch off lighting when no movement is sensed after 20 minutes. Allow for a minimum of one luminaire in three in the corridors and main lobby to remain operational for 24 hours per day to ensure that occupants do not enter the space in complete darkness.

Lighting within the gym, pool and common area

Lighting shall be controlled by occupancy sensor. Lighting shall operate upon sensing motion and switch off lighting when no movement is sensed after 30 minutes. Allow for a minimum of one luminaire in three in the gym and common area to remain operational for 24 hours per day to ensure that occupants do not enter the space in complete darkness.

External lighting about the site (not apartment external lighting)

Lighting shall comply to the requirements of Section J Clause 6.3 of the NCC 2016. The lighting shall be Photoelectric (PE) controlled to operate from sunset to sunrise.

4.3.3. Apartment Interior Lighting (as applicable)

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:

- Maintained average of 160 lux, within living rooms, bedrooms and dining areas at floor level; and
- Kitchen and vanity benchtops to a maintained average of 240 lux, measured at bench height, with floor lighting levels within these areas a maintained level of 160 lux
- Wall washing or wall mounted fittings shall be provided in the living areas, kitchens and bedrooms.

4.3.4. Lighting Controls

Lighting controls shall be provided throughout in accordance with NCC requirements for energy efficiency (Section J). Manual switching with the option of remote operation shall be provided in all areas. Two way switching should be investigated for large areas with multiple entries/exits.

4.3.5. Emergency Lighting

Emergency lighting and exit signage shall be provided in accordance with the NCC and AS 2293, and shall typically be recessed (or surface mount as applicable) LED, non-maintained (Spitfire) type emergency lights. The emergency and exit lighting system shall utilise a computer monitored system for testing purposes.

4.4 Data/Communications

4.4.1. General

Lead-in conduit shall be provided from Pitt St, below the OSD ground floor lobby, to the sky lobby level 8. The lead-in cables shall be installed in a dedicated cable containment system compliant with NBN requirements and should generally reticulate and be accessible from the OSD core. A dedicated communications room shall be provided on the sky lobby level for dedicated use by the OSD.

NBN Co compliant infrastructure shall be provided to the apartments or tenancies and throughout the site (including conduit paths, communications tray and provision for power and spatial requirements within the communications room and apartments).

As part of detail design to implement the commercial office option, a secondary diverse lead-in/communications room/data riser may be preferred. The diverse route and facilities has not been included in the design at the time of writing this brief.

4.4.2. NBN Co provisions

Provision of NBN Co infrastructure shall require the following:

- Supply and installation of lead in conduit into the communications room (as described above);
- Supply and installation of cable tray within the basement to the communications riser in coordination with other services and structures;
- Provision for power and space within the communications room for the NBN Co Fibre Distribution Hub (FDH);
- Supply and installation of cable tray shall be located within the communications riser cupboard on each floor for residential apartments/tenancy;
- Provisions of power and space within the communications riser on each floor for the NBN Co Fibre Collector Distributer (FCD) and Fibre Distribution Terminal (FDT);
- Provision for power and space within each apartment (where applicable) for the NBN Co Network Termination Device (NTD); and
- Supply and installation of minimum 23mm internal diameter communications conduit from the communications riser to the nominated NTD location within each apartment (where applicable).

4.4.3. House Services Communications

House services dial facilities shall be provided for lifts, the Fire Indicator Panel (FIP), and other safety services as required. Dedicated NBN NTD devices may be required, and shall be located in the OSD main communications room located on the sky lobby level.

A dedicated house communications server and NBN service is proposed to facilitate house requirements such as concierge communications requirements and booking systems. It is proposed to locate the house communications server in a dedicated house services communications room on the sky lobby level, which would also contain the OSD security head end infrastructure. The house services communications room would be separate to the main building communications room.

Communications outlets shall be located as required for house equipment and connected to the house services communications rack.

4.4.4. Apartments

Each apartment shall be provided with a Class E (4 pair Category 6 cable) horizontal cabling, terminated back to a local distributor within each apartment. Each apartment shall be provided with space for the NBN NTD and an adjacent local distributor. Data outlets shall be supplied and installed within the apartment, in locations nominated within the inclusions list connected to the local distributor.

4.4.5. Distributed Antenna System (DAS)

A Distributed Antenna System (DAS) shall be provided to enhance indoor mobile coverage and capacity management using spatially separated antennas distributed throughout the OSD areas including plant, lobbies and common areas.

The DAS must be designed in accordance with the Mobile Carriers Forum (MCF) specification which can be found at <http://www.mcf.amta.org.au> with the following key principles in mind:

- Provide enhanced coverage, and a consistent user experience within the target coverage area;
- Provide dominant coverage within the target area to avoid unnecessary hand-off's and/or interference to/from the rest of the network;
- Provide sufficient capacity for the size of the building and expected occupancy;
- The DAS must be engineered to allow in interference-free operation between the Sharing Carriers;
- The DAS design must provide for inter-operability with each of the Sharing Carrier's macro networks; and
- The DAS must be operated in accordance with ACMA licence conditions

4.5 MATV System

A MATV system shall be provided throughout the building which enables occupants to utilise either Free to Air (FTA) or Foxtel Satellite television services. FTA/Foxtel outlets shall be installed in locations nominated within the inclusions list, and connected back to a unified FTA/Foxtel MATV system, including multi-taps, splitters and rising mains cabling up to amplifiers within the top of the communications riser shaft. Foxtel compliant satellite dish and Digital FTA antennas are to be located on the roof.

4.5.1. CCTV Integration

Connection of select CCTV feeds from about the entries of the building shall be patched into the MATV head end unit. Vision from the CCTV system shall be available via a dedicated FTA channel.

4.6 Electronic Security and Access Control

An access control and CCTV system shall be provided for the OSD as described in the following sections.

4.6.1. OSD Access Control and Intrusion Detection System

This system shall control and monitor primary access into the OSD, including main doors, car park and plant areas. Access to areas required by utility providers and authorities (ie. Ausgrid, Sydney Water, Jemana and F&R NSW) shall be in accordance with the individual requirements.

The system shall integrate, monitor and control:

- Access to the street doors, lobby doors and car parks, via proximity based key fob system;
- Access to plant areas via authorized key fobs only;
- Operation of the lifts (including car lift) to allow access to the lift from authorized key fobs only; and
- Allow, from the same key fob, residence owners to operate remotely the entry roller door and boom gate into the shared loading dock;

The number of key fobs to be provided is to be specified by the Superintendent. All doors (unless specified otherwise) with mechanical free handle egress.

The Access Control System shall provide a high level interface with the BMS such that all alarms and entry requests can be utilised by the BMS and displayed at the BMS user interface.

The development Access Control and Intrusion Detection System shall have the ability to be expandable to receive independent alarms from any future private apartment security systems.

4.6.2. Intercom and Remote Door Release System

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

Handset monitor stations in each apartment with the ability to remotely release the external doors required to access the apartment. This shall also include remote access to the required lift services;

- The panel located at the front door shall have the ability to page any of the handsets within the apartments;
- Monitor stations within each apartment shall only be able to provide remote door release to the external doors and lifts required to access the apartment; and
- 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.

4.6.3. Closed Circuit TV (CCTV) System

A digital CCTV System as is to be provided for the development comprising:

- Video Management and Recording System;
- Equipment Rack Cabinet;
- IP Cameras;
- Signage; and
- Power Supplies.

Output from the video management and recording system shall be patched onto the MATV system, to enable occupants to view select cameras from a nominated television channel. The security head end equipment is proposed to be located in a dedicated house services communications room on the sky lobby level.

5.0 Hydraulic Services

5.1 General

The general approach and design criteria for the hydraulic services are discussed in the following sections and comprise:

- Domestic water supply and distribution;
- Water supply metering system;
- Hot water system;
- Sanitary plumbing and vent drainage systems;
- Roof water drainage systems;
- Recycled water (rainwater) treatment, supply and drainage systems for landscape system;
- and

- Gas supply and metering.
- Acoustic insulation to all pipework, including bracketing, separation between structure and acoustic insulation.

5.1.1. Backflow Prevention

The OSD 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.

5.2 Rainwater Collection

The design of the rainwater collection system will be independent from the use of the building.

5.2.1. Rainwater Collection and Drainage

The building has frontage to stormwater pipes in Bathurst Street and Pitt Street.

The building's stormwater system shall discharge to the Pitt Street stormwater system and the Bathurst Street stormwater system strictly in accordance with the Council's stormwater discharge requirements, as outlined in the Flood Assessment and Stormwater Management Plan, refer to Appendix Q.

Stormwater discharge flow from the site shall be restricted to a maximum allowable flow in accordance with Sydney Water requirements. Any additional flow shall be retained on site by means of appropriately sized Onsite Detention Tanks.

The roof rainwater collection and drainage system shall be designed to comply with the Deemed to Satisfy Provisions (DTS) of AS/NZS 3500.3.

If a non-DTS solution is proposed, it shall be prepared as an Alternative Solution. This shall be presented formally to the satisfaction of the Principle Certifying Authority and referenced in the Building Occupancy Certificate. The documentation issued by Fair Trading NSW for sanitary plumbing non-DTS systems shall be used as a guideline for the nature and presentation of the Alternative Solution.

Roof water shall be collected and treated for re-use, such as irrigation or wash-down.

Roof rainwater from the OSD shall be collected via roof outlets into downpipes and discharge into a rainwater collection tank (retention) before flowing into the detention tank.

Surface drainage and balcony drainage shall not be collected for re-used and discharge directly into detention tanks.

The detention tanks shall be located on Level 7 and Level 2 & Level 3 and shall be designed to accommodate the calculated stormwater flow in combination with the maximum allowable discharge. Each detention tank shall include an overflow allowing to fully by-pass the tank in case of a blockage. The by-passing and freely overflowing stormwater shall not damage the building in any way.

5.2.2. Balcony Drainage

The balconies rainwater and other surface drainage shall be collected via rainwater outlets into down pipes (separate to the roof water downpipes) and discharge into the two detention tanks on level 7.

From the detention tanks it will join the overall stormwater system as per the Flood Assessment and Stormwater Management Plan, refer to Appendix Q.

5.2.3. Landscaped Area

Rainwater from landscape areas, planter beds and the podium surfaces (installed as part of the plumbing scope of work) shall be collected to discharge into the detention tanks from which it flows to the Council/Sydney Water stormwater drainage system.

The quality of the discharging rainwater discharge shall be within the requirements of Sydney Water.

5.3 Natural Gas

The OSD has frontage to a 110mm, 7kPa gas main located in Pitt Street. There is also a secondary gas main (1050 kPa) located in Elizabeth St (one block away).

Responsibility for all liaison, application and approvals for connection rests with the successful developer/builder.

Upon suitable notification and application, the local Gas Authority shall advise to which gas main and pressure the building shall connect to.

Natural gas within the OSD shall be installed to provide primary energy to hydraulic and mechanical services boilers. It is also envisaged to provide gas to cook tops in each apartments.

A regulator set shall be installed on ground floor of the building. The gas regulator room shall also be ventilated to code requirements. If natural ventilation of the regulator set is not possible mechanical ventilation of the regulator room will be required.

Individual gas meters for each apartment shall be installed in dedicated identified enclosures to satisfy the requirements of the gas supplier and applicable to Health and Workspace regulations.

The enclosures and access covers shall be suitably durable, match the adjoining finishes and shall be located in common area of each level. Gas meters in plant rooms for central plant equipment shall be installed in a fire rated meter room and ventilated as required.

The gas system shall not encroach upon the station envelope.

Unventilated rooms containing gas pipework shall be fitted with gas detectors.

5.4 Hydraulic Services – Residential Option

5.4.1. Domestic Water System – Residential Option

Flow Rates

The fixtures listed in Table 2 are low water consumption types and selection has been based on sustainability criteria by the Interior Designer.

Table 2: Flow rates - residential

Shower Heads	7.5 l/min ⁽⁺⁾	Aerators	Single Leaver Mixer temperature limitation to 50°C by means of Thermostatic Mixing Valve
Hand Basin	4.0 l/min	Aerators	Single Leaver mixer temperature limitation to 50°C by means of Thermostatic Mixing Valve
WC	4.5/3 l flush	-----	Cistern
Bath Tub	12.0 l/min	Aerators	Single leaver mixer and Hand Shower Rose temperature limitation to 50°C by means of Thermostatic Mixing Valve
Kitchen Sink	9.0 l/min	Aerators	Single leaver mixer

(+) 9 l/min for shower heads in penthouse apartments

Allowable Water Pressure at Sanitary Fixtures

The allowable residual water pressures at inlet to sanitary fixtures are listed in Table 3.

Table 3: Allowable water pressures - residential

Fixtures	kPa (residual pressure)	
	Min.	Max.
Highest Plumbing Fixture	300*	500
Lowest Plumbing Fixture	300*	500
Mechanical Equipment	200*	500*

(*) or as required for the equipment to operate in a safe, quit and efficient manner

Water Metering

The following strategy shall be applied for water metering system, in accordance with the Sydney Water Multi-Level Individual Metering Guide current at time of design:

- One master water meter (Sydney Water meter) for the building shall be provided.
- All apartments shall be provided with individual cold water meters.
- All apartments shall be provided with individual hot water meters. The individual hot water meter shall be installed next to the individual cold water meter serving that apartment.
- All meters shall use wireless, automated metering solutions to manage the meter readings from the master meter and the individual unit systems.

- An Advanced Metering Infrastructure (AMI) metering system shall transmit individual meter reading data directly to Sydney Water using the mobile phone network.
- Meters shall be Sydney Water approved and must be sourced from the same accredited Metering Supplier.
- All individual meters shall be readily accessible within a dedicated meter cupboard and are to be located in a common space. They shall also be connected to the BMS system for leak detection.
- Additional individual water meters shall be installed for water usages such as retail areas, irrigation system, swimming pool, water fountain, cooling towers, plant rooms and the like.
- All individual water meters shall be connected to the BMS for recording, monitoring and leak detection.

Domestic Cold Water

The site has frontage to two DN 250 Sydney Water water mains located in Pitt Street. Responsibility for all liaison, application and approvals for connection rests with the successful developer/builder.

Upon suitable notification and application by the successful developer/builder Sydney Water shall indicate, which main shall provide cold water to the site. A new DN150 domestic water connection to the existing water main shall be required.

Additionally, a new DN150 fire service water connection will be required to supply the OSD fire system. The firewater connection to the water main will require a backflow prevention device to Authority requirements.

A new domestic water Sydney Water meter assembly complete with backflow prevention shall be installed for the OSD building in a designated area on ground floor or the level below. The cold water reticulation of the building shall satisfy the following parameters:

- Minimum 300kPa outlet pressure to apartments (at most disadvantaged fixture);
- Minimum 200kPa outlet pressure to other equipment;
- Maximum 500kPa outlet pressure; and
- Maximum system velocity of 1.8 m/sec.

The domestic cold water system shall be designed to comply with AS/NZS3500.1.

The domestic water system shall be zoned to result in an acceptable range of pressures at taps within apartments.

Water pressure shall be regulated within the design range by a combination of water storage, pumping and pressure reducing valves. To ensure equal residual water pressure of cold water and hot water at outlets and taps the cold water system shall follow in principle the pipe route of the hot water system. Refer to Section Domestic Hot Water.

Water pressure in the building shall be maintained by a pump set, pumping water to the top of the building and from there cold water shall be fed downwards, and installed immediately beside and following the hot water pipework. The pump set shall service the all levels between the Sky Lobby and

the plant room. The pump set shall have a break tank upstream of the pump set. The booster pumps shall have flooded suction to the level recommended by the pump manufacturer.

A stainless steel break tank shall be designed to approximately 1 hour storage capacity. This volume shall allow regular water turn over and minimum stagnation time. Each water storage tank shall be fully insulated to keep the water cool during summer months. Additional UV circulation (in a circulation system incorporating a self contained pipework system within the stored water in the tank) shall be provided to maintain water quality.

The incoming supply to the building shall incorporate a dual automatic water filtration system (backwash) with 50% capacity of each filtration system.

Domestic cold water shall be extended to all water consuming fixtures, fittings, plant and equipment throughout the OSD. These shall include, though not be limited to:

- Amenity fixtures and fittings;
- Hose taps;
- Hot water plant;
- Make-up supply to Mechanical services equipment;
- Make-up supply to recycled rainwater systems if required;
- Make-up supply to fire water tanks; and
- Water supply to fire hose reel system.
- Water supply to carwash area

All tapware shall meet 4 Stars performance specifications under the WELS rating scheme.

The cold water system shall incorporate stop valves and individual meters, located in readily accessible locations, to enable individual areas to be isolated for maintenance purposes without affecting supply to other areas. Isolation valves and equipment shall be installed in a location that is considered safe under the Workplace Health and Safety Regulation.

All cold water pipework shall be insulated to keep the domestic water temperature cool during summer months. The cold water pipework insulation shall have the same thermal performance than the hot water insulation and shall be installed with a continuous vapour barrier.

Water supply pipework for an apartment shall not pass through any other apartment.

Domestic Hot Water

- The domestic hot water system shall consist of calorifier type water heaters, fed by a bank of condensing boilers, located in the roof plant room and connected to the calorifiers via a primary heating water loop.
- This system has been chosen in lieu of individual water heating systems, which would take up valuable floor space in each apartment.
- Domestic hot water pipework shall direct hot water from the hot water system downwards to the apartments, installed immediately beside and following the cold water pipework. Pressure reducing valves shall be installed to limit the water pressure to a pressure as stated in Table 3: Allowable water pressures. Water pressures and flows shall be equal at each sanitary fixture that is provided with hot and cold water outlets, mixed or single.

- Each apartment shall have a hot water meter located next to the Authority cold water meter in the common area. Both meters shall be connected to the BMS system of the building and have isolation valves upstream and downstream of each meter.
- At the base of the hot water dropper a hot water circulation pump set shall provide constant hot water supply at the required temperature.
- For energy efficiency the circulation pump set shall have a variable speed drive and shall reduce the circulated hot water flow in times of higher demand.
- The hot water system (including hot water return pipework) shall be insulated to reduce energy loss and to maintain a hot water return temperature of 50C below the domestic hot water flow temperature.

5.4.2. Sanitary Plumbing – Residential Option

The building has frontage to a DN 300 and DN 225 sewer main located in Pitt Street.

Responsibility for all liaison, application and approvals for connection rests with the successful developer/builder.

Upon suitable notification and application Sydney Water shall indicate to which main the OSD shall be connected to.

The sanitary plumbing system that serves the apartments within the building shall be a reduced velocity aerator stack system (Geberit Sovent or equal) designed within the limits of AS/NZS3500.3-2015 section 11. Alternative drainage systems, strictly within the limits of AS/NZS 3500.2-2015 Deemed to Satisfy provision, (fully vented modified system) may be used.

Sanitary waste shall gravitate from apartment fixtures through the sanitary plumbing stack work before offsetting and draining to the Sydney Water sewer.

Sanitary drainage pipework for an apartment shall not pass through any other apartment, other than a bathroom ceiling or similar wet area ceiling, or a vertical dedicated accessible hydraulic duct.

5.4.3. Trade Waste

The OSD shall be provided with a car wash facility on the car park level. A trade waste pre-treatment system, designed to comply with Sydney Water trade waste guidelines, shall be installed to pre-treat drainage water from the car wash area before discharging to the sanitary drainage system. There is no requirement for trade waste drainage for the residential tower.

5.5 Hydraulic Services – Commercial Option

5.5.1. Domestic Water System – Commercial Option

Flow Rates

The fixtures listed in Table 4 are low water consumption types and selection has been based on sustainability criteria by the Interior Designer.

Table 4: Flow rates - commercial

Shower Heads	7.5 l/min(+)	Aerators	Single Leaver Mixer temperature limitation to 50°C by means of Thermostatic Mixing Valve
Hand Basin	4.0 l/min	Aerators	Single Leaver mixer temperature limitation to 50°C by means of Thermostatic Mixing Valve
WC	4.5/3 l/ flush	-----	Cistern
Kitchen Sink	9.0 l/min	Aerators	Single leaver mixer

Allowable Water Pressure at Sanitary Fixtures

The allowable residual water pressures at inlet to sanitary fixtures are listed in Table 5.

Table 5: Allowable water pressures - residential

Fixtures	kPa (residual pressure)	
	Min.	Max.
Highest Plumbing Fixture	300*	500
Lowest Plumbing Fixture	300*	500
Mechanical Equipment	200*	500*

(*) or as required for the equipment to operate in a safe, quit and efficient manner

Water Metering

The following strategy shall be applied for water metering system, in accordance with the Sydney Water Multi-Level Individual Metering Guide current at time of design:

- One master water meter (Sydney Water meter) for the building shall be provided.
- Every level shall be provided with individual cold water meters.
- Every level shall be provided with individual hot water meters. The individual hot water meter shall be installed next to the individual cold water meter serving that level.
- All meters shall use wireless, automated metering solutions to manage the meter readings from the master meter and the individual unit systems.
- An Advanced Metering Infrastructure (AMI) metering system shall transmit individual meter reading data directly to Sydney Water using the mobile phone network.
- Meters shall be Sydney Water approved and must be sourced from the same accredited Metering Supplier.

- All individual meters shall be readily accessible within a dedicated meter cupboard and are to be located in a common space. They shall also be connected to the BMS system for leak detection.
- Additional individual water meters shall be installed for water usages such as retail areas, irrigation system, swimming pool, water fountain, cooling towers, plant rooms and the like.
- All individual water meters shall be connected to the BMS for recording, monitoring and leak detection.

Domestic Cold Water

The site has frontage to two DN 250 Sydney Water water mains located in Pitt Street.

Responsibility for all liaison, application and approvals for connection rests with the successful developer/builder.

Upon suitable notification and application by the successful developer/builder Sydney Water shall indicate, which main shall provide cold water to the site. A new DN100 domestic water connection to the existing water main shall be required.

Additionally, a new DN150 fire service water connection will be required to supply the OSD fire system. The firewater connection to the water main will require a backflow prevention device to Authority requirements.

A new domestic water Sydney Water meter assembly complete with backflow prevention shall be installed for the OSD building in a designated area on ground floor or the level below. The cold water reticulation of the building shall satisfy the following parameters:

- Minimum 300kPa outlet pressure to apartments (at most disadvantaged fixture);
- Minimum 200kPa outlet pressure to other equipment;
- Maximum 500kPa outlet pressure; and
- Maximum system velocity of 1.8 m/sec.

The domestic cold water system shall be designed to comply with AS/NZS3500.1.

The domestic water system shall be zoned to result in an acceptable range of pressures at taps within apartments.

Water pressure shall be regulated within the design range by a combination of water storage, pumping and pressure reducing valves. To ensure equal residual water pressure of cold water and hot water at outlets and taps the cold water system shall follow in principle the pipe route of the hot water system. Refer to Section Domestic Hot Water.

Water pressure in the building shall be maintained by a single pump set, pumping water to the top of the building and from there cold water shall be fed downwards, and installed immediately beside and following the hot water pipework. The pump set shall have a break tank upstream of the pump set. The booster pumps shall have flooded suction to the level recommended by the pump manufacturer.

A stainless steel break tank shall be designed to approximately 1 hour storage capacity. This volume shall allow regular water turn over and minimum stagnation time. Each water storage tank shall be fully insulated to keep the water cool during summer months. Additional UV circulation (in a circulation

system incorporating a self-contained pipework system within the stored water in the tank) shall be provided to maintain water quality.

The incoming supply to the building shall incorporate a dual automatic water filtration system (backwash) with 50% capacity of each filtration system.

Domestic cold water shall be extended to all water consuming fixtures, fittings, plant and equipment throughout the OSD. These shall include, though not be limited to:

Amenity fixtures and fittings;

Hose taps;

- Hot water plant;
- Make-up supply to Mechanical services equipment;
- Make-up supply to recycled rainwater systems if required;
- Make-up supply to fire water tanks; and
- Water supply to fire hose reel system.
- Water supply to carwash area

All tapware shall meet 4 Stars performance specifications under the WELS rating scheme.

The cold water system shall incorporate stop valves and individual meters, located in readily accessible locations, to enable individual areas to be isolated for maintenance purposes without affecting supply to other areas. Isolation valves and equipment shall be installed in a location that is considered safe under the Workplace Health and Safety Regulation.

All cold water pipework shall be insulated to keep the domestic water temperature cool during summer months. The cold water pipework insulation shall have the same thermal performance than the hot water insulation and shall be installed with a continuous vapour barrier.

Domestic Hot Water

The domestic hot water system shall consist of calorifier type water heaters, fed by a bank of condensing boilers, located in the roof plant room.

A single domestic hot water system shall be located on the roof level to service all office levels. The central hot water system shall have sufficient capacity for the End of Trip facility.

Domestic hot water pipework shall direct hot water from the hot water system downwards to each level, installed immediately beside and following the cold water pipework. Pressure reducing valves shall be installed to limit the water pressure to a pressure as stated in Table 5. Water pressures and flows shall be equal at each sanitary fixture that is provided with hot and cold water outlets, mixed or single.

Each level shall have a hot water meter located next to the Authority cold water meter. Both meters shall be connected to the BMS system of the building and have isolation valves upstream and downstream of each meter.

At the base of the hot water dropper a hot water circulation pump set shall provide constant hot water supply at the required temperature.

For energy efficiency the circulation pump set shall have a variable speed drive and shall reduce the circulated hot water flow in times of higher demand.

The hot water system (including hot water return pipework) shall be insulated to reduce energy loss and to maintain a hot water return temperature of 5°C below the domestic hot water flow temperature.

5.5.2. Sanitary Plumbing – Commercial Option

The building has frontage to a DN 300 and DN 225 sewer main located in Pitt Street.

Responsibility for all liaison, application and approvals for connection rests with the successful developer/builder.

Upon suitable notification and application Sydney Water shall indicate to which main the OSD shall be connected to.

The sanitary plumbing systems that serve the levels within the building shall be a reduced velocity aerator stack system (Geberit Sovent or equal) designed within the limits of AS/NZS3500.3-2015 section 11. Alternative drainage systems, strictly within the limits of AS/NZS 3500.2-2015 Deemed to Satisfy provision, (fully vented modified system) may be used.

Sanitary waste shall gravitate from apartment fixtures through the sanitary plumbing stack work before offsetting and draining to the Sydney Water sewer.

5.5.3. Trade Waste – Commercial Option

The OSD shall be provided with a car wash facility on the car park level. A trade waste pre-treatment system, designed to comply with Sydney Water trade waste guidelines, shall be installed to pre-treat drainage water from the car wash area before discharging to the sanitary drainage system. There is no requirement for trade waste drainage for the residential tower.

6.0 Fire Services

6.1 General

The design of the fire services system of the proposed OSD will not change based on the usage (commercial or residential) of the building.

The general approach and design criteria for the fire protection services for the OSD are discussed in the following sections and comprise:

- Combined automatic fire sprinkler and hydrant system;
- Fire hose reels in non-residential areas;
- Portable fire extinguishers;
- Detection and evacuation systems;
- Gaseous fire suppression system within the substation;
- A Fire Control Room (FCR).

6.2 Combined automatic fire sprinkler and hydrant system

The OSD shall be protected by a combined sprinkler and hydrant system as stipulated under AS 2118.6. This system shall have the following firefighting elements:

- The fire sprinkler/hydrant system shall be installed as a ring main. In order to maintain maximum allowable pressure, the ring main shall be split into 50m pressure zones.
- Subject to advice regarding available water pressure and flow of the water main from Sydney Water it has been assumed to that there is a maximum available flow of about 25L/s.
- Fire brigade booster assembly at street level with booster ports for each pressure zone. The Fire brigade booster assembly shall be installed in view of the building entrance.
- Relay diesel pumps for pressure zones that are outside of what can be boosted by the local fire brigade (generally >50m height).
- The relay pumps shall be in Level 1 with direct access to a fire isolated stair. The relay pumps shall be compression ignition type (diesel).
- Water storage shall be located on the top level to provide firefighting water for the combined fire sprinkler/hydrant system.
- Fire pumps (diesel-electric) for each pressure zone shall be installed next to the fire storage tank.
- The fire system pump set shall be of the electric driven type including 100% back up capacity of the compression ignition type (diesel).
- Automatic wet fire sprinkler systems throughout the building.
- Fire sprinkler control assemblies shall be installed on each floor and shall be located with a fire isolated stair.
- Fire hydrants in all building exit passages, in fire staircases, and where required to provide hydrant coverage within each portion of the building.
- A fire water top up pump will be required. This top-up pump set (electric plus compression ignition type), located on the lowest car park level above ground shall pump firefighting water (maximum allowable flow) to the fire storage tanks on top floor level.
- Fire hydrants shall be installed in fire isolated exits and on the floor plate where required to provide hydrant coverage for each floor.

6.3 Fire Hose Reel System

Under National Construction Code (NCC) fire hose reels are not required for the residential portion of the building. All areas that are not part of the residential area (e.g. Sky Lobby, car park, plant rooms, bar, office space etc) shall be protected by fire hose reels in accordance with AS 2441-2003.

6.4 Portable Fire Extinguishers

Portable fire extinguisher shall be provided throughout the building in accordance with the hazards present as required by AS 2444. In general fire extinguishers shall be provided in close proximity to electrical cupboards, in switch rooms and plant rooms.

6.5 Gaseous Fire Protection (Carbon dioxide – CO₂)

The Ausgrid substation shall be protected with a CO₂ gas system, which allows CO₂ gas injection by the fire brigade from street level as outlined by the 'Construction design requirements for chamber substations' NS113. A connection box shall be provided next to the booster valve assembly on the outside face of the building wall for this purpose.

6.6 Fire Detection Systems

Analogue addressable fire detectors shall be installed throughout the building as required by AS 1670.1 and connected to a Fire Indicator Panel (FIP).

The FIP shall be analogue, addressable and shall be located in the building Fire Control Room (FCR) with direct street access. The FIP shall be capable of interfacing/networking with the other building services such as mechanical services, electrical services, vertical transportation and security services. The FIP shall be linked to the local Fire Brigade via an Alarm Signalling Equipment (ASE).

A fire fan control panel incorporating all smoke fan controls shall be integrated within the FIP. The OSD FIP shall also have an interface with the Station FIP such that a fire event in the Station can be acknowledged and alarmed throughout the OSD as deemed appropriate. As the Station FIP will be located in the Pitt St North development it is considered that this shall be done over a fire rated fibre optic link.

Additional Mimic panels shall be located at the main entrance of the OSD, at street level and at the Sky Lobby.

6.7 Building Occupant Warning System

Emergency warning speakers shall be installed throughout the building and connected to Emergency Warning and Intercommunication System (EWIS) controlled from a panel located next to the FIP and powered by a permanently –wired 240Volt power system.

Warden intercommunication phones (WIP) shall be installed on each level and close to exit doors in each fire zone in accordance with AS 1670.4. They shall be connected to the EWIS. Manual call points (break glass alarms) shall be provided throughout the building.

The EWIS alert and evacuation tones shall be performed in an automatic evacuation cascade sequence whereby areas in immediate danger are evacuated first, and escalated throughout the building until the whole building is evacuated in an orderly manner.

6.8 Fire Control Room

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

7.0 Pool system

7.1 General

The residential option for the OSD shall house a swimming pool on Level 8.

The general approach and design criteria for the pool system are discussed in the following sections and comprise:

- Filtration system
- Disinfection system
- Chemical dosing
- Heating system

7.2 Pool System

The pool hydraulic system shall be an automatic system with minimal operator input required and be capable to be monitored by the BMS system.

The pump filtration system, chemical dosing and disinfection shall be an automated system. Operator input shall be required for backwashing of the filtration system. Remote monitoring of the pool systems shall be provided.

The overflow of the pool and filtration back wash water shall discharge to the sanitary plumbing system.

7.3 Filtration system

High-rate sand filters shall be adopted for the filtration system. Whilst there are a number of alternates, sand filters are a cost effective option that require minimal maintenance and are easy to operate. Conventional sand filters are adopted in the majority of public pools, with these filters well known to pool operators.

7.4 Disinfection system

Calcium hypochlorite system shall be adopted for the pool disinfection system. The system generates a calcium hypochlorite solution from granulated dry chemical. These systems requires a smaller footprint than typical liquid chlorine disinfection and mitigate the transport and handling of sodium hypochlorite (liquid chlorine).

Typically, commercial pools are disinfected by dosing of liquid chlorine (sodium hypochlorite). However, for the OSD pool it has not been deemed feasible as liquid chlorine would have be delivered to site in a chemical tanker and pumped to the storage vessel. Based on the propose layout of the plant room (Level 8) this cannot be achieved.

7.5 Chemical dosing

The pool shall be automatically dosed to control the pH level of the pool. Storage of the chemical shall be allowed for in the plant room set out. The pool water quality shall be maintained as outlined in HB241 and Public Swimming Pool and Spa Pool Advisory Document.

7.6 Heating system

The pool shall have a heating system to ensure usage throughout the year. The heating system shall be of the standalone type so that it can operate independently from other OSD building services for ease of maintenance cost metering. The pool shall be heated through a heat pump system. A well ventilated area is required for the pool heat pump to operate efficiently and as desired.

8.0 Conclusion

Based on preliminary consultation between Sydney Metro and the relevant Utility Services Providers, it is believed that, after the proposed Ausgrid upgrades identified in this report, there will be sufficient capacity in the existing infrastructure to accommodate either of the proposed indicative OSD Design Options. As per the specific requirements of individual Utility Services Providers, the developer of the OSD will be required to undertake more detailed enquiries and arrange for final connections and associated approvals based on the final design.

Appendix A – Sydney Water

Feasibility Letter, dated 6/11/2017

6 November 2017

TRANSPORT FOR NSW
c/- WARREN SMITH & PARTNERS PTY LTD

FEASIBILITY LETTER

Developer: TRANSPORT FOR NSW
Your reference: 5694000
Development: 300 PITT ST, Sydney being Lot 1 DP436359, Lot 1 DP60293, Lot 1 DP59101, Lot 1 DP68635, Lot 1 DP229635, Lot 2 DP900055, Lot 3 DP74952, Lot 1 DP74367, Lot 1 DP982663, Lot 2 DP982663, Lot 2 DP509611, Lot 3 DP61187, Lot 1 DP62688, Lot 1 DP596474, Lot 17 DP1095869, Lot CP SP68274
Development Description: Construction of Metro Station on **Pitt Street** for Sydney Metro.
Your application date: 25 August 2017

Dear Applicant

Thank you for providing us with the opportunity work with you on the concept design for the construction of Pitt Street Station as a part of the Sydney Metro. This Feasibility Letter (Letter) is a guide only. It provides general information about what Sydney Water's requirements may be when you apply to us for a Section 73 Certificate (Certificate) for your proposed development. **The information is accurate at today's date only.**

When you obtain development consent for this development we will require you to apply to us for a Section 73 Certificate. You will need to submit a new application (and pay another application fee) to us for that Certificate by using your current or another Water Servicing Coordinator (Coordinator).

Sydney Water will then send you either a:

- Notice of Requirements (Notice) and Developer Works Deed (Deed) or
- Certificate.

These documents will be the definitive statement of Sydney Water's requirements.

There may be changes in Sydney Water's requirements between the issue dates of this Letter and the Notice or Certificate. The changes may be:

- if you change your proposed development eg the development description or the plan/site layout, after today, the requirements in this Letter could change when you submit your new application; and
- if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.

What You Must Do To Get A Section 73 Certificate In The Future.

To get a Section 73 Certificate you must do the following things. You can also find out about this process by visiting www.sydneywater.com.au > Plumbing, building & developing > Developing > Land development.

- 1. Obtain Development Consent from the consent authority for your development proposal.**
- 2. Engage a Water Servicing Coordinator (Coordinator).**

You must engage your current or another authorised Coordinator to manage the design and construction of works that you must provide, at your cost, to service your development. If you wish to engage another Coordinator (at any point in this process) you must write and tell Sydney Water.

For a list of authorised Coordinators, either visit www.sydneywater.com.au > Plumbing, building & developing > Developing > Providers > Lists or call **13 20 92**.

The Coordinator will be your point of contact with Sydney Water. They can answer most questions that you might have about the process and developer charges and can give you a quote or information about costs for services/works (including Sydney Water costs).

- 3. Developer Works Deed**

It would appear that your feasibility application is served from existing mains and does not require any works to be constructed at this time. Sydney Water will confirm this with you after you have received Development Approval from Council and your Coordinator has submitted a new Development application and Sydney Water has issued you with a formal Notice of Requirements.

- 4. Water, Sewer and Stormwater Works**

4.1 Water

Your development must have a frontage to a water main that is the right size and can be used for connection.

Based on the indicated drinking water demand of 6kLs/day and the current network configuration, Sydney Water has assessed your application and found that:

- The existing 250mm CICL water main in Castlereagh Street will serve your development.
- Your development must have its own connection to that water main and a water service and meter.
- Please note that this applies to the station only. Please see the Feasibility Letter for Case Number 165998 for water requirements for the proposed over station development.
- Please see the paragraphs below on Private Water Services Connection and Metering, Large Water Service Connection and Fire Fighting for additional information.

4.2 Sewer

Your development must have a sewer main that is the right size and can be used for connection.

Based on the indicated wastewater flow of 6kLs/day and the current network configuration, Sydney Water has assessed your application and found that:

- The existing 300mm VC sewer main in Pitt St and 225 VC sewer in Castlereagh Street will serve the southern and northern ends of your development respectively.
- Please note that this applies to the station only. Please see the Feasibility Letter for Case Number 165998 for wastewater requirements for the proposed over station development.
- The sewer must also have a connection point outside, but as close as practically possible to the development boundary, behind the kerb and gutter.
- Please note, if you intend to pump your wastewater to Sydney Water's wastewater main, you will be required to lodge an application with Sydney Water's Tap In™.

4.3 Stormwater

Locating the Exact Position of the Stormwater Channel

Exact position of the stormwater pipe/ channel is to be identified using the pot holes or any other acceptable survey method.

Stormwater connections to Sydney Water's Stormwater Channel

Any direct stormwater connection to Sydney Water's stormwater system is to be the last option at this location. The proponent is required to investigate the possibility of discharging stormwater into the kerb and gutter or any available council stormwater system.

In the event, the direct stormwater connection to Sydney Water's stormwater system is unavoidable, then the following requirements would apply:

If you have intention to make direct stormwater connection to Sydney Water's stormwater system, then the connection is to be carried out according to the Asset Creation Process. Further details regarding this process can be obtained from the Water Servicing Coordinator. The applicant is advised of the following:

- For pipes with a diameter 300mm or more the connection angle is to be no greater than 30 degrees in the direction of the channel flow.
- Proposed connections that are 300mm or more in diameter require a qualified structural engineer to design the connection. A structural engineer's certificate is to be attached with the design drawings.
- Proposed connections that are less than 300mm in diameter can use Sydney Water's standard drawings to design the connection drawings.
- All drawings are to be submitted in AutoCad to the Water Servicing Coordinator. Water Servicing Coordinator is required to transfer these drawings on to the Sydney Water's template prior to submit as design drawing.

5. Ancillary Matters

5.1 Asset adjustments

After Sydney Water issues this Notice (and more detailed designs are available), Sydney Water may require that other water mains/sewer mains/stormwater located in or around your site need to be adjusted/deviated. If this happens, you will need to do this work as well as the extension we have detailed above at your cost. The work must meet the conditions of this Notice and you will need to complete it **before we can issue the Certificate**. Sydney Water will need to see the completed designs for the work and we will require you to lodge a security. The security will be refunded once the work is completed.

5.2 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use Sydney Water's **Permission to Enter** form(s) for this. You can get copies of these forms from your Coordinator or the Sydney Water website. Your Coordinator can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

6. Adjustment/Deviation temporary works

You must not start work on the existing sewer main or the proposed adjustment/deviation/extension until Sydney Water advises your Coordinator. This includes the placement of any temporary pipework. Before you can do this pipework, you must engage your Coordinator to lodge an application that must include appropriate temporary pipework detail as well as the design of the proposed deviation/adjustment/extension.

Sydney Water will then assess both designs and advise your Coordinator when they are approved and of any conditions to be met before pipe placement.

If any work on our assets is carried out without that advice or final approval, Sydney Water will take action to have work on the site stopped. We will apply the provisions of Section 45 of the Sydney Water Act 1994.

OTHER THINGS YOU MAY NEED TO DO

Shown below are other things you need to do that are NOT a requirement for the Certificate. They may well be a requirement of Sydney Water in the future because of the impact of your development on our assets. You must read them before you go any further.

Approval of your building plans

Please note that the building plans must be approved when each lot is developed. This can be done at Sydney Water Tap in™. Visit www.sydneywater.com.au > Plumbing, building & developing > Building > Sydney Water Tap in™.

This is not a requirement for the Certificate but the approval is needed because the construction/building works may affect Sydney Water's assets (e.g. water, sewer and stormwater mains).

Where a Sydney Water stormwater channel, pipe or culvert is located within ten (10) metres of your development site it must be referred to Sydney Water for further assessment.

Your Coordinator can tell you about the approval process including:

- Possible requirements;
- Costs; and
- Timeframes.

Note: You must obtain our written approval before you do any work on Sydney Water's systems. Sydney Water will take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the *Sydney Water Act 1994*.

Soffit Requirements

Please be aware that floor levels must be able to meet Sydney Water's soffit requirements for property connection and drainage.

Private Water Services Connection and Metering

To provide domestic water to the total development you will need to connect to the Sydney Water main. You must lodge an application for this connection at Sydney Water Tap in™. We will then tell you about any requirements you need to meet. Visit www.sydneywater.com.au > Plumbing, building & developing > Building > Sydney Water Tap in™ to find out more.

Visit www.sydneywater.com.au > Plumbing, building & developing > Plumbing > Meters & metered standpipes to find out more about our metering requirements for your development.

Large Water Service Connection

A water main is available to provide your development with a domestic supply. The size of your development means that you will need a connection larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application with Sydney Water Tap inTM. You, or your hydraulic consultant, may need to supply the following:

- A plan of the hydraulic layout;
- A list of all the fixtures/fittings within the property;
- A copy of the fireflow pressure inquiry issued by Sydney Water;
- A pump application form (if a pump is required);
- All pump details (if a pump is required).

You will have to pay an application fee.

Sydney Water does not consider whether a water main is adequate for fire fighting purposes for your development. We cannot guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

Fire Fighting

Definition of fire fighting systems is the responsibility of the developer and is not part of the Section 73 process. It is recommended that a consultant should advise the developer regarding the fire fighting flow of the development and the ability of Sydney Water's system to provide that flow in an emergency. Sydney Water's Operating Licence directs that Sydney Water's mains are only required to provide domestic supply at a minimum pressure of 15 m head.

A report supplying modelled pressures called the Statement of Available pressure can be purchased through Sydney Water Tap inTM and may be of some assistance when defining the fire fighting system. The Statement of Available pressure, may advise flow limits that relate to system capacity or diameter of the main and pressure limits according to pressure management initiatives. If mains are required for fire fighting purposes, the mains shall be arranged through the water main extension process and not the Section 73 process.

Disused Water Service Sealing

You must pay to disconnect all disused private water services and seal them at the point of connection to a Sydney Water water main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Disused Sewerage Service Sealing

Please do not forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to a Sydney Water sewer main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at

the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Trade Wastewater Requirements

If this development is going to generate trade wastewater, the property owner must submit an application requesting permission to discharge trade wastewater to Sydney Water's sewerage system. You must wait for approval of this permit before any business activities can commence.

The permit application should be emailed to Sydney Water's Business Customer Services at businesscustomers@sydneywater.com.au

It is illegal to discharge Trade Wastewater into the Sydney Water sewerage system without permission.

A **Boundary Trap** is required for all developments that discharge trade wastewater where arrestors and special units are installed for trade wastewater pre-treatment.

If the property development is for Industrial operations, the wastewater may discharge into a sewerage area that is subject to wastewater reuse. Find out from Business Customer Services if this is applicable to your development.

Backflow Prevention Requirements

Backflow is when there is unintentional flow of water in the wrong direction from a potentially polluted source into the drinking water supply.

All properties connected to Sydney Water's supply must install a testable **Backflow Prevention Containment Device** appropriate to the property's hazard rating. Property with a high or medium hazard rating must have the backflow prevention containment device tested annually. Properties identified as having a low hazard rating must install a non-testable device, as a minimum.

Separate hydrant and sprinkler fire services on non-residential properties, require the installation of a testable double check detector assembly. The device is to be located at the boundary of the property.

Before you install a backflow prevention device:

1. Get your hydraulic consultant or plumber to check the available water pressure versus the property's required pressure and flow requirements.
2. Conduct a site assessment to confirm the hazard rating of the property and its services. Contact PIAS at NSW Fair Trading on **1300 889 099**.

For installation you will need to engage a licensed plumber with backflow accreditation who can be found on the Sydney Water website:

<http://www.sydneywater.com.au/Plumbing/BackflowPrevention/>

Other fees and requirements

The requirements in this Notice relate to your Certificate application only. Sydney Water may be involved with other aspects of your development and there may be other fees or requirements.

These include:

- plumbing and drainage inspection costs;
- the installation of backflow prevention devices;
- trade waste requirements;
- large water connections and
- council fire fighting requirements. (It will help you to know what the fire fighting requirements are for your development as soon as possible. Your hydraulic consultant can help you here.)

No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from Sydney Water and to the extent that it is able, Sydney Water limits its liability to the reissue of this Letter or the return of your application fee. You should rely on your own independent professional advice.

END

6 November 2017

TRANSPORT FOR NSW
c/- WARREN SMITH & PARTNERS PTY LTD

FEASIBILITY LETTER

Developer: TRANSPORT FOR NSW
Your reference: 5694000
Development: 300 PITT ST, Sydney being Lot 1 DP436359, Lot 1 DP436359, Lot 1 DP60293, Lot 1 DP59101, Lot 1 DP68635, Lot 1 DP229635, Lot 2 DP900055, Lot 3 DP74952, Lot 1 DP74367, Lot 1 DP982663, Lot 2 DP982663, Lot 2 DP509611, Lot 3 DP61187, Lot 1 DP62688, Lot 1 DP596474, Lot 17 DP1095869, Lot CP SP68274
Development Description: Construction of **Pitt Street Over Site Development** for Sydney Metro.
Your application date: 1 September 2017

Dear Applicant

Thank you for providing us with the opportunity work with you on the concept design for the construction of Pitt Street Station Over Site Development as a part of the Sydney Metro. This Feasibility Letter (Letter) is a guide only. It provides general information about what Sydney Water's requirements may be when you apply to us for a Section 73 Certificate (Certificate) for your proposed development. **The information is accurate at today's date only.**

When you obtain development consent for this development we will require you to apply to us for a Section 73 Certificate. You will need to submit a new application (and pay another application fee) to us for that Certificate by using your current or another Water Servicing Coordinator (Coordinator).

Sydney Water will then send you either a:

- Notice of Requirements (Notice) and Developer Works Deed (Deed) or
- Certificate.

These documents will be the definitive statement of Sydney Water's requirements.

There may be changes in Sydney Water's requirements between the issue dates of this Letter

and the Notice or Certificate. The changes may be:

- if you change your proposed development eg the development description or the plan/site layout, after today, the requirements in this Letter could change when you submit your new application; and
- if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.

What You Must Do To Get A Section 73 Certificate In The Future.

To get a Section 73 Certificate you must do the following things. You can also find out about this process by visiting www.sydneywater.com.au > Plumbing, building & developing > Developing > Land development.

- 1. Obtain Development Consent from the consent authority for your development proposal.**
- 2. Engage a Water Servicing Coordinator (Coordinator).**

You must engage your current or another authorised Coordinator to manage the design and construction of works that you must provide, at your cost, to service your development. If you wish to engage another Coordinator (at any point in this process) you must write and tell Sydney Water.

For a list of authorised Coordinators, either visit www.sydneywater.com.au > Plumbing, building & developing > Developing > Providers > Lists or call **13 20 92**.

The Coordinator will be your point of contact with Sydney Water. They can answer most questions that you might have about the process and developer charges and can give you a quote or information about costs for services/works (including Sydney Water costs).

- 3. Developer Works Deed**

It would appear that your feasibility application is served from existing mains and does not require any works to be constructed at this time. Sydney Water will confirm this with you after you have received Development Approval from Council and your Coordinator has submitted a new Development application and Sydney Water has issued you with a formal Notice of Requirements.

- 4. Water, Sewer and Stormwater Works**

4.1 Water

Your development must have a frontage to a water main that is the right size and can be used for connection.

Based on the indicated drinking water demand of 210kLs/day and the current network

configuration, Sydney Water has assessed your application and found that:

- The existing 250mm CICL watermain in Pitt Street and the 250mm CICL main in Castlereagh Street will service the northern and southern stations of your development respectively.
- Your development must have its own connection to that water main and a water service and meter.
- Please see the paragraphs below on Multi-level individual metering requirements, Private Water Services Connection and Metering, Large Water Service Connection and Fire Fighting for additional information.

4.2 Sewer

Your development must have a sewer main that is the right size and can be used for connection.

Based on the indicated wastewater flow of 190kLs/day and the current network configuration, Sydney Water has assessed your application and found that:

- The existing 300mm VC sewer main in Pitt Street and existing 225mm VC sewer main in Castlereagh Street will service the northern and southern stations of your development respectively.
- The sewer must also have a connection point outside, but as close as practically possible to the development boundary, behind the kerb and gutter.
- Please note, if you intend to pump your wastewater to Sydney Water's wastewater main, you will be required to lodge an application with Sydney Water's Tap In™.

4.3 Stormwater

On-site Stormwater Detention (OSD)

The proposed development will require an OSD system to offset stormwater run-off. To determine the required On Site Detention and Permissible Site Discharge (PSD), the following site specific information is required to be submitted:

- Total site area (m²)
- Existing pre-development impervious area (m²)
- Proposed post-development impervious area (m²)

Discharged Stormwater Quality Targets

Stormwater run-off from the site should be of appropriate quality before discharged into a Sydney Water asset or system. Developments must demonstrate stormwater quality improvement measures that meet the following specified stormwater pollutant reductions:

Pollutant	Pollutant load reduction objective (%)
Gross Pollutants (>5mm)	90
Total Suspended Solids	85
Total Phosphorus	65
Total Nitrogen	45

You may use our tool, through the website below, to determine whether your development is Deemed to Comply. In some cases though, we may request an eWater MUSIC model before approving your connection.

Stormwater connections to Sydney Water's Stormwater Channel

You are required to investigate the possibility of discharging stormwater into the kerb and gutter or any available council stormwater system. Any direct stormwater connection to Sydney Water's stormwater system is to be the last option at this location.

In the event, the direct stormwater connection to Sydney Water's stormwater system is unavoidable, then the following requirements would apply:

If you have intention to make direct stormwater connection to Sydney Water's stormwater system, then the connection is to be carried out according to the Asset Creation Process. Further details regarding this process can be obtained from the Water Servicing Coordinator. The applicant is advised of the following:

- For pipes with a diameter 300mm or more the connection angle is to be no greater than 30 degrees in the direction of the channel flow.
- Proposed connections that are 300mm or more in diameter require a qualified structural engineer to design the connection. A structural engineer's certificate is to be attached with the design drawings.
- Proposed connections that are less than 300mm in diameter can use Sydney Water's standard drawings to design the connection drawings.
- All drawings are to be submitted in AutoCad to the Water Servicing Coordinator. Water Servicing Coordinator is required to transfer these drawings on to the Sydney Water's template prior to submit as design drawing.

5. Ancillary Matters

5.1 Asset adjustments

After Sydney Water issues this Notice (and more detailed designs are available), Sydney Water may require that the water main/sewer main/stormwater located in the footway/your site needs to be adjusted/deviated. If this happens, you will need to do this work as well as the extension we have detailed above at your cost. The work must meet the conditions of this Notice and you will need to complete it **before we can issue the Certificate**. Sydney Water will need to see the completed designs for the work and we will require you to lodge a security. The security will be refunded once the work is completed.

5.2 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use Sydney Water's **Permission to Enter** form(s) for this. You can get copies of these forms from your Coordinator or the Sydney Water website. Your Coordinator can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

6. Multi-level individual metering requirements

Your development must either allow for or provide individual metering. This means that you must:

1. comply at all times and in all respects with the requirements of Sydney Water's "Multi-level Individual Metering Guide" (version 7 dated 28 October 2016);
2. provide and install plumbing and space for individual metering in accordance with Sydney Water's "Multi-level Individual Metering Guide";
3. if and when you implement a strata/ stratum plan (or strata/ stratum subdivide) you must:
 - a. engage an Accredited Metering Supplier ("**AMS**") to provide individual metering in accordance with the "Multi-level Individual Metering Guide" and meet the cost of the meters and metering system;
 - b. transfer the meters and metering system to Sydney Water once the Testing Certificate has been issued by Sydney Water to the AMS and the AMS has confirmed that payment for the meters and metering system has been paid in full.

Before the Section 73 Certificate can be issued, you must sign the attached undertaking to show that you understand and accept these metering requirements and associated costs.

All the details about this requirement are available on Sydney Water's website at www.sydneywater.com.au.

OTHER THINGS YOU MAY NEED TO DO

Shown below are other things you need to do that are NOT a requirement for the Certificate. They may well be a requirement of Sydney Water in the future because of the impact of your development on our assets. You must read them before you go any further.

Approval of your building plans

Please note that the building plans must be approved when each lot is developed. This can be done at Sydney Water Tap inTM. Visit www.sydneywater.com.au > Plumbing, building & developing > Building > Sydney Water Tap inTM.

This is not a requirement for the Certificate but the approval is needed because the

construction/building works may affect Sydney Water's assets (e.g. water, sewer and stormwater mains).

Where a Sydney Water stormwater channel, pipe or culvert is located within ten (10) metres of your development site it must be referred to Sydney Water for further assessment.

Your Coordinator can tell you about the approval process including:

- Possible requirements;
- Costs; and
- Timeframes.

**Note: You must obtain our written approval before you do any work on Sydney Water's systems. Sydney Water will take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the *Sydney Water Act 1994*.
Soffit Requirements**

Please be aware that floor levels must be able to meet Sydney Water's soffit requirements for property connection and drainage.

Private Water Services Connection and Metering

To provide domestic water to the total development you will need to connect to the Sydney Water main. You must lodge an application for this connection at Sydney Water Tap in™. We will then tell you about any requirements you need to meet. Visit www.sydneywater.com.au > Plumbing, building & developing > Building > Sydney Water Tap in™ to find out more.

Visit www.sydneywater.com.au > Plumbing, building & developing > Plumbing > Meters & metered standpipes to find out more about our metering requirements for your development.

Large Water Service Connection

A water main is available to provide your development with a domestic supply. The size of your development means that you will need a connection larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application with Sydney Water Tap in™. You, or your hydraulic consultant, may need to supply the following:

- A plan of the hydraulic layout;
- A list of all the fixtures/fittings within the property;
- A copy of the fireflow pressure inquiry issued by Sydney Water;
- A pump application form (if a pump is required);
- All pump details (if a pump is required).

You will have to pay an application fee.

Sydney Water does not consider whether a water main is adequate for fire fighting purposes for your development. We cannot guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

Fire Fighting

Definition of fire fighting systems is the responsibility of the developer and is not part of the Section 73 process. It is recommended that a consultant should advise the developer regarding the fire fighting flow of the development and the ability of Sydney Water's system to provide that flow in an emergency. Sydney Water's Operating Licence directs that Sydney Water's mains are only required to provide domestic supply at a minimum pressure of 15 m head.

A report supplying modelled pressures called the Statement of Available pressure can be purchased through Sydney Water Tap inTM and may be of some assistance when defining the fire fighting system. The Statement of Available pressure, may advise flow limits that relate to system capacity or diameter of the main and pressure limits according to pressure management initiatives. If mains are required for fire fighting purposes, the mains shall be arranged through the water main extension process and not the Section 73 process.

Disused Water Service Sealing

You must pay to disconnect all disused private water services and seal them at the point of connection to a Sydney Water water main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Disused Sewerage Service Sealing

Please do not forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to a Sydney Water sewer main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Trade Wastewater Requirements

If this development is going to generate trade wastewater, the property owner must submit an application requesting permission to discharge trade wastewater to Sydney Water's sewerage system. You must wait for approval of this permit before any business activities can commence.

The permit application should be emailed to Sydney Water's [Business Customer Services](mailto:businesscustomers@sydneywater.com.au) at businesscustomers@sydneywater.com.au

It is illegal to discharge Trade Wastewater into the Sydney Water sewerage system without permission.

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Separate hydrant and sprinkler fire services on non-residential properties, require the installation of a testable double check detector assembly. The device is to be located at the boundary of the property.

Before you install a backflow prevention device:

1. Get your hydraulic consultant or plumber to check the available water pressure versus the property's required pressure and flow requirements.
2. Conduct a site assessment to confirm the hazard rating of the property and its services. Contact PIAS at NSW Fair Trading on **1300 889 099**.

For installation you will need to engage a licensed plumber with backflow accreditation who can be found on the Sydney Water website:

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The requirements in this Notice relate to your Certificate application only. Sydney Water may be involved with other aspects of your development and there may be other fees or requirements.

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- the installation of backflow prevention devices;
- trade waste requirements;
- large water connections and
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reissue of this Letter or the return of your application fee. You should rely on your own independent professional advice.

END

Appendix B – Jemena

Comments Jemena dated 22/1/2018

Rainer Oechsle

From: Tony Thorp
Sent: Friday, 9 February 2018 12:28 PM
To: Rainer Oechsle
Cc: Paul Hebblewhite
Subject: Services Infrastructure SEARs report

CompleteRepository: 212556111
Description: OSD Pitt St South - Planning Documents
JobNo: 25561
OperatingCentre: 21
RepoEmail: 2125561@ghd.com
RepoType: Job
SubJob: 11

Hi Rainer,

We've got Ausgrid feedback and the below wrt Jemena. Is the Jemena info sufficient for the SEARs report?

Do we have anything from Sydney Water?

Do we need anything else (eg NBN?)

Cheers

Tony

From: Hirst, Ron [mailto:Ron.Hirst@transport.nsw.gov.au]
Sent: Thursday, 8 February 2018 4:54 PM
To: Tony Thorp <Tony.Thorp@ghd.com>
Subject: FW: Sydney Metro: Gas connection feasibility

FYI

Ron Hirst
Design Manager | Over Station Development
Sydney Metro, City and Southwest
Transport for NSW

M 0419 258 311
L 43, 680 George Street, Sydney 2000 NSW



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From: Tzannes, Charles
Sent: Monday, 22 January 2018 2:32 PM
To: Hughes, Richard; Polkinghorne, Richard; Hirst, Ron; Calzini, Jenni; Cull, Paul; Morgan, Damian; Blackman, Sue
Subject: FW: Sydney Metro: Gas connection feasibility

Hi all,

See table below from Jemena of indicative budget amounts for augmentation of the Jemena's gas network in order to facilitate the connection of the proposed developments (with some commentary description of works)

Vic Cross currently does not require reinforcement, however in the event something changes there is an opportunity to nominate some contingency.

Regards
Charles

From: Leszczynski, Jessica
Sent: Monday, 22 January 2018 2:03 PM
To: Tzannes, Charles
Cc: Rogers, Paul
Subject: FW: Sydney Metro: Gas connection feasibility

Hi Charles,

Please find attached budget estimates provided by Jemena for the connections.

Thanks,
Jess Leszczynski
0439 501 241

From: Aaron Greaves [<mailto:Aaron.Greaves@jemena.com.au>]
Sent: Monday, 22 January 2018 1:59 PM
To: Leszczynski, Jessica
Cc: Rogers, Paul
Subject: RE: Sydney Metro: Gas connection feasibility

Hi Jess,

No price was provided as the servicing plan indicates that the network will not require any reinforcement to supply the proposed load. If any new information is provided which changes this I can give you an indicative pricing for the scope at that time. If you wanted to be safe in the event something changes you could probably nominate ~\$50k.

Cheers

Aaron Greaves
Network Development Manager I & C
Customer & Markets
Jemena
Level 12, 99 Walker Street, North Sydney, NSW 2060
(02) 9867 7144 | 0419 230 600
Aaron.Greaves@jemena.com.au | www.jemena.com.au



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From: Leszczynski, Jessica [<mailto:Jessica.Leszczynski@transport.nsw.gov.au>]
Sent: Monday, 22 January 2018 11:54 AM
To: Aaron Greaves <Aaron.Greaves@jemena.com.au>
Cc: Rogers, Paul <Paul.Rogers@transport.nsw.gov.au>
Subject: RE: Sydney Metro: Gas connection feasibility

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Thanks Aaron.

For clarity – was no price provided for Vic Cross because the assumption is that the existing secondary service into the block can be re-used?

Thanks,
Jess Leszczynski
0439 501 241

From: Aaron Greaves [<mailto:Aaron.Greaves@jemena.com.au>]
Sent: Monday, 22 January 2018 11:43 AM
To: Leszczynski, Jessica
Cc: Rogers, Paul
Subject: RE: Sydney Metro: Gas connection feasibility

Hi Jess

See table below for indicative budget amounts for augmentation of the Jemena’s gas network in order to facilitate the connection of the proposed developments

Location	Scope	Budget Estimate
Pitt St North	In order to meet load demand a 110mm PE main is to be inserted into the conduit and tied into the existing network.	\$20k
Crows Nest	Install one Cocon on Atchison St and lay ~ 210m of 110mm PE from the outlet of the Cocon down Oxley Steet to Site A. Site B and C can be fed off the 50mm NY main.	\$250k
Marrickville Stabling Yard	There are two options for connection either off the medium or secondary networks, option 1 is the preferred option.: 1. Medium pressure network: A mains extension of ~300m of 50mm NY will be required to get gas to the site (as shown in Figure 3). 2. Secondary pressure network: A secondary service is already present at the site and will provide enough capacity. The alternative option is to supply the site with a secondary service.	\$100k

Cheers

Aaron Greaves
Network Development Manager I & C
Customer & Markets
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Level 12, 99 Walker Street, North Sydney, NSW 2060
(02) 9867 7144 | 0419 230 600
Aaron.Greaves@jemena.com.au | www.jemena.com.au



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From: Aaron Greaves
Sent: Monday, 15 January 2018 8:40 AM

To: Leszczynski, Jessica <Jessica.Leszczynski@transport.nsw.gov.au>

Cc: Rogers, Paul <Paul.Rogers@transport.nsw.gov.au>

Subject: RE: Sydney Metro: Gas connection feasibility

Hi Jess

Section 4.2 should refer to Figure 2, the cross reference did not update as intended. Also each of the Pitt Street sites were modelled using the same loads as from memory no load details were provided for one of the buildings.

Cheers

Aaron Greaves

Network Development Manager I & C
Customer & Markets

Jemena

Level 12, 99 Walker Street, North Sydney, NSW 2060

(02) 9867 7144 | 0419 230 600

Aaron.Greaves@jemena.com.au | www.jemena.com.au



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From: Leszczynski, Jessica [<mailto:Jessica.Leszczynski@transport.nsw.gov.au>]

Sent: Wednesday, 10 January 2018 3:53 PM

To: Aaron Greaves <Aaron.Greaves@jemena.com.au>

Cc: Rogers, Paul <Paul.Rogers@transport.nsw.gov.au>

Subject: RE: Sydney Metro: Gas connection feasibility

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Hi Aaron,

Thanks for sending the updated report through. Can you please confirm that the load assessment for Pitt St was completed on the assumption that there are 310 apartments at the Pitt St South location (from Sec 4.2 in the report it looks like it was completed for Pitt St North). Also, Sec 4.2 refers to Figure 3 for the insertion of a new gas main across George St but Fig 3 on page 4 is for Crows Nest.

Can you please review?

Also, is it possible to get high level budget estimates for these connection works?

Happy to meet to discuss further.

Kind regards,
Jess Leszczynski
0439 501 241

From: Aaron Greaves [<mailto:Aaron.Greaves@jemena.com.au>]

Sent: Monday, 27 November 2017 9:50 AM

To: Leszczynski, Jessica

Cc: Rogers, Paul

Subject: RE: Sydney Metro: Gas connection feasibility

Hi Jess

Updated and attached

Cheers

Aaron Greaves

Network Development Manager – Projects
Customer & Markets

Jemena

Level 12, 99 Walker Street, North Sydney, NSW 2060
(02) 9867 7144 | 0419 230 600

Aaron.Greaves@jemena.com.au | www.jemena.com.au



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From: Leszczynski, Jessica [<mailto:Jessica.Leszczynski@transport.nsw.gov.au>]

Sent: Monday, 20 November 2017 11:51 AM

To: Aaron Greaves <Aaron.Greaves@jemena.com.au>

Cc: Rogers, Paul <Paul.Rogers@transport.nsw.gov.au>

Subject: RE: Sydney Metro: Gas connection feasibility

Thanks Aaron.

The load that was provided by the Sydney Metro design team was for the development at Pitt St South only. The final design for Pitt St nth is still being determined.

Can you please review the analysis for Pitt St?

Thanks,

Jess Leszczynski

0439 501 241

From: Aaron Greaves [<mailto:Aaron.Greaves@jemena.com.au>]

Sent: Friday, 17 November 2017 2:33 PM

To: Leszczynski, Jessica

Cc: Rogers, Paul

Subject: RE: Sydney Metro: Gas connection feasibility

Hi Jess

Apologies for the delay, see attached Jemena's current proposed servicing strategy based on the information that has been provided for Sydney Metro developments.

If you have any question please feel free to give me a call.

Cheers

Aaron Greaves

Network Development Manager – Projects
Customer & Markets

Jemena

Level 12, 99 Walker Street, North Sydney, NSW 2060
(02) 9867 7144 | 0419 230 600

Aaron.Greaves@jemena.com.au | www.jemena.com.au





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From: Leszczynski, Jessica [<mailto:Jessica.Leszczynski@transport.nsw.gov.au>]
Sent: Friday, 17 November 2017 8:36 AM
To: Aaron Greaves <Aaron.Greaves@jemena.com.au>
Cc: Rogers, Paul <Paul.Rogers@transport.nsw.gov.au>
Subject: Sydney Metro: Gas connection feasibility

Hi Aaron,

Thanks for your time on the phone last week. Can we expect to receive the Jemena responses to the various gas connection feasibility assessments/applications submitted for the Sydney Metro City & Southwest project?

Kind regards,
Jessica Leszczynski
Utilities Project Manager - SSC
Sydney Metro – City & Southwest
Transport for NSW

M: 0439 501 241 | E: jessica.leszczynski@transport.nsw.gov.au
Level 43, 680 George Street, Sydney, NSW 2000



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Appendix C – Ausgrid

DESIGN INFORMATION 5 JANUARY 2018



Project Number: SC12452

Establish Elevated Control Point CP.78937 Pitt Bathurst
No.3 & Upper Level Chamber Sub S.8638 Pitt Bathurst
No.4

300 Pitt St Sydney NSW 2000

Design Information

Site Specific Requirements - Complex

Date: 5th January 2018



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SITE SPECIFIC DESIGN INFORMATION REQUIREMENTS

The Design Information Site Specific Requirements Complex is complementary to, and must be read in conjunction with, the Design Information General Requirements, which can be found on the Ausgrid web site.

1. Ausgrid Project References

SAP Project Number	SC12452
Prjtrak Number	XCZ020643
Drawing Title	Establish Elevated Control Point CP.78937 Pitt Bathurst No.3 & Upper Level Chamber Sub S.8638 Pitt Bathurst No.4 at 300 Pitt St Sydney NSW 2000

2. Ausgrid Contact Details

Note that this information is not to be placed on the design.

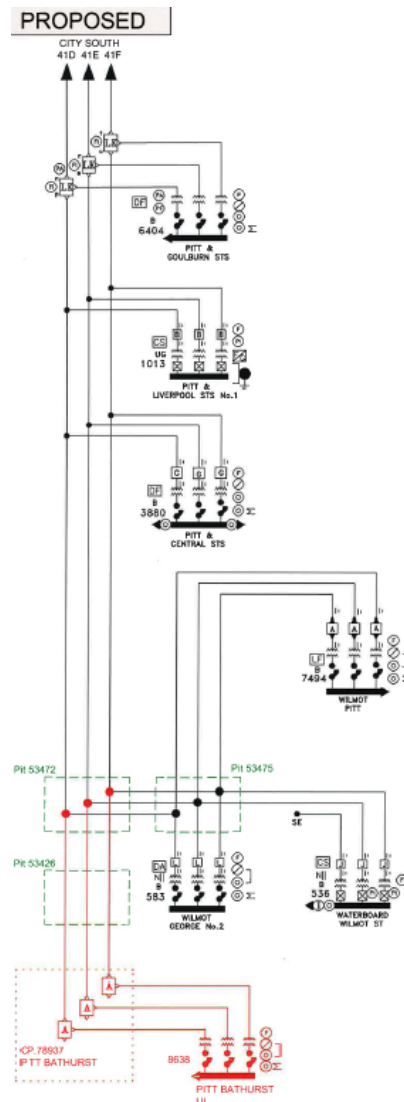
Ausgrid Contact	LINGASEN PATHER
Telephone No	9663 9209
Email Address	lpather@ausgrid.com.au

3. Network Extension Connection Point

3.1. High Voltage Connection Point

Zone substation City South Zone No.3288 Sheet 4 - 11kV feeder: Panels 41D, 41E, 41F

- Tee connected in pit SY-53472 and extended into pit SY-53426.

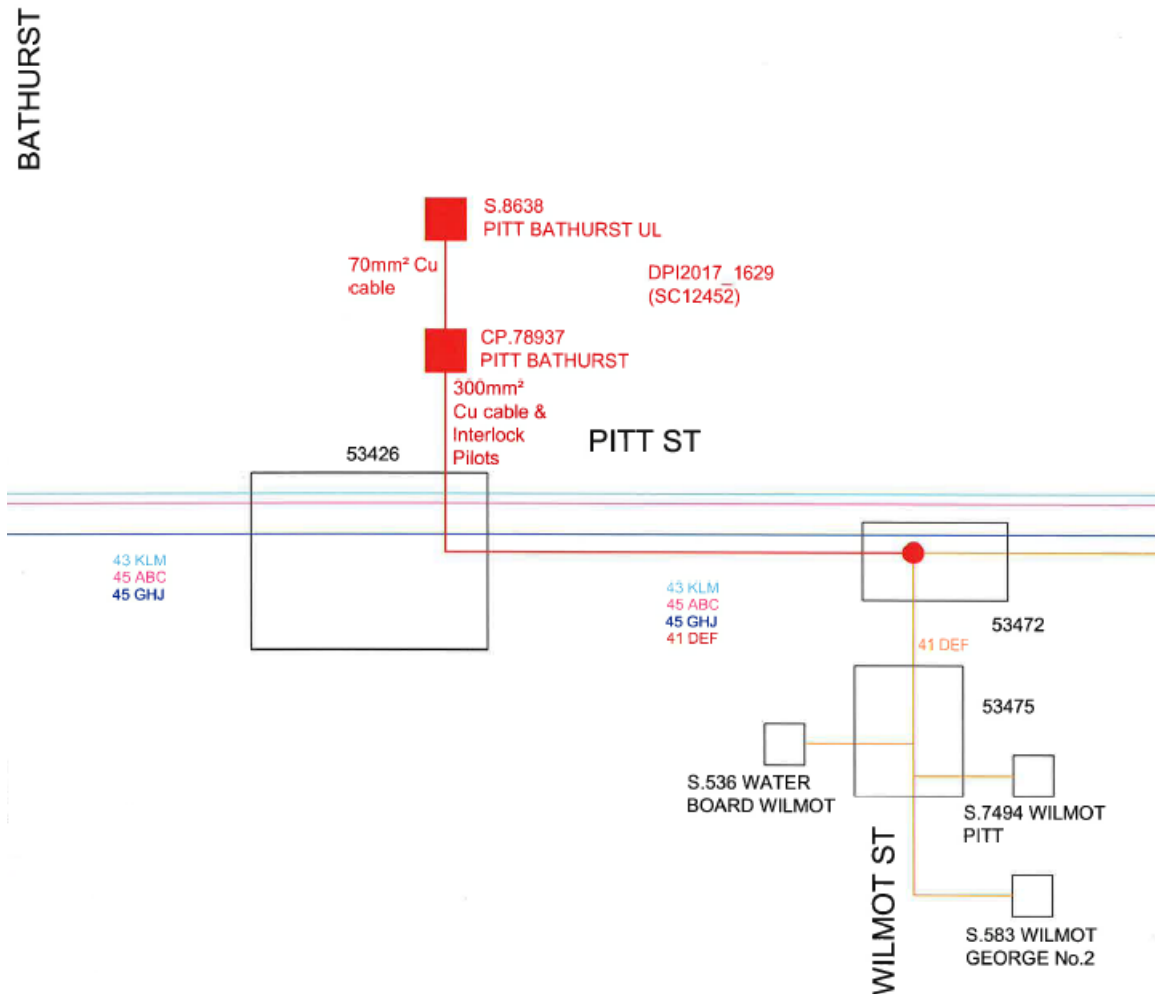


4. Details of Ausgrid Network in Vicinity of the Development

Recorded details of the Ausgrid network, including cable codes, soil codes, etc, are shown in Ausgrid's WebGIS. The ASP/3 designer must login to the WebGIS to obtain relevant information. The ASP/3 designer should contact Ausgrid for any further clarification or if information appears to be missing. Note: Ausgrid's WebGIS information has not been verified against actual site assets. The ASP/3 designer is responsible for the accuracy of information on designs and it is strongly advised that the ASP/3 designer verifies WebGIS asset details on site prior to undertaking the design.

5. Proposed Works

Alter the existing high voltage and/or low voltage network systems, in accordance with the schematic and/or graphical representation, for the required electrical works as shown on the attached and/or following drawing(s).



5.1. Extension Works

In pit SY-53472 join to existing feeders 41DEF and utilise existing ducts to pit SY-53426.

Install eight (8) 125mm HV conduits from pit SY-53426 to proposed control point CP.78937

Fit out an elevated control point that is to be constructed on the development property either within the proposed building or as a freestanding structure.

Fit out a 3 x 1500kVA transformer upper chamber substation that is to be constructed on the development property either within the proposed building or as a freestanding structure.

Removal of existing LV supplies ie, substation S.7994 distributor 4 and renaming distributor.

6. Customer Point of Supply (Connection Point)

Provide a 3000amp three phase low voltage point of supply at the low voltage switchgear terminals within the chamber substation enclosure.

7. Fault Level

11kV node: at proposed CP.78937 Pitt Bathurst No.3 is anticipated to be 15.4kA.

~ Existing maximum three phase 11kV fault level is at S.3288 City South Zone is 15.4kA.

8. Cable/Conductor Route and Type

8.1. Route Information

It is generally the responsibility of the ASP/3 designer to select an appropriate route. However, Ausgrid reserves the right to require variation(s) of any proposed cable route.

Ausgrid makes no warranty expressed or otherwise that any proposed route depicted in the design information by Ausgrid is suitable for the intended purpose.

8.2. Underground

11kV	11KV 300CU1 EPR 70 CU(WS) Z YQ / Triplex. 11kV 70 sq mm Cu between the CP and upper level substation.
SCADA / Telecontrol	UGFO - 60 Fibre Nylon Jacketed Dry Core Cable

8.3. Conduits

Conduits available for use	Three ducts between pits SY-53473 & SY-53426
Conduits to be laid as part of this project	one (1) spare 63mm conduit (for future optic fibre pilot cable use), is to be installed in association with all 11kV cable trenches. Eight HV conduits to be installed from pit SY-53426 to proposed control point CP.78937. Sydney CBD area use 125mm conduit all other areas 150mm conduit. One 100mm conduit to be installed from CP.78937 to S.8638 for service board supply in CP.

8.4. Protection

Protection	As per NS130.
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9. EQUIPMENT

9.1. Control Point

Control Point Number	78937	Substation Name	Pitt Bathurst No.3	
Description			Stock Code	Quantity
HV Switchgear	ABB Safelink SF6 3 Way Isolating and Earthing Switch		180232	3

9.2. Multiple Transformer Chamber Substation

Substation Number	8638	Substation Name	Pitt Bathurst No.4	
Ultimate Capacity	3 x 1500kVA transformers		Initial Capacity	3 x 1500kVA transformers
Rating (Firm)	5,000A		Load Cycle	C: Domestic - Much Water

Voltage Ratio	11000/433	Vector Group	Dyn 1	
Description			Stock Code	Quantity
PowerTransformers	1500kVA dry type		180361	3
LV Board "E" type low voltage board that consists of free standing modular units as described.	3000amp ACB incoming panel motorised (LV isolation of the transformer)		179996	3
	3000amp ACB customer point of supply motorised panel – cable		TBA	1
	Surge arrester and 62amp auxiliary fuse panel (Right hand and/or Left hand)		180221 (RH) 179619 (LH)	1
<ul style="list-style-type: none"> ~ Customer to procure the whole LV board (note: lead times are in the order of 24 weeks). ~ Materail cost of the LV board component(s) funded by Ausgrid is reimbursed after substation commissioning. ~ Any stock item not purchased from Ausgrid must conform with Ausgrid's current specifications. 				

9.2.1. Multiple Transformer Chamber Substation Protection Equipment

Required Protection	Optical Arc Flash Detection Transformer Differential Transformer Over-Current & Earth Fault Customer Over-Current			
Description			Stock Code	Quantity
Protection Panels	Free Standing Protection Cabinet TX 1 / TX 2		TBA	1
	Free Standing Protection Cabinet TX3 / Customer OC		TBA	1
Current Transformers				
Excluding components included in the "E" Type LV Board	100/5 HV Differential CT (10P25F20)		89722	9
	2450/1837/2.89 OAFD EF Check Epoxy CT		67173	3
Relays	K3M Differential Fuse Relay		91058	3
	MICOM P115 Relay (24/48V AC/DC) (Transformer O/C)		182547	3
	SEL751A Relay (OAFD)		182548	3
	Schneider P14221BB6M0449J (Firmware version: 44V)		TBA (Drawing Ref 224809)	1 x customer overcurrent panel
	3A32 K37 0.2 Ohm Thermal Trip Indicator		175103 3	3
	PIR Pilot Interlock Relay		62158	3
	Latching Multitrip RMS TR12 – CD – 22 (48V)		TBA (Drawing Ref 223206)	6
	Latching Multitrip RMS TR12 – BD – 22 (32V)		TBA (Drawing Ref 223206)	6
	DMT Auxillary Relay		62141	1
	FF5 Fan Failure Relay		60961	1
	Marshalling Box - Polynova PC 360mm (H) x 360mm (W) x 205mm (D) Manufacturer:- B&R Enclosures Pty Ltd Catalogue No. PC363620		To be obtained from external supplier	1

Miscellaneous	Fibre optic assembly for OAFD	18241	6
	DLAC Scada Panel	81174	1
	ECTU Intermediate Cabinet	TBA	1
	Battery Rack Insulator	95323	20
Battery Items	Battery Rack Acrylic Washer	65235	20
	Battery Rack Presspahn Washer	59543	20
	Battery Set 10 volt 8 Cell Alkaline	96602	8
	Battery Charger - 30V trickle type	75168	1
	30V DC battery test box	123703	1
	Battery Charger - 48V float type	182540	1
SCADA	Automation Controller: Schweitzer SEL-3530 3530HC2BX323X0XXXXXX (Firmware version: SEL-3530-R134-V1-Z001001-D20150417)	TBA (Drawing Ref 222615)	1
Distribution Substation Control Equipment	Network Switch: Ruggedcom RS8000 RS8000-48-MM-MS-XX (Firmware version: 8x100BASE-FX LC, ROS version 3.12.1, Boot version 2.20.0)	TBA	1
	SCD5200 Wide Range Power Supply Module (Invensys Part Number: SY-0399131)	TBA	1
	SCD5200 One-slot Card File (Invensys part number: SY-2003104)	TBA	1
	Communications Unit Distribution Sub: OAP-SE-4xETH, 1x100BaseSX/10Base-FL, 2xFXS, 1xX.21, 2xSFW 100 Base-FX, C50 Mech (CommTel part number: P21002.02-003 OAP-SE)	TBA	1
	Communications Unit – Network Node: OAP-XE-VOIP OAP-XE 4xETH, 4xFXO/VoIP, 1xV.11 2xSFW 100Vase-FX, P2P. OAP-SR Mechanics (CommTel part number: P21001.02-002 OAP-XE-VOIP)	TBA	1
	Communications Unit – Network Node: OAP-XE-VOIP OAP-XE 4xETH, 4xFXO/VoIP, 1xV.11 2xSFW 100Vase-FX, P2P. OAP-SR Mechanics (CommTel part number: P21001.02-002 OAP-XE-VOIP)	TBA	1

10. Asset Number Allocation

During the design stage the ASP/3 designer will need to request from Ausgrid any additional asset numbers.

11. Apportionment of Costs

The information this section contains is based on assumptions of the likely design solution. Certification of a design that does not conform to such assumptions may require Ausgrid to reassess the apportionment of costs and funding of the project, including re-assessment of any quotations issued prior to Design Certification.

11.1. Funding

At this stage Ausgrid will fund the following works for the development and anything not listed is funded by the customer. Where applicable, the amount(s) to be paid by Ausgrid will be detailed on the Schedule to the Certified Design.

- There is no funding by Ausgrid on this project.

12. Design Information Attachments

The following documentation is readily available and can be found on our website www.ausgrid.com.au

- Design Information – General Terms and Conditions document.
- Ausgrid's external CAD design template.
- Design Certification Check Sheet.
- Asset Number Request Spreadsheet.
- Asset Valuation Spreadsheet (AVS).
- Street Lighting Acceptance Form(s).
- Network Earthing Information Sheet.

The following can only be obtained from the Ausgrid WebGIS portal.

- A translated GIS extract of the proposed work area in DWG format (includes soil codes).
- Relevant additional asset information including cable codes.
- Relevant system diagram(s). **NOTE – Loads and ratings shown on system diagrams is for internal Ausgrid use only.**
- Environmental Analysis report.

The ASP/3 designer intending to undertake the design must obtain and use the electronic format of the relevant design information attachments (refer to NS104).

13. Notations to be placed on Design

In addition to the standard notations on the attached CAD design template add the following notations.

- The ASP/1 is required to comply with the correct procedure(s) for working with and/or near asbestos material (refer to Ausgrid NUS 211 – Working with Asbestos Products). The following Ausgrid assets are registered as containing asbestos.
 - ~ Pits & Conduits between pits.

14. Remarks / Other Comments

The ASP/3 designer needs to contact Ausgrid early in the design phase should any of the proposed works require an alteration and/or extension to the Ausgrid fibre optic network. Ausgrid will then advise the ASP/3 designer of the scope of fibre optic network works that needs to be undertaken by Ausgrid and the works that will need to be done by the ASP/1. Generally Ausgrid only undertakes the final terminations and commissioning of the fibre optic network installation, however, the fibre optic network design and funding review is undertaken on a case by case basis.

Please consult your Contestable Project Coordinator for approval prior to the use of 11kV high voltage stub tee joints (HV3-43) on this project.

15. Design Information Revision History

5.01.2018	Initial issue using template version v161027