SERVICES AND UTILITIES INFRASTRUCTURE REPORT

APPENDIX L

Sydney Metro City & Southwest: Crows Nest Over Station Development

Services and Utilities Infrastructure Report

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Technical Checker	*Principal Civil Engineer*	*John Toth*	*31/07/2020*
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Amendment Record

Changes made to this document since its last revision, which affect its scope or sense, are marked in the right margin by a vertical bar (|).

Date	Rev	Amendment Description	By
	A	*Draft*	
	B	*Updated in response to Sydney Metro comments*	
	0	*Final draft*	
	1	*Final*	

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Terms & Definitions

	Definition
ARI	Average Recurrence Interval – The "average" or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration. It is implicit in this definition that the periods between exceedances are generally random.
ASP3	A qualified level 3 designer acting on behalf of the distributor - Accredited Service Provider
BMS	Means the Building Management Statement prepared by TfNSW and which outlines the mechanism for managing the operational interfaces between the OSD Lot(s) and the Station Lot(s)
BOD	Means the Basis of Design Report undertaken by USDTS Design team to provide summary of basic design criteria and design requirements.
CSSI	An application made for the development of the Sydney Metro under the Critical State Significant Infrastructure provisions of the EP&A Act 1979 (as amended)
DBYD	Dial Before You Dig (DBYD) is a free national referral service designed to assist in identifying, preventing damage and disruption to Australia's vast infrastructure networks.
DRAINS	Stormwater Drainage System design and analysis program.
Integrated OSD Design	Means the design concept prepared by the OSD Design team which integrates a commercially viable OSD with the Metro Station
Metro Station	Means the functional areas necessary for the efficient and effective use and operation of the Sydney metro at the location the subject of this document
OSD	Means the development of air space over each site acquired to enable the Sydney Metro project; also known as Over Station Development where the site is a Station
OSD Developer	Means the entity awarded the rights to commercially develop the OSD Lot(s).
OSD Enabling Works	Means the works to be provided by the STME and TSE Contractors and designed by the USDTS Design Team to fully enable the subsequent development of the OSD
OSD Lot(s)	Means the spaces created by volumetric title that accommodates the functional areas necessary for the efficient and effective use and operation of the OSD. The OSD Lot(s) may be further subdivided to create lots specific to different uses
Pre-Existing	The previously existing site, prior to any demolition or diversion works undertaken for the Sydney Metro Station.
PSD	Permissible Site Discharge of stormwater runoff stipulated by Council.
Reference	The scope of the Project as determined by the NSW Government as a

Design	result of the Project Definition Phase. The Reference Design consists of the Reference Scope and technical requirements prior to the Stage 1 Design phase.
SSD	An application made for the development of the OSD under the State Significant Development provisions of the EP&A Act 1979 (as amended)
Stage 1 Design	The scope of the Project as determined by the NSW Government as a result of the Project Reference Design Phase. The Stage 1 Preliminary 40% Design phase follows on from the Reference Design.
Station Lot(s)	Means the spaces created by volumetric title that accommodates the functional areas necessary for the efficient and effective use and operation of the Metro Station
STME Contract	Means the Stations, Mechanical and Electrical Works undertaken by the STME Contractor
STME Contractor	Means the contractor appointed under the STME Contract
Sydney Metro (Metro)	Means the overall Sydney Metro network
SMDO	Means the Sydney Metro Delivery Office set up by TfNSW
Sydney Metro Northwest	Means the former North West Rail Link, i.e. the project between Cudgegong Road, Rouse Hill and Chatswood (inclusive)
Sydney Metro City & Southwest	Means the proposed metro railway between Chatswood and Bankstown, including the Sydney Metro Harbour Crossing.
Sydney Trains	An organisation formed out of RailCorp from the NSW rail industry reform process. Sydney Trains serves Sydney customers. NSW Trains serves intercity and regional customers.
TfNSW	Means Transport for NSW (a New South Wales government agency constituted under the Transport Administration Act 1988 (NSW)) (ABN 18 804 239 602), the Principal under this Agreement.
Transfer Level	Means the uppermost level to be constructed by the STME Contractor and at which level design responsibility for the performance of the OSD transfers from the OSD Design team to the USDTS Design team
TSE Contractor	Means the contractor appointed to undertake the TSE Works
TSE Works	Means the design and construct contract for the tunnels, station excavations, cross passages and associated civil works components of the Sydney Metro City and Southwest
USDTS	Underground Stations Design and Technical Services
USDTS Design Team	Means the design team appointed to undertake the USDTS services
Works	Means the works to be performed by a major works contractor under a Project Deed.

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Executive Summary

A Services and Utilities Infrastructure Report dated November 2018 was prepared as Appendix FF of the Environmental Impact Statement for the concept SSD Application to specifically respond to the Secretary's Environmental Assessment Requirements (SEARs) issued on 26 September 2018. Following Exhibition of the Environmental Impact Statement, the design of the OSD has responded to issues raised in submissions. The purpose of this report is to identify those changes in the Amended OSD Scheme and to assess the impacts of changes with regards to Services and Utilities Infrastructure.

This report supports a concept State Significant Development Application (concept SSD Application) submitted to the Department of Planning, Industry and Environment (DPIE) for the Over Station Development (OSD) above Crows Nest Metro station.

This report specifically provides a Services Infrastructure Assessment that has been undertaken for the OSD concept drawings prepared by Sydney Metro in support of the concept SSD Application and Secretary's Environmental Assessment Requirements (SEARs).

The design of the OSD is an integrated design solution to occur in parallel with the station design. The station designers are to make provisions to for the OSD to be constructed after the station has become operational with no impact on Sydney Metro operations. The physical provisions for utilities connections and infrastructure below the Transfer Level are planned to be undertaken as part of the station works under the CSSI Approval. This strategy is aimed at reducing the potential for future disruption to the Metro Station and surrounding areas should the OSD construction be delayed after the completion of the station.

This assessment includes the infrastructure capacity required to service the retail, residential and the commercial tenancies for the indicative OSD design. Based on preliminary consultation between Sydney Metro and the relevant Utility Services Providers, there is either sufficient capacity in the existing infrastructure or upgrade works can be provided to accommodate the proposed indicative OSD Design. A summary of the relevant Utility Service Providers are listed below:

- Sydney Water Corporation - Sewage and Potable Water
- North Sydney Council - Stormwater
- Jemena - Gas
- Ausgrid - Electrical
- NBN - Telecommunication
- Optus - Telecommunication
- Telstra - Telecommunication.

Based on the Crows Nest Stations OSD Services Infrastructure Assessment and preliminary consultation between Sydney Metro and the relevant Utility Services Providers, it is believed that there is insufficient capacity in the existing infrastructure and upgrade works on the Sydney Water Potable Water will need to be carried out to accommodate the proposed

indicative OSD Design. Further consultation will be required with Jemena to confirm the reticulated gas main in Oxley Street will require augmentation.

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 in subsequent stages of design.

1.0 Introduction

1.1 Purpose of this report

This report supports the Response to Submissions Report (Submissions Report) for the concept State Significant Development application (concept SSD Application) submitted to the Department of Planning, Industry and Environment (DPIE) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The concept SSD Application is made under Section 4.22 of the EP&A Act.

Sydney Metro is seeking to secure concept approval for a mixed use development comprising three buildings above the Crows Nest Station, otherwise known as the over station development (OSD). The concept SSD Application seeks consent for building envelopes and land uses, maximum building heights, maximum gross floor areas, pedestrian and vehicular access, circulation arrangements and associated car parking and the strategies and design parameters for the future detailed design of the development.

The station and public domain elements form part of a separate planning approval for Critical State Significant Infrastructure (CSSI) approved by DPIE on 9 January 2017.

As the development is within a rail corridor, is associated with railway infrastructure and is for commercial premises and residential accommodation with a Capital Investment Value of more than $30 million, the project is identified as State Significant Development (SSD) pursuant to Schedule 1, 19(2)(a) of the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP). The development is, therefore, State significant development for the purposes of Section 4.36 of the EP&A Act.

A Services and Utilities Infrastructure Report (2018) was prepared as Appendix FF of the Environmental Impact Statement for the concept SSD Application to specifically respond to the Secretary's Environmental Assessment Requirements (SEARs) issued on 26 September 2018. Following Exhibition of the Environmental Impact Statement, the design of the OSD has responded to issues raised in submissions. The purpose of this report is to identify those changes in the Amended OSD Scheme and to assess the impacts of changes with regards to Services and Utilities Infrastructure.

1.2 Changes between the Exhibited Scheme and Amended Scheme

In response to the submissions made on the Exhibited Scheme, the following changes have been made to the concept SSD Application under what is termed the Amended Scheme:

- Changes to the building envelope
- Changes in proposed land use on each site
- Reduction in car parking numbers
- Inclusion of an articulation zone
- Clarification on the provision of social infrastructure

- Amendments to the Design Guidelines.

These changes are described in further detail in Chapter 7 of the Submissions Report. The western elevation of the Amended Scheme is shown below, with a summary of the changes between the Exhibited Scheme and Amended Scheme provided in the table below.

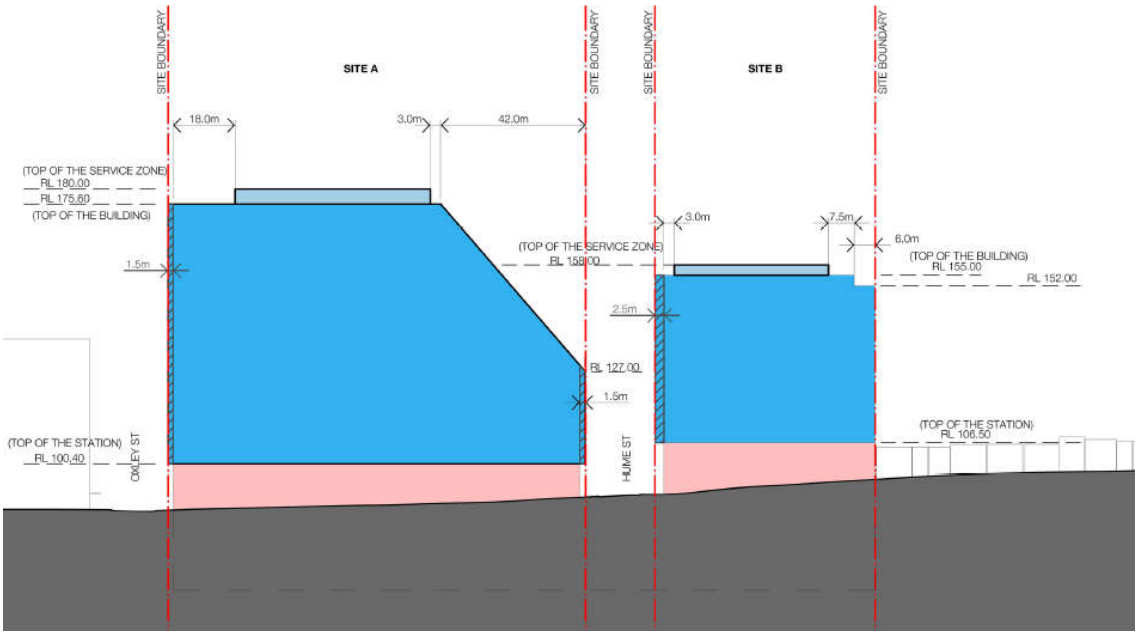


Figure 1 - West elevation of the building envelope under the Amended Scheme, showing CSSI Approval (pink) and OSD components (blue)

Table 1 - Changes to the overall concept scheme per site under the Exhibited Scheme and Amended Scheme (excluding station GFA)

	Exhibited Scheme[1]	Amended Scheme[1]
Site A		
Land Use	Residential[2]	Commercial
GFA	37,500m^2	40,207m^2
Max height – top of roof (RL)	183	175.6

	Exhibited Scheme[1]	Amended Scheme[1]
Max height – top of services zone (RL)	188	180
FSR - OSD	9.67:1	10.4:1
Non-residential FSR - OSD	0.7:1	10.4:1
Car parking	125	46
Site B		
Land Use	Tourist / visitor accommodation	Residential
Max height – top of roof (RL)	155	155
Max height – top of services zone (RL)	158	158
GFA	15,200m^2	12,685m^2
FSR - OSD	8.12:1	6.8:1
Non-residential FSR - OSD	8.12:1	0.1:1
Car parking	25	55
Site C		
Land Use	Commercial[2]	Commercial
Max height – top of roof (RL)	127	127
Max height – top of services zone (RL)	132	132
GFA	2,700m^2	3,031m^2
FSR – OSD	4.44:1	4.9:1
Non-residential FSR - OSD	4.44:1	4.9:1
Car parking	0	0

[1] GFA figures exclude GFA attributable to the station and station retail space approved under the CSSI approval

[2] The Exhibited Scheme included a provisional option for social infrastructure GFA to be located on Site A or Site C inclusive of the GFA figures nominated above.

The revised concept SSD Application (SSD-9579) under the Amended Scheme seeks approval for the following:

- maximum building envelopes for Sites A, B and C, including street wall heights and setbacks as illustrated in the plans prepared by Crows Nest Design Consortium for Sydney Metro at Appendix A to the Submissions Report
- maximum building heights:
    - **Site A:** RL 175.60 metres or equivalent of 21 storeys (includes two station levels and conceptual OSD space in the podium approved under the CSSI Approval)
    - **Site B:** RL 155 metres or equivalent of 17 storeys (includes two station levels and conceptual OSD space approved under the CSSI Approval)
    - **Site C:** RL 127 metres or 9 storeys (includes two station levels and conceptual OSD space approved under the CSSI Approval)

***Note 1**: the maximum building heights defined above are measured to the top of the roof slab and exclude building parapets which will be resolved as part of future detailed SSD Application(s)*

- maximum height for a building services zone on top of each building to accommodate lift overruns, rooftop plant and services:
    - **Site A:** RL 180 or 4.4 metres
    - **Site B:** RL 158 or 3 metres
    - **Site C:** RL 132 or 5 metres.

***Note 1**: the use of the space within the building services zone is restricted to non-habitable floor space.*

***Note 2**: for the purposes of the concept SSD Application, the maximum height of the building envelope does not make provision for the following items, which will be resolved as part of the future detailed SSD Application(s):*

- *communication devices, antennae, satellite dishes, masts, flagpoles, chimneys, flues and the like, which are excluded from the calculation of building height pursuant to the standard definition in NSLEP 2013*
- *architectural roof features, which are subject to compliance with the provisions in Clause 5.6 of NSLEP 2013, and may exceed the maximum building height, subject to development consent.*

- maximum gross floor area (GFA) of 56,400 square metres for the OSD comprising the following based on the proposed land uses:
    - **Site A:** Commercial office premises - maximum 40,300 square metres
    - **Site B:** Residential accommodation - maximum of 13,000 square metres
    - **Site C:** Commercial office premises - maximum of 3,100 square metres

Note: *GFA figures exclude GFA attributed to the station and station retail space approved under the CSSI Approval*

- minimum non-residential floor space for the OSD across combined Sites A, B and C of 43,505 square metres
- the use of approximate conceptual areas associated with the OSD which have been provisioned for in the Crows Nest station box (CSSI Approval) including areas above ground level (i.e. OSD lobbies and associated spaces)
- a maximum of 101 car parking spaces on Sites A and B associated with the proposed commercial and residential uses
- modulation and expression of built forms within an articulation zone extending to the property boundary
- loading, vehicular and pedestrian access arrangements
- strategies for utilities and services provision
- strategies for managing stormwater and drainage
- a strategy for the achievement of ecological sustainable development
- a public art strategy
- indicative signage zones
- a design excellence framework
- the future subdivision of parts of the OSD footprint, if required.

2.0 Scope of Assessment

This report outlines utility Service Infrastructure Assessment that has been undertaken for the OSD concept drawings prepared by Sydney Metro for the OSD at Crows Nest in support of the concept SSD Application and Secretary's Environmental Assessment Requirements (SEARs).

The assessment includes the infrastructure capacity required to service the retail tenancies and the commercial floor space in the indicative OSD design, however the physical provisions for utility connections and plant rooms below the Transfer Level are planned to be undertaken as part of the station works under the CSSI Approval. This strategy is aimed at reducing the potential for future disruption to the Metro Station and surrounding areas should the OSD construction be delayed after the completion of the station.

Design development has been undertaken in conformance with the Sydney Metro City & Southwest Chatswood to Sydenham Design Guidelines June 2017. The following tasks were also undertaken as part of this report:

- Review of relevant legislation, policies and guidelines associated with services infrastructure assessment
- Review of PB-AECOM JV Reference Design for the Sydney Metro – City & Southwest project, (which precludes the Stage 1 Design)
- Preparation of briefing calculations to inform consultation by the Water Services Coordinator (WSC) and Level 3 Accredited Services Provider, engaged by Sydney Metro
- Consultation with Sydney Metro Technical Advisors, (conducting 40% Stage 1 Design); in relation to utility services infrastructure and demand.

The report content incorporates a number of key utilities noted below in Table 1.

Table 1 Key Utilities

Utility	Notes
Stormwater drainage	Dedicated OSD connection to drainage network
Sewerage	Dedicated OSD infrastructure connection
Potable water	Dedicated OSD infrastructure connection
Gas	Dedicated OSD infrastructure connection
Telecommunications	Dedicated OSD infrastructure connections
Electricity	Dedicated OSD infrastructure connections

The scope of services does not consider the utilities assessment associated with the proposed Sydney Metro Station building. Due the interconnectivity of the Sydney Metro Station and OSD, references to the station services have been included to provide context for the proposed OSD concept proposal where relevant.

2.1 Assessment Summary

A series of collaborative workshops to coordinate designs have been undertaken with the Sydney Metro Technical Advisors to identify challenges and propose solutions for the supply of utility services to the OSD atop Crows Nest Station.

The assessment provides infrastructure capacity requirements to service both the commercial floor space and the retail tenancies in additional to providing an assessment of lead-in services connections to the OSD through the Crows Nest Station. The proposed utility requirements identified include the following:

Site A:

- OSD sewerage drainage connections to Clarke Lane
- OSD stormwater connections to Clarke Lane
- OSD potable water connection to Pacific Highway
- OSD (Site A, B, C) fire water connection to Pacific Highway
- OSD gas connections to Oxley Street
- OSD Electrical connection to Clarke Lane

Site B:

- OSD sewerage drainage connections to Clarke lane
- OSD stormwater drainage connections to Clarke Lane
- OSD potable water connection to Pacific Highway
- OSD gas connection to Pacific Highway
- OSD Electrical connection to Clarke Lane

Site C:

- OSD's sewerage drainage connections to Clarke Lane
- OSD stormwater drainage connections to Clarke Street
- OSD's potable water connection to Hume Street
- OSD gas connection to Hume Street.

OSD Electrical connections have been shown indicatively in utilities plans subject to detail design at next stage. All OSD connections approvals are to be submitted by OSD team at next stage of design.

Telecommunication connections are to be advised by the maintenance team (MTR) and this is to be provided at the next stage of design.

3.0 Authorities Interface

The following section is a summary of the latest correspondence, application submissions and assessments conducted with various Utility Service Providers for the development of the Crows Nest Station OSD Design.

3.1 Sydney Water Corporation

A feasibility application for the OSD water and sewerage connections as part of the Section 73 Feasibility Application for Crows Nest Station has been submitted to Sydney Water Corporation (SWC). This has been documented in Appendix A of this report. This process was also undertaken to understand if and to what extent the existing infrastructure is to be augmented for the new development.

Potable water has been accepted as per SWC Feasibility Letter response (27/09/2019 under Case 179214) with exception for the Fire Water Services which will require a new Section 73 application being made based on the expected fire flows in addition to new applications being made for the fire connections and associated pump approvals.

3.2 North Sydney Council

In the context of utilities, North Sydney Council (NSC) have provided Sydney Metro the necessary permissible site discharge (PSD) limits for storm water drainage discharge for the OSD sites to inform the on-site detention tank sizes.

3.3 Jemena

A preliminary assessment of Jemena's existing gas infrastructure and network's capacity to service the new developments around Sydney Metro Stations has been conducted by Sydney Metro and Jemena. The recommendations on route selection and reinforcements are subject to change with a detailed review of the proposed gas supply options and as design progresses.

Currently, Jemena has prepared a feasibility assessment of proposed developments at Crows Nest and provided budgetary cost estimates for the site. Due to the exhibited OSD Designs large gas load, network augmentation was required Atchison St to Oxley St, adjacent to the OSD site, to meet the required demand.

An updated estimation of the design loads were submitted to Jemena on 19/08/2019. Jemena will model the network based on the updated demands and, if required, coordinate network augmentation works.

3.4 Ausgrid

Sydney Metro commenced engagement with Ausgrid in 2017 to obtain Design Information Packages (DIP) for the proposed supply connection for the over-station development. However, due to the change in design load, the connection applications need to be revised.

Currently, an Ausgrid level 3 Accredited Service Provider (ASP3) has been engaged to prepare connection applications for the proposed Crows Nest Station and OSD. Project numbers have been created by Ausgrid per the received responses. These offers have been accepted by Sydney Metro and the team is awaiting DIP from Ausgrid. Once the DIP is received, the ASP3 designer will be engaged to complete preliminary design of the connections for the Sydney Metro Station and OSD.

3.5 Telecommunications

Sydney Metro have conducted consultation with major telecommunications providers, Including Telstra, NBN and Optus.

The developer of the OSD will undertake further consultation as the design progresses and seek approvals based on their final design.

The development will need to be registered with the NBN Co. All external works will be done by the carriers. All internal works will be completed as part of the developer works in accordance with the carriers' requirements.

4.0 Relevant Standards and Guidelines

The proposed utilities design works will comply with the applicable requirements of the below listed Standards and Design Guidelines that are relevant to the scope of the design.

In accordance with the Sydney Metro's Scope and Performance Criteria, the hierarchy of the codes and standards will be as follows:

(i) Acts and secondary legislation

(ii) TfNSW and other NSW Government agencies' documents and standards as listed in this below. These include ASA, RMS, NSW EPA, Sydney Buses, etc.

(iii) Australian Standards and Guidelines (AS, AS/NZS, Austroads, Engineers Australia, ISCA, etc.)

(iv) International Standards (ISO, IEC, IEEE, CENELEC, ITU, etc.)

(v) European Norms (EN, TSI)

(vi) Other relevant International standards, which must be reviewed by Sydney Metro and approved by the Independent Certifier prior to use.

4.1 Australian Standards and Authority Guidelines

- NCC (BCA) National Construction Code (Building Code of Australia)
- AS 1345 Identification of contents of pipes, conduits and ducts
- AS/NZS 1477 - 2006-PVC Pipes and Fitting for Pressure Application
- AS 1342 - Precast Concrete Drainage Pipes
- AS 1345 - Identification of the Contents of Piping, Conduits and Ducts
- AS 1631 - Cast Iron Non-Pressure Pipes and Pipe Fittings
- AS 2032 Code of Practice for installation of UPVC Pipe Systems
- AS 2033 Installation of polyethylene pipe systems
- AS/NZS 2033 - 2008 -Installation of Polyethylene Pipe Systems
- AS 2200 - 2006 - Design Charts for Water Supply and Sewerage
- AS/NZS 2053.1 - Conduits and fittings for electrical installations - General requirements
- AS/NZS 2053.2 - Conduits and fittings for electrical installations - Rigid plain conduits and fittings of insulating material

- AS/NZS 2053.8 - Conduits and fittings for electrical installations - Flexible conduits and fittings of metal or composite material
- AS 2566.1 - 1998-Buried Flexible Pipelines – Structural Design
- AS/NZS 2638 - 2011-Gate Valves for Waterworks Purposes
- AS 2941 - 2013-Fixed Pump set installations
- AS/NZS 3000 - Electrical installations - Buildings, structures and premises (known as the Wiring Rules)
- AS/NZS 3500 - 2015-Plumbing and Drainage
- AS 3725 - 2007-Design for Installation of Buried Concrete Pipes
- AS/NZS 4129 - 2008-Fittings for Polyethylene Pipes for Pressure Purposes
- AS/NZS 4130 - 2009-Polyethylene Pipes for Pressure Purposes
- AS 5200.000 - 2006-Plumbing and Drainage Products
- AS 5601 - Gas Installation Code
- BCA 2016 - Building Code of Australia
- WSA 02 - 2014-Gravity Sewerage Code of Australia
- WSA 03 - 2011-Water Supply Code of Australia

4.2 Guidelines

- Australian Rainfall & Runoff.

4.3 RMS Specifications

- RMS 3051 RMS Specification D&C 3051 - Granular Base and Subbase Materials for Surfaced Road Pavements
- RMS 3552 Subsurface Drainage Pipe (Corrugated Perforated and Non-Perforated Plastic)
- RMS D&C 3557 - Flexible Strip Filter Drains
- RMS D&C 3058 - Aggregate Filter Materials for Subsurface Drainage
- RMS B341 RMS QA Specification B341 - Demolition of Existing Structure
- RMS Pub 13.184 Traffic Modelling Guidelines. (Issued Feb 2013)
- RMS Q6 RMS Specification D&C Q6 - Quality Management System

- RMS D&C R11 - Stormwater Drainage
- RMS D&C R83 - Jointed Concrete Base
- RMS D&C R132 - Safety Barrier Systems
- RMS D&C R44 - Earthworks
- RMS D&C R58 - Construction of Reinforced Soil Walls (Contractor's Design).

4.4 Council Standards

- North Sydney Council standards
- North Sydney Development Control Plan 2013- Complete
- North Sydney Council, Performance Guide for Engineering & Construction
- North Sydney Council, Infrastructure specification for roadworks, drainage, and miscellaneous works 2016/2017
- Development Control plan 2002 and Area Character Statements.

5.0 Utilities Assessment

The following section provides the existing and proposed utility services infrastructure assessment that has been undertaken for the OSD Preliminary drawings prepared by Sydney Metro for the OSD at Crows Nest in support of the DA Application.

It is noted that the utilities that serve the OSD will be completely separate from those serving the Metro station though are planned to be constructed as part of the station works under the CSSI Approval. This strategy will mitigate the requirements for additional excavation at the time of the OSD construction and reduce the impact to the Sydney Metro Station.

The connections described herein this report are subject to an application process and approval by the relevant Utility Service Provider with formal applications required to be made for their approval along with payment of the required fees.

The Dial Before You Dig (DBYD) information plans obtained for the preparation of this report may be outdated as a result of the advanced works of the Tunnel Site Excavation (TSE) Contractor with services temporarily relocated, capped or made redundant. Refer to Appendix A for Sydney Metro's "Utilities Status Document" in which the latest Crows Nest Station utilities works is available.

The Department of Planning, Industry and Environment (DIPE) has released a Draft 2036 Plan Utilities Study on the 16th October 2018 for exhibition that will eventually form part of the 2036 Planning Package. Subsequent Crows Nest Utilities Assessment is to make reference to the utilities study.

5.1 Stormwater Infrastructure

5.1.1 Existing Trunk Drainage Infrastructure

North Sydney Council are the service authority responsible for the operation and maintenance of the existing trunk drainage stormwater infrastructure within the Crows Nest Station site area.

A summary of the existing underground drainage infrastructure from DBYD and survey information are shown below. Existing underground stormwater drainage assets are located along the southern side of Oxley Street, the western side of Clarke Street and the southern side of Hume Street.

As per supplied survey information the Clarke Street and Oxley Street Intersection drainage lines are noted to be nominal 750 diameter. The drainage line along Clark Street to the junction at Oxley Street is a nominal 375 pipeline. The drainage lines in Hume Street are noted to range between 300, 375 and 525mm nominal pipe size.

Figure 2 Existing Trunk Stormwater Network.

5.1.2 OSD Stormwater Strategy

Reference should be made to the Sydney Metro City & South West - Crows Nest Over Station Development –Appendix W for details on the proposed indicative OSD design stormwater management strategy and associated drainage calculations. Refer to Appendix H for the currently proposed utilities information plan.

A summary of the proposed stormwater connections is provided below:

5.1.2.1 Site A Connection

The station design makes provision for three connections points from the OSD to the council system at Site A. This includes two 300mm downpipes and a 225mm stub. The Site A OSD can use three detention tanks to discharge through these three connection points.

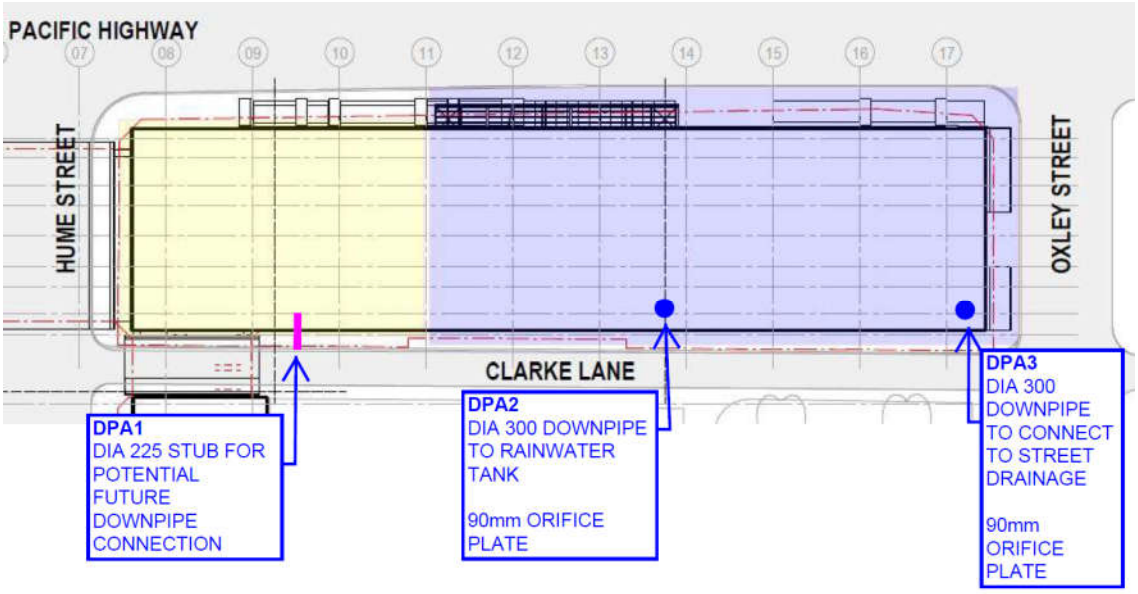


Figure 3 OSD Site A Outlets

5.1.2.2 Site B Connection

The station design makes provides two 300mm downpipes to be used at Site B for stormwater connections from the OSD to the council system. The Site B OSD can use two detention tanks to discharge through these two connection points.

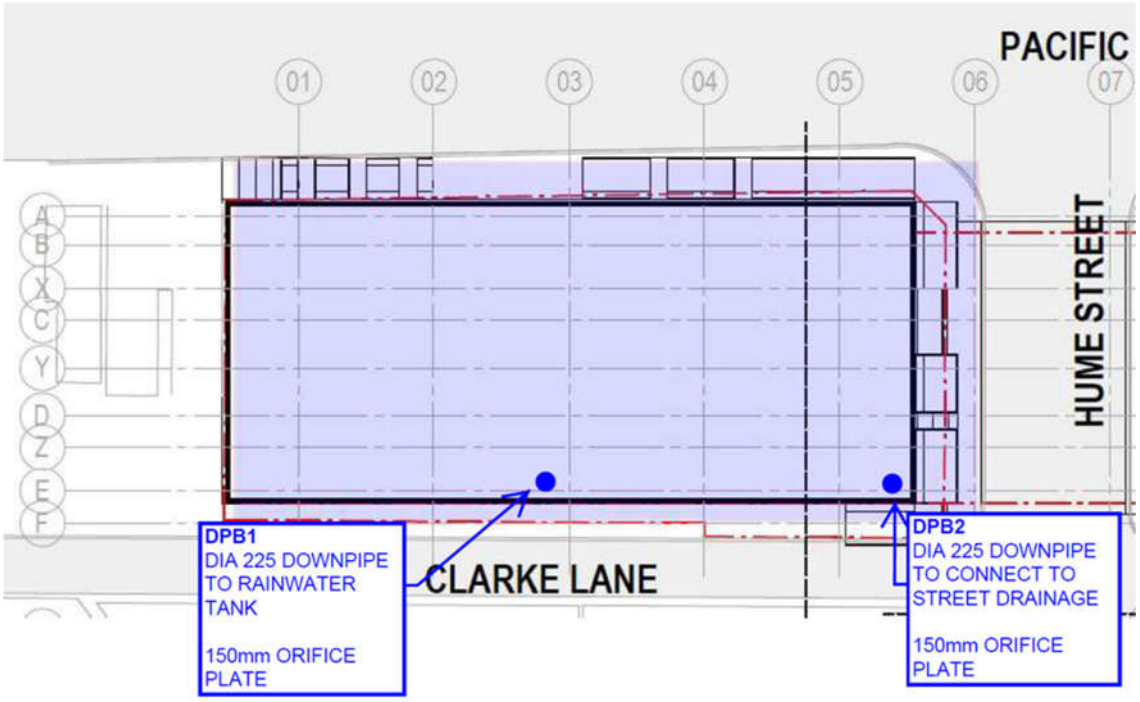


Figure 4 OSD Site B Outlets

5.1.2.3 Site C Connection

It is proposed to connect a 300mm diameter pipe from the OSD to the council system. This will carry primary discharge from the detention tank.

5.1.3 Proposed Stormwater Peak Discharge Assessment

Technical requirements for on-site detention are outlined in the draft Issue of the 'Sydney Metro City & Southwest- Performance Requirements Brief and the Sydney Metro City & South West - Crows Nest Over Station Development – "Flood Assessment and Stormwater Management" report. Such requirements include on-site detention tanks discharging to specific points along the Council stormwater system. Each of the OSD sites will require their own flow control devices and on-site detention tanks.

Detention has been sized to comply with North Sydney Council's Stormwater Management Policy and Permissible Site Discharge (PSD) for the 100-year Average Recurrence Interval (ARI):

It should be noted that these figures are indicative only, based on the indicative OSD design and may be subject to change with further design development. The performance criteria for On Site Detention is stated as the below

- Maximum PSD of 151 L/S for Site A
- Maximum PSD of 73 L/S for Site B

- Maximum PSD of 24 L/S for Site C.

Reference should be made to the Flood Assessment and Stormwater Management report – Appendix W for further detailed information on the proposed OSD peak discharge arrangements and onsite detention requirements for the site.

5.2 Sewerage Infrastructure

5.2.1 Existing Infrastructure

Sydney Water Corporation (SWC) are the service authority responsible for the operation and maintenance of the existing sewerage infrastructure within the site area.

The existing infrastructure shown in Figure 10 is based on the DBYD response from Sydney Water and available survey information.

The existing SWC sewerage mains near the site include:

- 225mm vitrified clay (VC) sewerage main running along Clarke lane, Oxley Street and Hume street.

A Feasibility Application has been lodged as part of Sydney Metros Stage 1 Design to SWC to confirm viable sewerage servicing options. The feasibility application will provide details on the existing and remaining capacities of the sewerage main in the surrounding area.

Based on the feasibility letter received from SWC (Case Number 179214), the 225mm VC sewerage main in Clarke Lane can service both the proposed Sydney Metro Station and OSD.

Figure 5 Existing Reticulated Sewerage Infrastructure

5.2.2 Sewerage Demand Assessment

A feasibility letter for the station and OSD precincts was submitted under Case 179214, with the feasibility advice letter from Sydney Water received on 27 September 2019 and supersedes the existing advice letter submitted by Metron under Case number 165996. A high-level flow estimation was completed using Sydney Water's – 'Average daily water use' and applying a discharge factor of 0.8 to estimate the potential discharge of sewerage.

Discharge summaries are as follows;

- OSD A – 88kL/day with a maximum permissible simultaneous discharge (PSD) of 8L/S
- OSD B - 63kL/day with a maximum permissible simultaneous discharge (PSD) of 7.5L/S
- OSD C - 9kL/day with a maximum permissible simultaneous discharge (PSD) of 4.5L/S.

The connection locations of the OSD A, B and C can be made to the existing DN225 vitrified clay sewer along Clarke Lane, which has sufficient capacity to serve the over station development as per the feasibility study.

5.2.3 OSD Sewerage Connection Strategy

5.2.3.1 Site A Connection

It is proposed the Site A OSD Building will connect to the authority's 225mm sewerage main in Clarke Lane. The sewer will extend and terminate at the site's boundary adjacent to the sewer boundary trap riser locations for the OSD building. Spatial allocations have been coordinated by MEP to facilitate the installation of the sewerage drainage extending from the civil capped services to the OSD spatial zone above Ground Floor.

- 225mm sewerage pipe connection is proposed.

5.2.3.2 Site B Connection

It is proposed for Site B OSD to connect to the authority's 225mm sewerage main in Clarke Lane. The sewer will extend and terminate at the site's boundary adjacent to the sewer boundary trap riser location for Site B.

Spatial allocations have been coordinated to facilitate the installation of the sewerage drainage extending from the civil capped service to the OSD spatial zone above Ground Floor.

- 225mm sewerage pipe connection is proposed.

5.2.3.3 Site C Connection

It is proposed for Site C OSD to connect to the authority's 225mm sewerage main in Clarke Lane. The sewer will extend and terminate at the site's boundary adjacent to the sewer boundary trap riser location for Site C OSD Building.

Spatial allocations have been coordinated to facilitate the installation of the sewerage drainage extending from the civil capped service to the OSD spatial zone above Ground Floor.

- Minimum 150mm sewerage pipe connection is required.

5.3 Potable Water Infrastructure

5.3.1 Existing Infrastructure

SWC is the service authority responsible for the operation and maintenance of the existing potable water infrastructure within the site area.

The existing potable water infrastructure shown below is based on the DBYD response from SWC and available survey information which indicates several existing SWC assets near the site including:

- 100mm cast iron cement lined (CICL) potable water main running along the western side of Clarke Street and the northern side of Hume Street
- 150mm cast iron cement lined (CICL) potable water main running along the northern side of the Pacific Highway
- 200mm potable water main (material varies) running along the western side of Oxley Street.

A Feasibility Application has been lodged as part of Sydney Metros Stage 2 Design to SWC to confirm viable potable water servicing options. The feasibility application will give details on the existing and remaining capacities of the water main in the surrounding area.

The Feasibility Advice letter received under Case 179214 stipulates the existing DN150 on Pacific Highway will need to be upsized to a DN250 as the existing main does not have sufficient capacity and is appropriately sized in accordance with the WSA guidelines. The existing main will need to be upsized from Oxley Street to Willoughby Road. The existing DN250 main on Willoughby Road will be the supply point for the OSD.

5.3.2 Potable Water Demand Assessment

A feasibility letter for the station and OSD precincts was submitted under Case 179214, with the feasibility advice letter from Sydney Water received on 27th September and supersedes the existing advice letter submitted by Metron under Case number 165996. A high-level flow estimation was completed using Sydney Water's – 'Average daily water use'. Proposed water consumption rates are as follows;

- OSD A - 110kL/day with a maximum peak flow of 11L/S
- OSD B - 78kL/day with a maximum peak flow of 9.5L/S
- OSD C - 11.5kL/day with a maximum peak flow of 6L/S.

5.3.3 OSD Potable Water Connection Strategy

The OSD potable water connections are distinct from the Sydney Metro Station's potable water supply and will be undertaken as part of the CSSI Approval process including extension from the existing SWC infrastructure to the allocated OSD water meter spatial zone for each site.

The proposed OSD water connections strategy and as further noted below. All proposed connection points to Site A and Site B are from the proposed DN250 DICL potable water main running along the Pacific Highway with Site C connecting to the DN100 CICL potable water main along Hume Street.

5.3.3.1 Site A Connection

OSD Site A - 150 potable cold-water connection is proposed from the proposed DN250 DICL potable water main running along the Pacific Highway.

5.3.3.2 Site B Connection

OSD Site B - 150 potable cold-water connection is proposed from the proposed DN250 DICL potable water main running along the Pacific Highway.

5.3.3.3 Site C Connection

OSD Site B - 100 potable cold-water connection is proposed from the existing DN100 CICL potable water main running along the Hume Street.

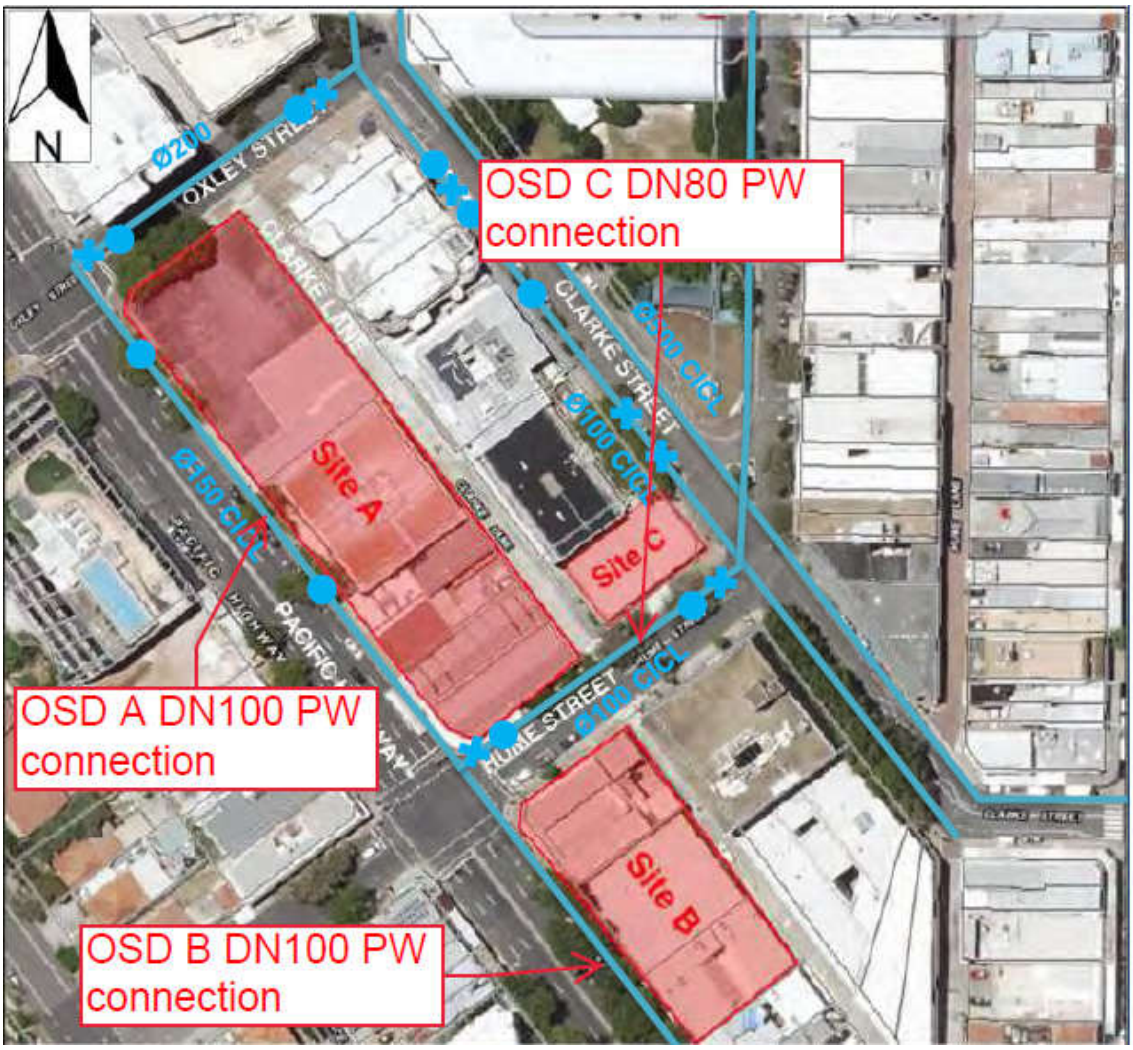


Figure 6 Proposed Cold Water connections

5.3.4 OSD Fire Demand Assessment

Site A:

- Fire Hydrants (L/S) - 20
- Fire Hose Reels (L/S) - 0.66
- Fire Sprinklers (L/S) - 12
- Fire Drenchers (L/S) - 20.

Site B:

- Fire Hydrants (L/S) - 20
- Fire Hose Reels (L/S) - 0.66
- Fire Sprinklers (L/S) - 12

- Fire Drenchers (L/S) - 20.

Site C:

- Fire Hydrants (L/S) - 20
- Fire Hose Reels (L/S) - 0.66
- Fire Sprinklers (L/S) - 6
- Fire Drenchers (L/S) - 20.

5.3.5 OSD Fire Connection Strategy

The fire services for the OSD sites are proposed to be a combined system based on a precinct-wide approach, i.e. one combined fire hydrant/sprinkler system (1) x system to serve all three sites.

The connection point for the combined fire system is from the Proposed DN250 DICL potable water main running along the Pacific Highway for sites A and B.

The connection point for the combined fire system is from the existing DN150 CICL potable water main running along the Hume Street for site C.

The combined fire main will extend and terminate at the site's boundary outside of the FRNSW booster enclosure. Spatial allocations have been coordinated by MEP to facilitate the installation of the fire main extending from the civil capped service to the booster enclosure. The booster enclosure is located facing the Pacific Highway on the south end of Site A at a central location to the three sites.

The booster has been space proofed to allow for separate inlets for each sub-ring main considered. This allows for multiple pressure zones to be allowed for in each building, and fire relay pumps have been allowed for in each development to facilitate this.

Reticulation of the fire pipes will run underneath Hume Street and Clarke Lane and above the Crows Nest Station structure to connect Sites A, B and C. This will provide a ring main to serve the Crows Nest precinct from a single system.

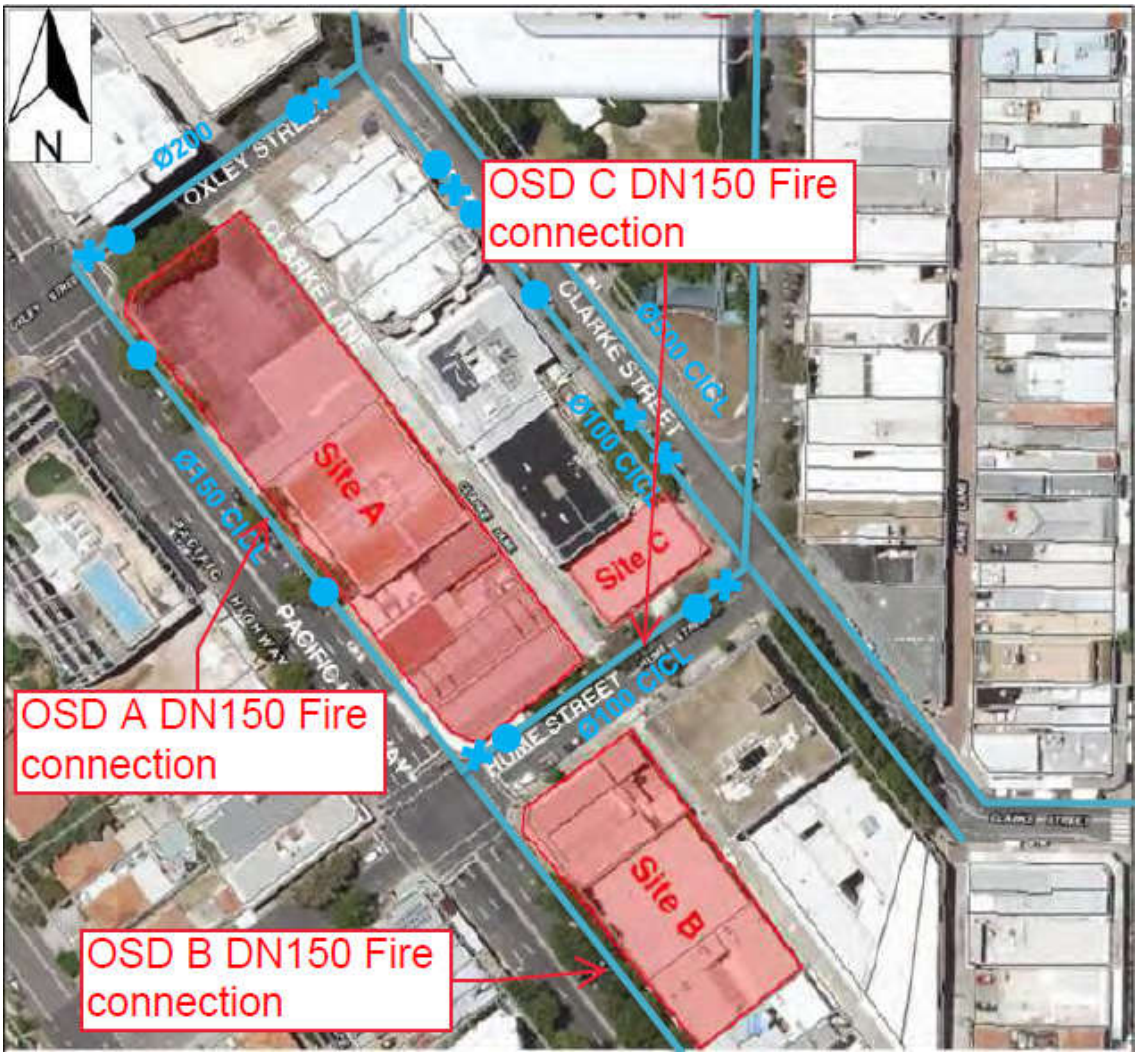


Figure 7 Proposed Fire Water connections

5.4 Gas Infrastructure

5.4.1 Existing Infrastructure

Jemena is the service authority responsible for the operation and maintenance of the existing pressurised gas infrastructure within the site area.

Based on the DBYD and survey information, Jemena have a number of assets in the vicinity of the site, which include:

- 50mm Nylon Line (210kPa) along the eastern side of Clarke Street, the northern side of Hume Street, the western side of Pacific Highway and the eastern side of the Pacific Highway starting.

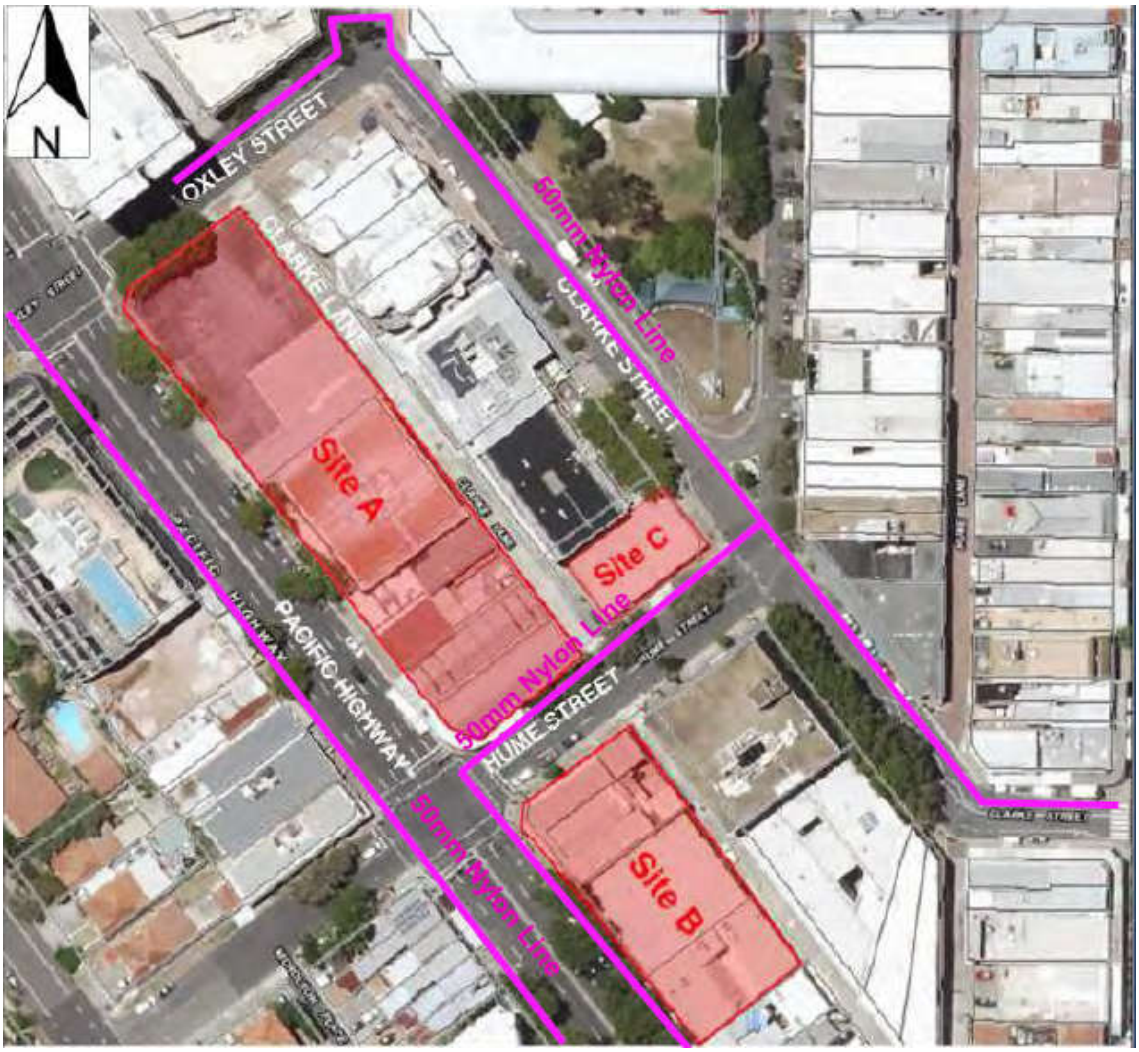


Figure 8 Existing Reticulated Gas Infrastructure

5.4.2 OSD Gas Demand Assessment

Table 2 OSD Gas Demand Assessment

Site	Hydraulic Gas Demand (Mj/H)	Mechanical Gas Demand (Mj/H)	Total Gas Load (Mj/H)	Remarks
Site A - Commercial	7,300	10,000	17,300	• Preliminary assessment based on past experience • Loads subject to detailed design • 6 x Retail tenancies assumed to be part of the OSD loads
Site B - Residential	8,700	-	8,700	• Gas for cooktops and central hot water plant

Site	Hydraulic Gas Demand (Mj/H)	Mechanical Gas Demand (Mj/H)	Total Gas Load (Mj/H)	Remarks
				• 4 x Retail tenancies assumed to be part of the OSD loads
Site C - Commercial	3,300	7,500	10,800	• Preliminary assessment based on past experience • Loads subject to detailed design • 1 x Retail tenancies assumed to be part of the OSD loads

5.4.3 OSD and Retail Gas Connection Strategy

The OSD gas connections are distinct from the Sydney Metro Stations system with spatial allowance outside of the Station's box and will be undertaken as part of the CSSI Approval process including extension from the existing Jemena gas infrastructure to the allocated OSD gas meter room spatial zone for each site.

Due to the previous OSD designs significant gas loads to service Site A, B and C, it was proposed that an upgrade of Jemena's reticulation was required in the vicinity of the OSD sites.

The upgrade work proposed incorporates the installation of one Cocon (high pressure regulator) on Atchinson Street and install approximately 210 metres x Ø110PE from the outlet of the Cocon along Oxley Street to adjacent of Site A, however, this upgrade is subject to network modelling currently being undertaken by Jemena.

Site B and C can be serviced off the Ø50 NY main along Pacific Highway and Hume Street respectively.

The proposed jemena upgrade is to be reassessed based upon the revised gas loads as per the above table.

5.4.3.1 Site A Connection

It is proposed the Site A OSD Building will connect to the new Ø110 gas mains to be installed along Oxley Street. The gas pipe for Site A will extend and terminate at the site's boundary adjacent to the gas meter room. Spatial allocations have been coordinated by MEP to facilitate the installation of the gas main extending from the civil capped service to the gas meter room on Ground Floor;

- OSD Site A Buildings North and South - Ø50 gas pipe is proposed from the Ø110 gas mains in Oxley Street
- One (1) gas meter room (Room No. D8C2) located on Ground Floor.

5.4.3.2 Site B Connection

It is proposed for Site B OSD Building North to connect to the existing 50mm gas mains located in Pacific Highway. The gas pipe for Site B will extend and terminate at the site's boundary adjacent to the gas meter room. Spatial allocations have been coordinated by MEP to facilitate the installation of the gas main extending from the civil capped service to the gas meter room on Basement L00 RL 91.00;

- OSD Site A Buildings North and South - Ø50 gas pipe is proposed from the 50mm gas mains located in Pacific Highway
- One (1) gas meter room (Room No. D8C2) located on Basement L00 RL 91.00.

5.4.3.3 Site C Connection

It is proposed for Site C OSD Building to connect to the existing 50mm gas main located in Hume Street. The gas pipe for Site C will extend and terminate at the site's boundary.

Site C is under design development with the location of the gas meter room still to be confirmed. However, spatial allocation has been coordinated to facilitate the installation of the gas pipe extending from the civil capped service to a feasible gas meter room for Site C.

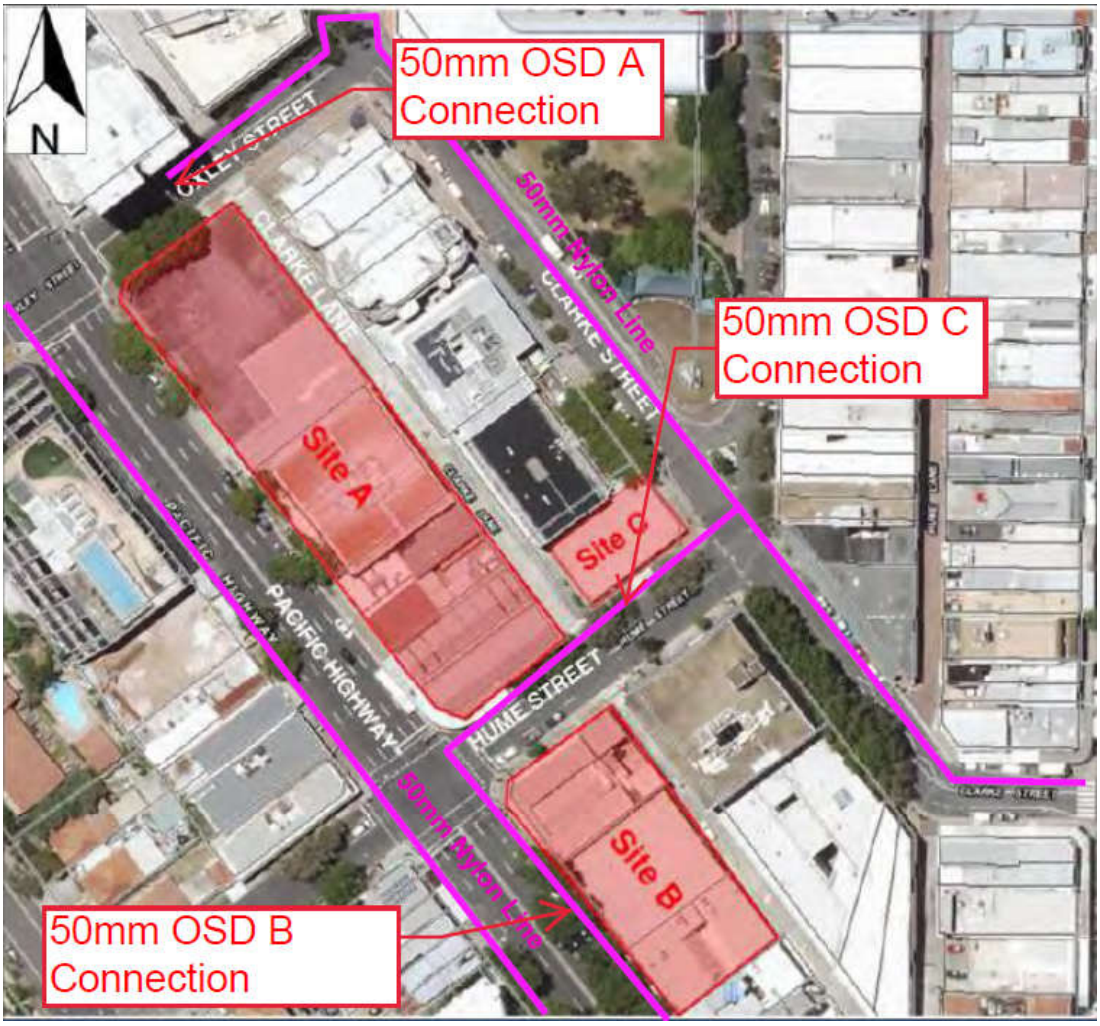


Figure 9 Proposed Gas connections

5.4.4 Gas Considerations

A gas boundary valve will be provided outside each of the OSD's building's boundary.

Jemena gas meters and regulators are proposed to be located within a dedicated room with direct street access.

Each gas meter and regulator room will contain:

- The Authority's boundary regulator
- The Authority's commercial OSD building gas meter
- The Authority's gas meters for the retail tenancies.

It is proposed for the gas service for each OSD building to extend from the gas regulator and meter:

- To each mechanical plantroom
- To each domestic hot water plant of each building
- To each residential hot water gas meter cupboard on each typical floor of the residential buildings.

5.5 Telecommunications Infrastructure

5.5.1 Existing Infrastructure

There are a number of existing telecommunications carriers surrounding the site. Based on the DBYD information, Telstra, Optus, NEXTGEN, and Verizon Business all have services along Hume Street, Pacific Hwy and Oxley Street. In addition, according to the NBN website, NBN services is available in the planned zone, as this is a major development, a dedicated fibre system will be required to service the apartments and commercial building.

5.5.2 OSD Connection Strategy

The OSD telecommunication connections are distinct from the Sydney Metro Station's telecommunication systems and will be undertaken as part of the CSSI Approval process including extension from the existing external infrastructure to the allocated OSD spatial zones above Ground Floor.

Building Distributor Rooms (BDR) shall be provided for each of the development's buildings to facilitate the NBN Co lead-in equipment as well as the Commercial and Retail tenancies arranged telecommunications infrastructure.

Building entry lead-in conduits are to interface with existing carrier infrastructure (Telstra, Optus, Verizon, NEXTGEN and future NBN services). Cabling within each building shall be provided by the NBN Co. Each OSD will need a communications room or equivalent to ensure a distribution frame (MDF or equivalent) can be installed as per authority requirements.

Existing NBN infrastructure will require extension from Oxley Street through Pacific Highway to ensure future provisions for connectivity Site A and B. NBN will also need to be extended through Hume Street to ensure future provisions to Site C.

Existing overhead Optus cables need to be buried as part of the precinct scope. All OSDs will have a frontage to Optus cables/conduits as part of the futureproofing requirements from the CNDC project.

5.6 Electrical Infrastructure

5.6.1 Existing Infrastructure

The OSD's site is located within the Ausgrid electricity supply network. Design and provision for the indicative OSD Design connections will occur as part of the CSSI approved works. The substation and connections will be part of the Indicative OSD Design works.

There are multiple existing Ausgrid substations identified on the Ausgrid DBYD plans within/nearby the development zone. The substations appear to supply low voltage to a number of properties adjacent to the site and associated street lighting. This substation situated in site A will be decommissioned as part of the CSSI approved works.

Sydney Metro commenced engagement with Ausgrid in 2017 to obtain Design Information Packages for the proposed supply connection for the over-station development. However, due to the change in design load, the connection applications will be revised and resubmitted.

5.6.2 OSD Connection Strategy

The OSD HV connections are distinct from the Station's telecommunication systems and will be undertaken as part of the CSSI Approval process including extension from the existing external infrastructure to the allocated OSD spatial zones above Ground Floor.

The proposed supply to the development shall be from underground high voltage cables leading in from Clarke Lane to a substation room located inside the building. This scheme is subject to final approval from Ausgrid. Please note that further coordination is required with the ASP3 designer and the Station design.

The HV cabling will be installed in a three hours fire rated concrete encasement until it enters the substations subfloors. The chamber substations will be a two hours fire rated enclosure.

5.6.3 Maximum Demand Assessment

- **Site A:** Maximum demand of 7,128kVa (with 25% spare)
- **Site B:** Maximum demand of 750kVa (with 25% spare)
- **Site C:** Maximum demand of 1,322kVa.

Note: the maximum demand is based on AS/NZS3000 Table C3 and also NS109 Table B:

- No diversity
- 140VA/m2 of commercial
- 120VA/m2 of retail
- 100VA/m2 for residential space
- 15VA/m2 for plant/carpark and BOH areas
- 5000VA/apartment (gas cooktop and centralised gas hot water)
- 10% spare for future design flexibility.

5.6.4 Substation Infrastructure Assessment

Based on the current maximum demand and Ausgrid information for substations firm rating (NS 109), the total number of chamber substation will be as follows:

Option 1 - 9,000kVa (9MVa) substation compromising of 2x4.5MVa chamber substations located on site to service Sites A and B

Option 2 - 4.5MVa transformer and 3MVa transformer to service Site A and 1.5MVa transformer to service Site B.

6.0 Protection of Existing Utility Infrastructure

As the Crows Nest OSD sits atop the Metro station, there are no earth works associated with the OSD project. These works will be undertaken as part of the station works under the CSSI Approval. As such the protection of existing in ground infrastructure is being undertaken as part of the CSSI approved works.

The approved CSSI works must be constructed in accordance with Sydney Metros Scope and Performance criteria below:

- All the Utility Services (including overland flow paths) potentially affected contractors and subcontractor's activities will be identified to determine requirements for adjustment, protection and support. This will be undertaken in consultation with the relevant Utility Service owner or Authority
- All Utility Services required for contractors and subcontractor's activities will be identified, and all necessary things will be done to provide and maintain connections to such Utility Services to the Sydney Metro Station works and the Temporary Works.

For Stage 1 design, the Sydney Metro Technical Advisors were provided with detailed survey of the horizontal geometry of utilities. Further detailed survey is required at the next stage of design for vertical depths of utilities to ensure sufficient clearances and cover for all services. The CSSI Approved works is to consider any temporary TSE Contract works that have occurred, with the need to minimise relocation of existing utilities shall be considered during the following design stages.

7.0 Conclusion

This report outlines the Services Infrastructure Assessment that has been undertaken for the OSD preliminary drawings prepared by Sydney Metro for the OSD at Crows Nest in support of the Council DA Application.

The Crows Nest OSD utility service design is an integrated solution that serves the OSD and Sydney Metro Station. The OSD utility services will be completely separate from those serving the Metro station though are planned to be constructed as part of the station works under the CSSI Approval. This will reduce the potential for future disruption to the Metro Station and surrounding areas should the OSD construction be delayed after the completion of the Metro Station.

Due to the advanced works of the TSE Contract, information plans obtained for the preparation of this report may, services may be outdated, temporarily relocated, capped or made redundant. It is imperative that the future OSD designer will seek the latest TSE contractor and survey information.

Based on the Crows Nest Stations OSD Services Infrastructure Assessment and preliminary consultation between Sydney Metro and the relevant Utility Services Providers, it is believed that there is insufficient capacity in the existing infrastructure and upgrade works on the Sydney Water Potable Water will need to be carried out to accommodate the proposed indicative OSD Design. Further consultation will be required with Jemena to confirm the reticulated gas main in Oxley Street will require augmentation.

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 in subsequent stages of design.

Appendix A - Sydney Water Corporation

Case Number: 179213

27 September 2019

Sydney Metro
c/- SMEC AUSTRALIA PTY LTD

LETTER of CONDITIONS
For
ADJUSTMENT/ DEVIATION/ EXTENSION OF A SYDNEY WATER ASSET

Applicant: **Sydney Metro**
Your reference: **30012631-Stage1**
Property location: **521 Pacific Highway, Crows Nest**
Your application date: **3 September 2019**

Note: **Level 1 water restrictions are now in place,** which limits how and when water can be used outdoors. This can impact you and your contractors in the activities relating to this proposal.
Using water to suppress dust is not restricted, but this does mean that you/your contractors will need to apply for an exemption permit to use water for most outdoor uses including:

- Cleaning equipment
- Drilling and boring, and
- Batching concrete on-site

Fines for deliberate breaches of restriction rules apply from 1 September 2019.
For more information on the restrictions and for applying for an exemption, visit our web site at http://www.sydneywater.com.au/SW/water-the-environment/what-we-re-doing/water-restrictions/index.htm
The more water everyone saves, the longer we can stave off the progression to stricter restrictions or emergency measures.
Please provide this information to your contractors and delivery partners to inform them of their obligations.

Dear Applicant

Sydney Water has received your application and the concept design to undertake work at the above location.

The proposal has been reviewed and you are required to do the following things:

- Amplify the DN 100 CICL Main from Oxley Street and Hume Street to DN150
- Install a hydrant either side of the dividing valve on the corner of Pacific Highway and Oxley Street
- When the DN150 main is reinstated it is to be amplified to a DN250 from Oxley Street to Willoughby Road (this will be a requirement of the Section 73 for the final Over Station Development)
- Undertake investigation as part of the design process to determine the full extent of any adjustments based on your final works design.

The asset adjustment and protection manual will detail and assist you in your review and the process that is required to be followed to complete all works.
The manual can be found on the following link: www.sydneywater.com.au/SW/SearchResults/index.htm?sUserText=asset+aDJUSTMENT+And+protection+manual

The Water Servicing Coordinator generally will be the single point of contact between you and Sydney Water. They can answer most questions you might have about our process and charges.

Consideration of the following minimum activities, listed in the manual, should also be undertaken:

1. Case Information Sheet: In completing and returning the attached case sheet, you acknowledge that this application is part of the Sydney Metro Project and is subject to the Sydney Metro Program – Sydney Water Interface Deed.

2. Design Package: A design package prepared by an appropriately listed designer must be lodged with Sydney Water, based on the relevant codes, standards and any requirement by Sydney Water. The designer prepares this design for the Water Servicing Coordinator to submit to Sydney Water together with any supporting documents and forms they need to support the design. Supporting documentation is listed in the manual.
   We will work with the designer to determine the best result for all parties, as during the design phase the adjustment of our services may affect your project design and vice versa. Once we complete the review, we will send the coordinator a Job Specific Schedule letter telling them this.

3. Permission to Enter: 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 Water Servicing Coordinator. Your Coordinator can also negotiate on your behalf. You will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

4. Construction Costs: Construction of the determined works will require you to pay project management, survey, design and construction costs directly to your Providers. **Additional costs payable to Sydney Water may include:**

- water main shutdown and disinfection;
- connection of new water mains to Sydney Water system(s);
- design and construction audit/inspection fees;
- contract administration, Operations Area Charge & Customer Redress prior to project finalisation;
- creation or alteration of easements including any compensation that may applicable;
- water usage charges where water has been supplied for building activity purposes prior to disinfection of a newly constructed water main.
- **Where Sydney Water has engaged or will engage specialist consultants to review your proposal, we will pass that direct cost back to you as part of the Contract Administration costs. E.g. Costs incurred from our Engineering Panel**

Note: Payment for any Goods and Services (including Customer Redress) provided by Sydney Water will be required prior to the release of the Bank Guarantee or Cash Bond.

Your Coordinator can tell you about these costs.

5. Variations: Any variation submitted to Sydney Water for approval during the design and/ or construction stages of the works must include the associated cost and details of the variation. Sydney Water will review the variation and advise of the outcome.

As soon as a variation occurs, Sydney Water is required to be notified in writing within 5 days of a variation being identified if reimbursement of costs will be required; it will detail the estimated cost of the variation, nature of variation and description on events and history.

All variations, where there is a contribution by Sydney Water must follow the Sydney Water (Urban Growth) Procurement Guidelines.

If any work on our assets is carried out without final Sydney Water 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.

END

Appendix B - Optus

16 September 2019

Avishall Chandra
Level 5, 20 Berry Street, North Sydney NSW 2060

Re: Aerial to Underground Relocation Core

Dear Avishall:

We refer to your request to do Aerial to Underground Relocation Core at Oxley ST, CROWS NEST.

As you may be aware, the infrastructure at this location was originally deployed by Optus as authorised under the Telecommunications Act 1991 and its continued existence is authorised by the Telecommunications Act 1997. With regard to your request to relocate the infrastructure, Optus will undertake the Project Work once you have formally agreed to the terms specified in our quotation.

Attached is a quotation for the Project Work. We highly recommend that you take time to read the quotation terms.

If you would like Optus to carry out the Project Work, please sign and email the Acceptance Quotation form to **NFODamages&RelocationsDropbox@optus.com.au**. By signing the Acceptance Quotation Form, you agree to Optus providing the Project Work under the terms and conditions set out in the quotation. You will be responsible for the cost of the Project Work.

Please note that once you have made payment, the quotation will be a tax invoice for GST purposes (please refer to the last page of the quotation for a copy of your tax invoice).

If you have any questions about the quotation, please do not hesitate to contact me.

Yours sincerely,

SNasalo

for

Alex Todorovic
Group Leader| ICM-1 / DART | National Field Operations | FNE
Optus Networks Pty Limited

Quotation
Terms and Conditions

16 September 2019

This quote will remain valid for 30 Days from the date hereon. Afterward, you may ask Optus to prepare another quote.

This Quotation (Q22438) is prepared for:

Level 5, 20 Berry Street, North Sydney NSW 2060
ABN: 47065475149

Site address	Oxley ST, CROWS NEST
Contact person:	Avishall Chandra
Contact details (phone, email):	0299255555, avishaal.chandra@smec.com
Project Work:	Aerial to Underground Relocation Core
Total cost (including GST):	$62,641.09

This quotation includes (check relevant box):

☒ Labour
☒ Materials including delivery to site
☒ Travel costs
☒ Excavation
☐ Excavation in rock
☒ Equipment
☒ Traffic Management
☒ Co-ordination with other adjoining service owners
☒ Commissioning
☐ Any specific approvals and permissions (please specify below)

Others (please specify below):

This quotation excludes (check relevant box):

☒ Physically relocating any pole
☒ Moving any other pole mounted services
☒ Work outside of normal working hours
☐ Excavation
☒ Excavation in rock
☒ Other carriers or authorities lease, inspection, establishment or consulting costs
☒ Remobilization costs
☒ Legal costs
☒ Search fees
☐ Surveying fees
☒ Any work that is unforeseeable from visual inspection of the site, any additional work as encountered during excavation or any
☒ Any specific approvals and permissions (please specify below)

Others (please specify below):

In the event that costs to be incurred in relation to any of the items referred to above as being excluded, Optus will submit a further Quotation, which needs to be paid prior to such costs being incurred by Optus.

1. Work Schedule:

(a) Optus will not commence work until:
  (i) you return to Optus the Quotation Acceptance Form signed by you; and
  (ii) full payment for the work is received from you.

(b) The Optus Project Engineer will contact you to discuss a start date for the work. There will be a minimum notice period of 3 Weeks from the date Optus receives the Quotation Acceptance form and full payment from you before work commences.

2. Payment Options:

(a) Payment for the work may be made through the following methods:

(i) **EFT** (electronic funds transfer) quoting the **Quotation#** on this document as your payment reference:

Bank: **ANZ**
Account Name: **Optus Billing Services**
BSB & Account: **012-052 775387028**
Reference Quotation: **Q22438**

(ii) **Cheque** (along with a copy of the signed Quotation Acceptance form) payable and sent to:

Optus Billing Services Pty Ltd
Attention: Shuping Yang
Level 3 Building C
1 Lyonpark Road, Macquarie Park NSW 2113

(b) Due to the volume of payments Optus receives, **it is important that you quote the correct reference (Quotation number)** in your payment and email the payment details to: **NFODamages&RelocationsDropbox@optus.com.au**

3. Assumptions

(a) The charges quoted is based on the following assumptions :

(i) Optus has unfettered rights of access to carry out the work;

(ii) you have obtained all necessary permissions, authorisations and licences (for example from utility companies, local authorities including environmental agencies, land owners or any interested third parties who may object to the work) to enable Optus to carry out the work;

(iii) the materials required for the work are freely available at the time the quotation is accepted by you and there is no time delay in procuring the materials;

(iv) there is no obstruction underground, contamination in the soil or other problems with the soil which prevents Optus from carrying out the works; and

(v) (and where applicable)
(A) to the extent that Optus undertakes inspection, maintenance or installation (as those terms are defined under the Telecommunications Act 1997 (Cth)(Act), the owner and any occupier agree that they do not require Optus to give notice of that activity under clause 17(1) of Schedule 3 of the Telecommunications Act 1997 (Cth); and
(B) the owner(s) and occupiers of the property in which the proposed work is to be carried out and the party to this agreement other than Optus will not seek compensation under clause 42 of Schedule 3 of the Telecommunications Act 1997 (Cth).

(b) In the event that any assumption above does not apply, Optus in its sole discretion and without any liability to you, may withdraw the quotation, amend the quotation or terminate this agreement.

4. Your Obligations

(a) You must:

(i) ensure that Optus personnel have full and safe access to the site / each site for the purpose of performing the work;

(ii) ensure that where and to the extent that Optus personnel are required to deploy to and /or work within the site(s), you must comply with Work and Health Safety Laws;

(iii) confirm with Optus which third party consents, including but not limited to permissions, authorisations and licences (for example from utility companies, local authorities including environmental agencies, land owners or any interested third parties who may object to the work) you will obtain to ensure Optus has unfettered access to perform the work, and which permissions, authorisations and licences Optus is to obtain directly. You must provide copies of all such consents to Optus before on or before Optus commences work; and

(iv) provide Optus with reasonable advance notification of any changes, projects or strategic direction that may impact the performance or scope of the work.

5. Termination

(a) You may cancel the work to be performed under the agreement by giving written notice to Optus. Upon receiving your notice, Optus will refund to you any up-front payment made by you for the work, less:

(i) any expenses Optus has incurred;

(ii) any unavoidable expenses; and

(iii) a percentage representing Optus' loss of profit.

(b) If Optus has already commenced work, it will stop performing the work when it receives your notice.

(c) Processing of the refund may take up to 15 business days.

6. Indemnity and Limitation of Liability

(a) You indemnify and will keep Optus indemnified against any Loss suffered or incurred by Optus in connection with a third party claim (including a claim based in negligence) in any way related to Optus' performance of the work under the agreement.

(b) Optus is only liable to you to the extent provided under this agreement. Optus is not liable to you for Consequential Loss in connection with the provision of the work or the agreement.

(c) Optus excludes all conditions and warranties implied into this agreement. If the law implies terms into this agreement and Optus breaches them, then Optus is liable to you. In those circumstances Optus is only liable for repairing or replacing the relevant goods, resupplying the relevant or equivalent services, or paying you the cost of doing so, and only as long as the goods or services are of a kind not ordinarily acquired for personal, domestic or household use or consumption.

(d) Optus will be liable for your Loss (but excluding any Consequential Loss) where it arises from:
   (i) the acts or omissions of Optus' subcontractors; or
   (ii) damage to your property; or
   (iii) personal injury or death to you or your personnel, ut only to the extent that it's caused or contributed to by Optus' negligent act or omission or the negligent act or omission of Optus' subcontractors, in connection with the agreement.

(e) Optus' liability for your Loss is reduced to the extent that your acts or omissions, or your equipment (or the acts, omissions or equipment of a third person but not Optus' subcontractor) cause or contribute to that Loss.

(f) To the extent Optus is liable to you in connection with this agreement, Optus' liability is limited to the lesser of the following:
   (i) the fees paid by you to Optus for the work to be performed under this agreement; or
   (ii) $500,000 in aggregate.

7. This agreement is governed by the laws of New South Wales, and all parties submit to the non-exclusive jurisdiction of the courts of New South Wales.

Definitions:

Consequential Loss means expenses incurred, loss of revenue, loss of profits, loss of anticipated savings or business, pure economic loss, loss of data, loss of goodwill, loss of value of equipment (other than cost of repair), loss of opportunity or expectation loss, and any forms of special, indirect, punitive or exemplary loss or damages, and any penalties or fines imposed by a Regulator, (even if such loss arises directly, naturally or in the usual course of things from any breach, action or inaction in question).

Loss means any loss, cost, liability or damage, including reasonable legal costs on a solicitor/client basis and includes Consequential Loss.

Quotation Acceptance/ Tax Invoice

Optus Billing Services Pty Limited ABN 95 088 011 536 as billing agent for Optus Networks Pty Limited 92 008 570 330 ("Optus")

Quote Date:	16 September 2019
Quotation/ Invoice Number:	Q22438
Project Number:	P1058137
Work to be done:	Aerial to Underground Relocation Core
Site address:	Oxley ST, CROWS NEST
Quote amount incl GST:	$62,641.09
GST included:	$5,694.64

This Quotation is being accepted by:

ABN: 47065475149

Contact name and Job title: Avishall Chandra,

(person authorised to sign this form on behalf of the above company)

Optus will not commence such works until this Quotation Acceptance form has been signed and full payment has been received.

By signing this Quotation Acceptance form, you warrant that you are authorised to sign this form and agree to the terms and conditions of the Quotation, including the cost for the work.

This document will be a TAX INVOICE for GST purposes once you make payment.

Bank:	**ANZ**
Account Name:	**Optus Billing Services**
BSB & Account:	**012-052 775387028**
Reference:	**Q22438**

---------- ----------

Signature Date

_____

Please email the signed Quotation Acceptance, together with the remittance advice or proof of your payment to NFODamages&RelocationsDropbox@optus.com.au, quoting Q22438 as your reference.

Appendix C - Hydraulic OSD Loads

Consultant Advice

From:	**Ashwin Muralidharan**	**Date:**	**5 Aug. 19**	**File No:**	S32225\001\H-\21\ca190703s0001	**Pages:**	4
Project:	**Sydney Metro Crows Nest Station Design Technical Services**					**No:**	**H-003**[2.0]

	Attention	Company	Email
To:	William Sherlock	SMEC Australia	William.Sherlock@smec.com
	Avishaal Chandra	SMEC Australia	Avishaal.Chandra@smec.com
	Willem VAN EDE	SMEC Australia	Willem.vanEde@smec.com
cc:	Dustin Hansen	Norman Disney & Young	d.hansen@ndy.com
	Kevin Rawsthorne	Norman Disney & Young	K.Rawsthorne@ndy.com
	Peter Koulos	Norman Disney & Young	p.koulos@ndy.com
	Prasad Surve	Norman Disney & Young	p.surve@ndy.com
	Sav Dell'aquila	SMEC Australia	sav.dellaquila@smec.com

Hydraulics – Section 73 – OSD Hydraulic Loads

This CAN has been prepared to provide the hydraulic demands for Crows Nest Station OSD development to assist with the Section 73 application. Please see below for demands.

1. Site A – Commercial

As per the CNM OSD Services Brief prepared by Woods Bagot, Site A consists of:

- 13 level commercial building, approx. area 40,000 m^2;
- Structure designed to be transferred to edge of TSE box;
- PCA Grade A commercial space appropriate to Crows Nest / North Sydney;
- Level 2 Mezzanine Crash deck lobby connected to level 2 public/private podium;
- Car Parking (location TBA);
- Plant rooms and services to be associated;
- 6 Star Green Star;
- Temporary Staging Works;
- End of Trip facilities.

Based on the above, the hydraulic loads are given below based on Sydney Water Average Daily Water Usage data and previous experience:

Sl. No	Description	Unit	Quantity
1.	Maximum demand of Potable Water	KL/Day	110
2.	Average demand of Potable Water	KL/Day	91
3.	Probable peak demand of Potable Water	L/Sec	11 (1)
4.	Maximum discharge of Waste Water discharge	KL/Day	88
5.	Average discharge of Waste Water discharge	KL/Day	72
6.	Probable simultaneous Waste Water discharge	L/Sec	8 (1)
Firefighting Requirements			
1.	Fire Hydrants	L/Sec	20 (2)
2.	Fire Hose Reels	L/Sec	0.66
3.	Fire Sprinklers	L/Sec	12 (3)
4.	Fire Drenchers	L/Sec	20 (4)

2. Site B – Residential

As per the CNM OSD Services Brief prepared by Woods Bagot, Site B consists of:

- Approx. area 19,000 m^2;
- Approx. 132 apartments
- Up to level 17;
- Compliant with Sepp65 environmental rules;
- Lobby access from ground floor;
- Provision of parking level as per North Sydney DCP;
- Plant rooms and services to be associated;
- Building to exceed minimum Basix requirements;
- Temporary Staging Works.

Based on the above, the hydraulic loads are given below based on Sydney Water Average Daily Water Usage data and previous experience:

Sl. No	Description	Unit	Quantity
1.	Maximum demand of Potable Water	KL/Day	78
2.	Average demand of Potable Water	KL/Day	65
3.	Probable peak demand of Potable Water	L/Sec	9.5 (5)
4.	Maximum discharge of Waste Water discharge	KL/Day	63
5.	Average discharge of Waste Water discharge	KL/Day	52
6.	Probable simultaneous Waste Water discharge	L/Sec	7.5

Firefighting Requirements			
1.	Fire Hydrants	L/Sec	20 (2)
2.	Fire Hose Reels	L/Sec	0.66
3.	Fire Sprinklers	L/Sec	12 (3)
4.	Fire Drenchers	L/Sec	20 (4)

3. Site C – Community Building

As per the CNM OSD Services Brief prepared by Woods Bagot, Site C consists of:

- 2 Levels of Child Care;
- 5 Levels of Commercial;
- Plant space on level 1 and level 9;
- 2266m² GFA of commercial space and 456m²of child care;

Based on the above, the hydraulic loads are given below based on Sydney Water Average Daily Water Usage data and previous experience:

Sl. No	Description	Unit	Quantity
1.	Maximum demand of Potable Water	KL/Day	12
2.	Average demand of Potable Water	KL/Day	10
3.	Probable peak demand of Potable Water	L/Sec	6 (1)
4.	Maximum discharge of Waste Water discharge	KL/Day	9.5
5.	Average discharge of Waste Water discharge	KL/Day	8
6.	Probable simultaneous Waste Water discharge	L/Sec	4.5 (1)
Firefighting Requirements			
1.	Fire Hydrants	L/Sec	20 (2)
2.	Fire Hose Reels	L/Sec	0.66
3.	Fire Sprinklers	L/Sec	6 (6)
4.	Fire Drenchers	L/Sec	20 (4)

Qualification list:

1. Probable peak demand for potable water and wastewater for site A and site C is subject to detailed design. This figure has been assumed based on the area of the proposed building;
2. Fire Hydrant flow rate based on 2 hydrants operating simultaneously and fire compartment area no greater than 5000 m^2;
3. Fire sprinkler demand based on OH2 classification for the car park levels being the worst case;
4. Requirement of fire drenchers subject to detailed design. Flow rate based on previous experience and proximity issues with other buildings and station box;
5. Probable potable water peak demand for site B based on 132 apartments;
6. No car park assumed for site C and sprinkler demand based on workst case of OHI for the plant rooms.

Above figures based on preliminary calculations and Sydney Water Average Daily Water Usage data.

NORMAN DISNEY & YOUNG

Ashwin Muralidharan
Senior Project Engineer (Hydraulic)
a.muralidharan@ndy.com

Appendix D - Gas OSD loads

From: Muralidharan, Ashwin
Sent: Monday, 19 August 2019 10:09 AM
To: Willem VAN EDE; Ashan JAYASURIYA; Avishaal CHANDRA
Cc: 30012631 - Crows Nest Station Design Consortium; Dhyan YAHAMPATH; Rawsthorne, Kevin
Subject: RE: Gas loads and connection location
Attachments: Crows Nest Station_Indicative Gas Connection Locations.pdf

Hi Team,

Please find below gas loads for the OSD sites. Attached is the Jemena DBYD drawing with markups of the indicative connection locations for the OSD's.

Site	Hydraulic Gas Demand (Mj/H)	Mechanical Gas Demand (Mj/H)	Total Gas Load (Mj/H)	Remarks
Site A - Commercial	7,300	10,000	17,300	Preliminary assessment based on past experience Loads subject to detailed design 6 x Retail tenancies assumed to be part of the OSD loads
Site B - Residential	8,700	-	8,700	Gas for cooktops and central hot water plant 4 x Retail tenancies assumed to be part of the OSD loads
Site C – Community / Commercial	3,300	7,500	10,800	Preliminary assessment based on past experience Loads subject to detailed design 1 x Retail tenancies assumed to be part of the OSD loads

Please note that the above has been calculated based on past experience with similar OSD projects and the provided GFA for the OSD's. The loads shall be confirmed during the detailed design stage prior to Jemena connection application and selection of all equipment, ESD strategy etc.

Regards,

Ashwin Muralidharan | Senior Project Engineer (Hydraulic)
T +61 2 9928 6800 | **D** +61 2 9928 6909 | **M** 0451 710 058
E a.muralidharan@ndy.com | www.ndy.com

Norman Disney & Young A Tetra Tech Company
Level 1, 60 Miller Street, North Sydney, NSW 2060, Australia
TETRA TECH HIGH PERFORMANCE BUILDING GROUP

From: Willem VAN EDE <Willem.vanEde@smec.com>
Sent: Friday, 16 August 2019 10:59 AM
To: Rawsthorne, Kevin <k.rawsthorne@ndy.com>; Muralidharan, Ashwin <a.muralidharan@ndy.com>; Ashan JAYASURIYA <Ashan.Jayasuriya@smec.com>; Rawsthorne, Kevin <k.rawsthorne@ndy.com>
Cc: 30012631 - Crows Nest Station Design Consortium <sb-SMEC-30012631@smec.com>; Dhyan YAHAMPATH <Dhyan.Yahampath@smec.com>
Subject: Gas loads and connection location
Importance: High

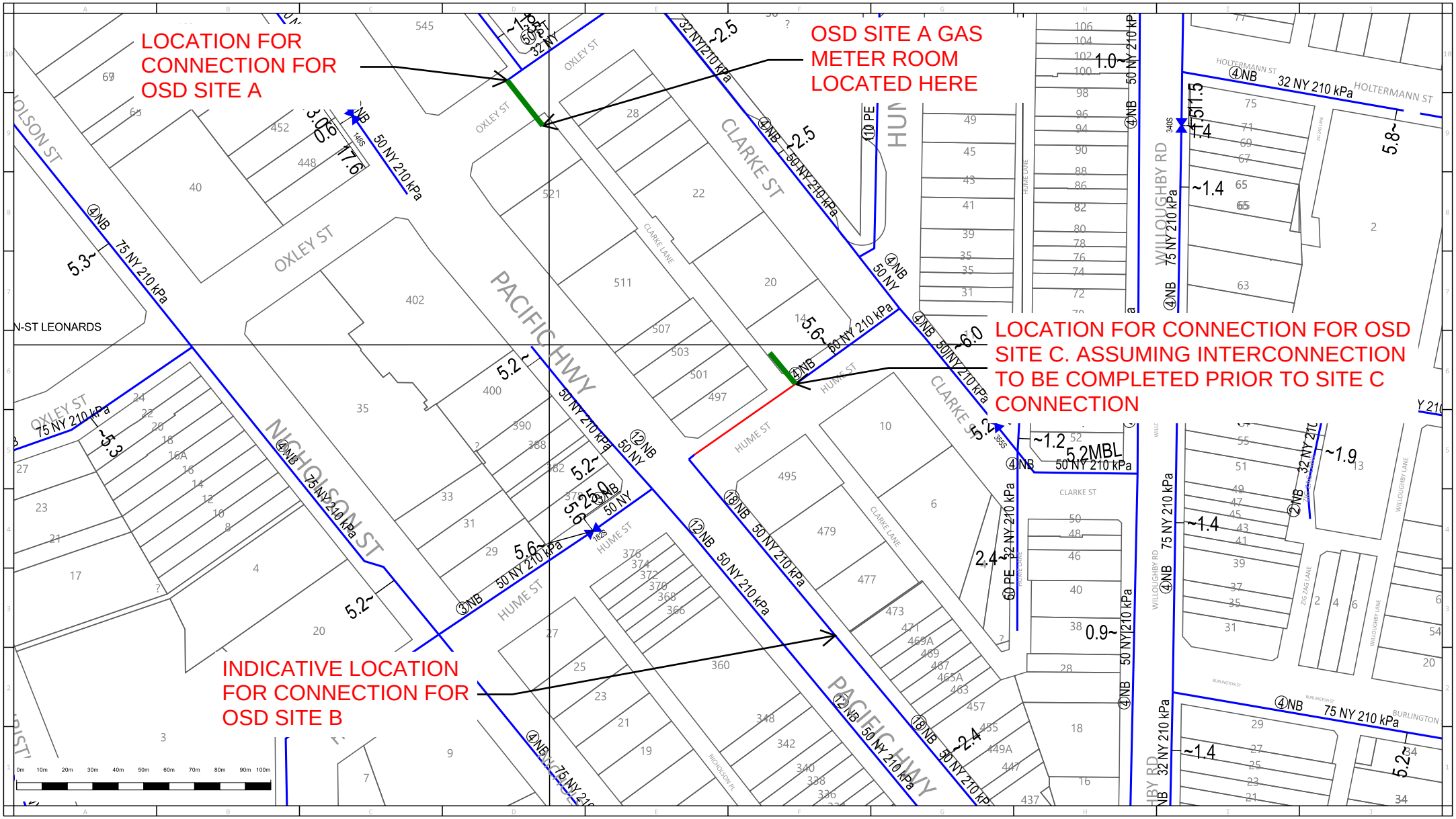
Hi Ashwin, Kevin, copy Ashan to add to inputs register

We urgently need the updated gas loads + gas connection locations. We asked for this a few weeks ago. Could you send this through today please, or advise today the date that this will be provided.

Thanks

Willem van Ede
Senior Associate Engineer
SMEC (Member of the Surbana Jurong Group)
M +61 417 919 160 T +61 2 9900 7007

DBYD Authority: Jemena Gas Networks (NSW) **DBYD Location:** 495 Pacific Highway Crows Nest NSW, 2065



Jemena
ABN 87 003 004 322

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

Main	In Service	Proposed
Distribution - 300 kPa		
Distribution - 400 kPa		
Critical Main - Treat as High Pressure Main		

High Pressure Main & Pipeline	In Service	Proposed
Secondary - 1050 kPa		
Secondary Service		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators: Siphon, Valve, Distance in metres of Main from Boundary Line ~ 1.5, MBK = Metres Back of Kerb, MFL = Metres from Fence Line, Regulator Set, Regulator Station, Automatic Line Break Valve

N W E S

Scale: 1:2000

Issue Date: 13/03/2019
DBYD Seq No: 81190357
DBYD Job No: 15923185

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

Appendix E - Telstra and NBN coordination plan

Cable Plan

Stage 1: Works to commence immediately
Stage 2: Works to commence 2022

Section in blue has NBN cabling in the Telstra duct. Telstra will propose to remove pits and split pipe conduit. Trench and install new P100 conduit from M/hole Corner Oxley st and Pacific Hwy to 6 pit Corner of Hume st and pacific Hwy

Stage 1: Property service lines and connections not to reinstated as they are no longer required.

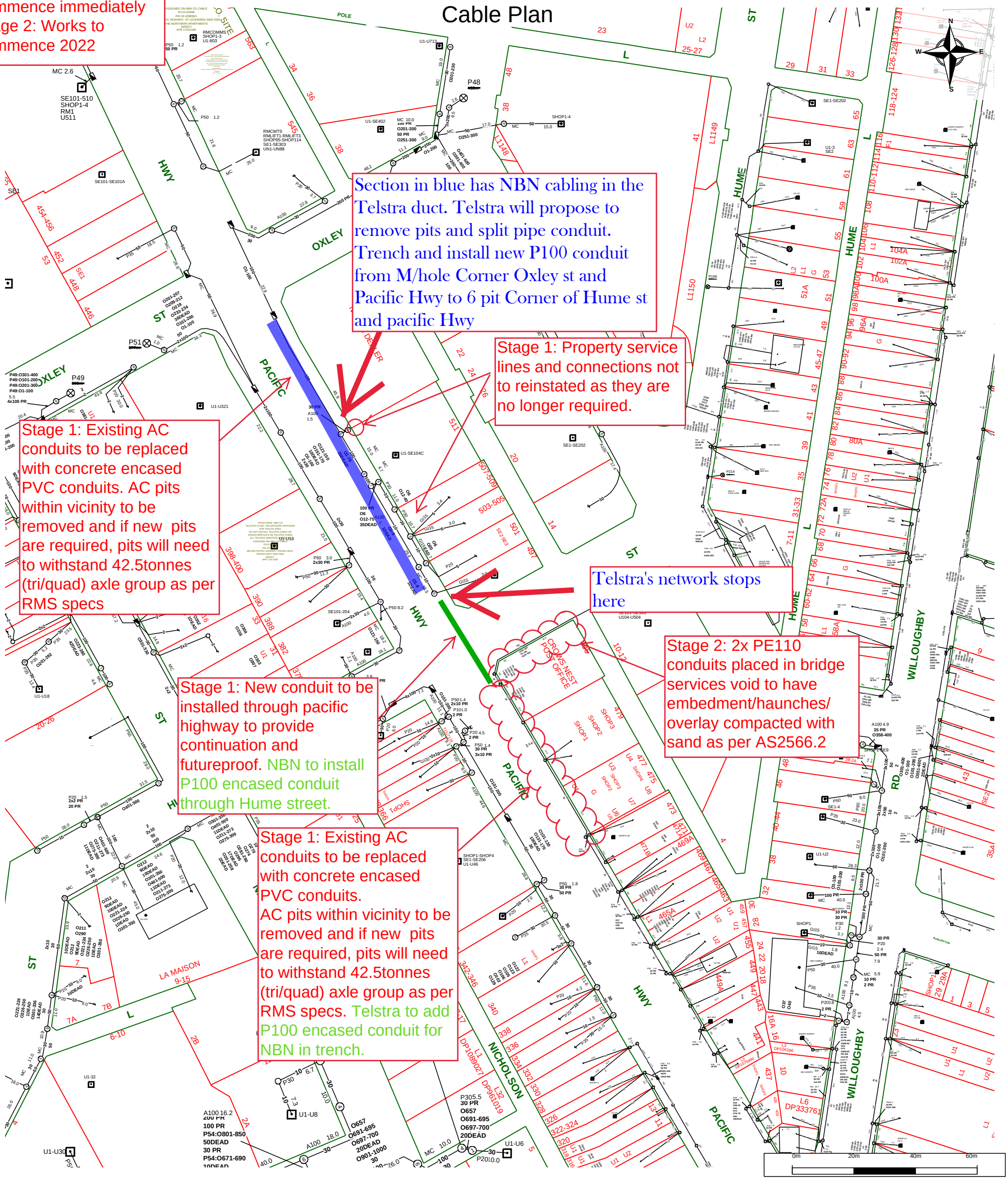
Stage 1: Existing AC conduits to be replaced with concrete encased PVC conduits. AC pits within vicinity to be removed and if new pits are required, pits will need to withstand 42.5tonnes (tri/quad) axle group as per RMS specs

Telstra's network stops here

Stage 2: 2x PE110 conduits placed in bridge services void to have embedment/haunches/ overlay compacted with sand as per AS2566.2

Stage 1: New conduit to be installed through pacific highway to provide continuation and futureproof. NBN to install P100 encased conduit through Hume street.

Stage 1: Existing AC conduits to be replaced with concrete encased PVC conduits.
AC pits within vicinity to be removed and if new pits are required, pits will need to withstand 42.5tonnes (tri/quad) axle group as per RMS specs. Telstra to add P100 encased conduit for NBN in trench.



Telstra	For all Telstra DBYD plan enquiries - email - Telstra.Plans@team.telstra.com For urgent onsite contact only - ph 1800 653 935 (bus hrs)
TELSTRA CORPORATION LIMITED A.C.N. 051 775 556	
Generated On 11/03/2019 13:59:41	Sequence Number: 81080274
	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

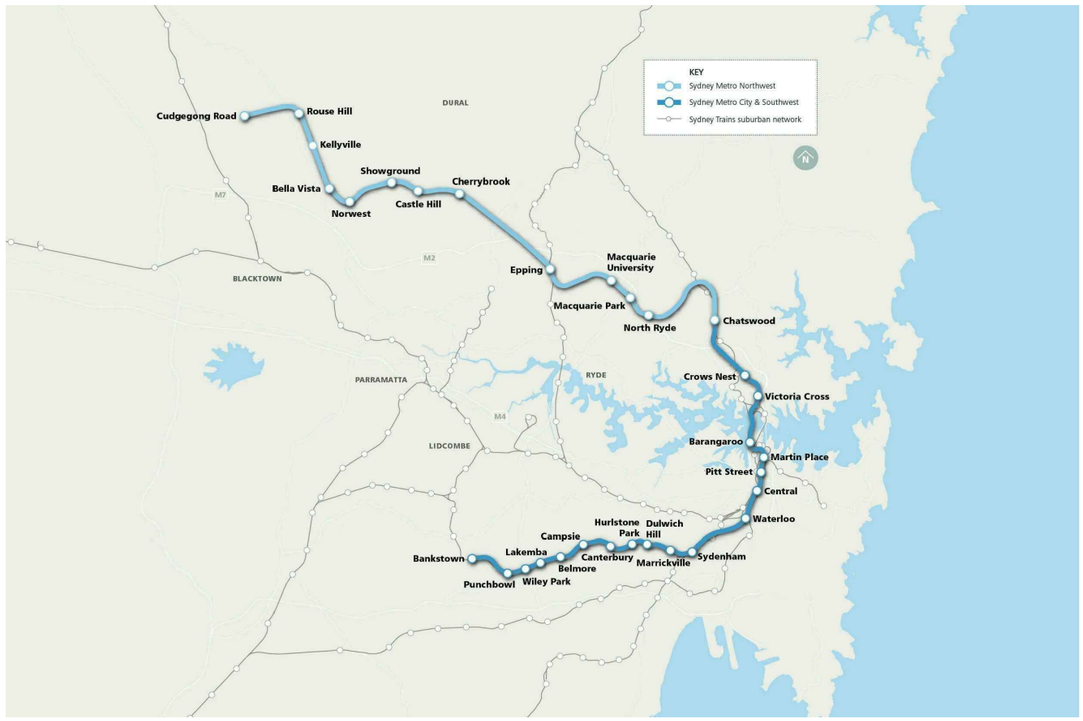
Appendix F - Combined utilities plans

SYDNEY METRO

CITY & SOUTHWEST

CROWS NEST STATION

UTILITIES DESIGN - COVER SHEET



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SCALES

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CONFIRMED		

CLIENT

NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS

CNDC Crows Nest Design Consortium

DRAWN MICHAEL TARRANT
DESIGNED PULITH VIDANAPATHIRANA
DRG CHECK MICHAEL TARRANT
DESIGN CHECK
APPROVED

SYDNEY METRO
CROWS NEST STATION
UTILITY DESIGN
COVER SHEET

STATUS: FOR INFORMATION | SHEET 1 OF 1 | ©

DRG No SMCSWSCN-SMC-SCN-UT-DWG-000001 | REV. A

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

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SYDNEY METRO

CITY & SOUTHWEST

CROWS NEST STATION

UTILITIES DESIGN - DRAWING INDEX

DRAWING INDEX

SMCSWSCN-SMC-SCN-UT-DWG-000001	COVER SHEET
SMCSWSCN-SMC-SCN-UT-DWG-000002	DRAWING INDEX
SMCSWSCN-SMC-SCN-UT-DWG-000005	GENERAL NOTES
SMCSWSCN-SMC-SCN-UT-DWG-207001	UTILITIES OVERALL SITE PLAN
SMCSWSCN-SMC-SCN-UT-DWG-217011	EXISTING UTILITIES PLAN - SHEET 1
SMCSWSCN-SMC-SCN-UT-DWG-217012	EXISTING UTILITIES PLAN - SHEET 2
SMCSWSCN-SMC-SCN-UT-DWG-217013	EXISTING UTILITIES PLAN - SHEET 3
SMCSWSCN-SMC-SCN-UT-DWG-227011	PROPOSED UTILITIES PLAN - SHEET 1
SMCSWSCN-SMC-SCN-UT-DWG-227012	PROPOSED UTILITIES PLAN - SHEET 2
SMCSWSCN-SMC-SCN-UT-DWG-227013	PROPOSED UTILITIES PLAN - SHEET 3
SMCSWSCN-SMC-SCN-UT-DWG-227021	PROPOSED WATER PLAN - SHEET 1
SMCSWSCN-SMC-SCN-UT-DWG-227031	PROPOSED GAS PLAN - SHEET 1
SMCSWSCN-SMC-SCN-UT-DWG-227041	PROPOSED COMMUNICATIONS PLAN - SHEET 1
SMCSWSCN-SMC-SCN-UT-DWG-227051	PROPOSED ELECTRICAL PLAN - SHEET 1

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DISCIPLINE		
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CONFIRMED		

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: CNDC Crows Nest Design Consortium

DRAWN: MICHAEL TARRANT
DESIGNED: PULITH VIDANAPATHIRANA
DRG CHECK: MICHAEL TARRANT
DESIGN CHECK:
APPROVED:

SYDNEY METRO
CROWS NEST STATION
UTILITY DESIGN
DRAWING INDEX

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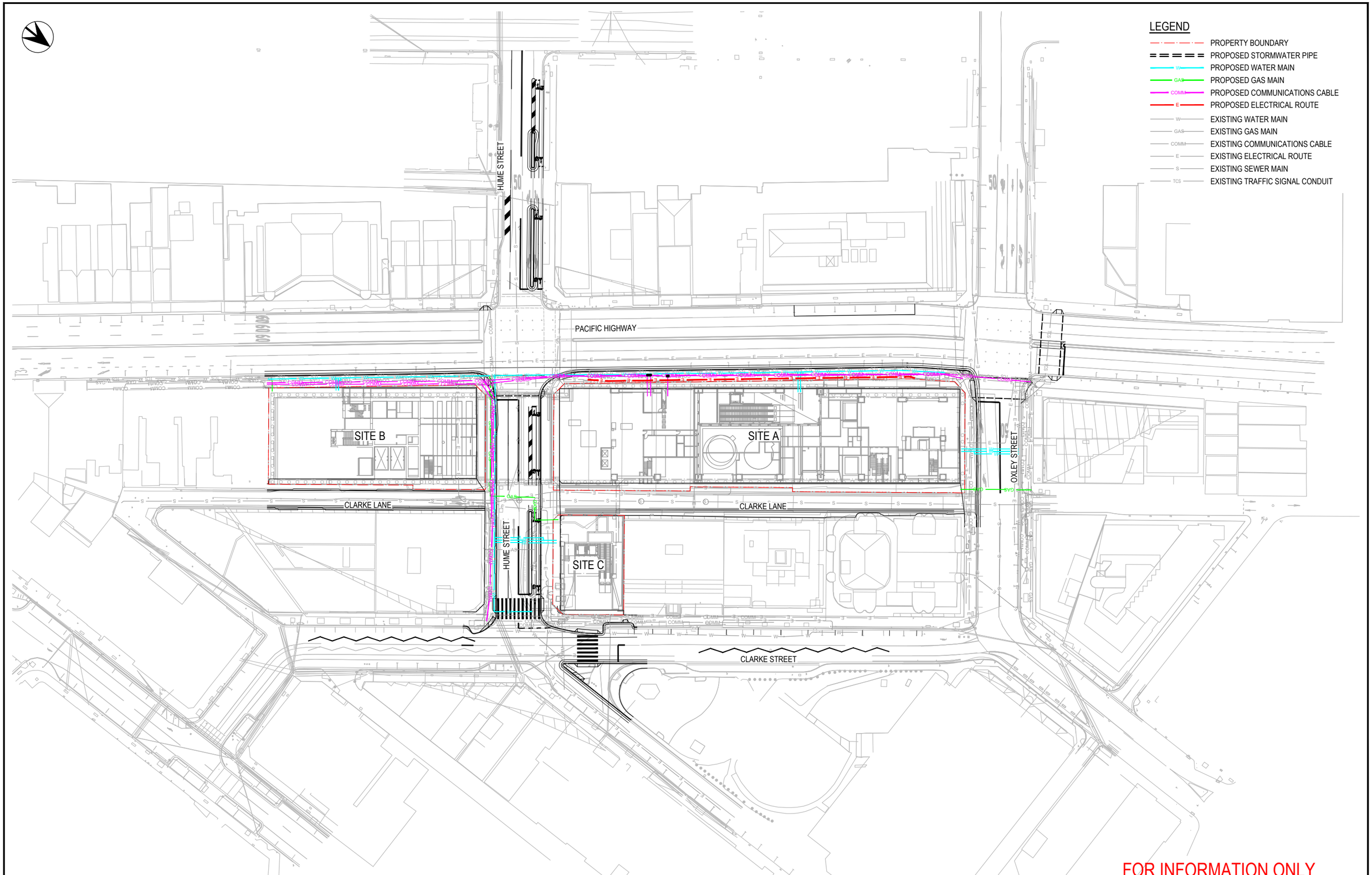

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CLIENT

NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS

CNDC Crows Nest Design Consortium

DRAWN MICHAEL TARRANT

DESIGNED PULITH VIDANAPATHIRANA

DRG CHECK MICHAEL TARRANT

DESIGN CHECK

APPROVED

SYDNEY METRO
CROWS NEST STATION
UTILITY DESIGN
OVERALL SITE
PLAN

STATUS: FOR INFORMATION | SHEET 1 OF 1 | ©

DRG No SMCSWSCN-SMC-SCN-UT-DWG-207001 | REV. A

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NOTE: Do not scale from this drawing.

ALT. DRG No. [Alt. Drg. No.]

PACIFIC HIGHWAY

BUS ZONE

ELEC-AG/RMS-01 LIGHT POLES AND LV ABC

SW_WM_01

GAS_MP_02

TEL_TEL_08

TEL_TEL_09

SW_WW_01

GAS_MP_01

TEL_TEL_07

TEL_OPT_01

ELEC_AG_03

SITE B

SITE A

SW_MH_02

SW_WW_02

SW_MH_01

SW_WW_03

CLARKE LANE

TEL_TEL_06

SW_WM_02

SW_WM_02

HUME STREET

SITE C

ELEC_AG_02

ELEC_AG_01

SW_WW_04

SW_MH_03

SW_WM_03

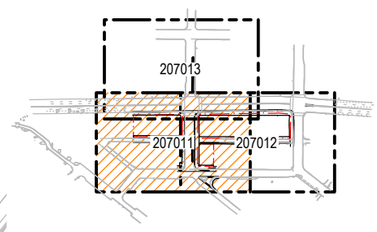
TEL_TEL_05

CLARKE STREET

LEGEND

- PROPERTY BOUNDARY
- W — EXISTING WATER MAIN
- GAS — EXISTING GAS MAIN
- COMM — EXISTING COMMUNICATIONS CABLE
- E — EXISTING ELECTRICAL ROUTE
- S — EXISTING SEWER MAIN
- TCS — EXISTING TRAFFIC SIGNAL CONDUIT

KEY PLAN



FOR INFORMATION ONLY

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CONFIRMED		

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: CNDC Crows Nest Design Consortium

DRAWN MICHAEL TARRANT

DESIGNED PULITH VIDANAPATHIRANA

DRG CHECK MICHAEL TARRANT

DESIGN CHECK

APPROVED

SYDNEY METRO

CROWS NEST STATION
UTILITY DESIGN
EXISTING UTILITIES
PLAN

STATUS: FOR INFORMATION | SHEET 1 OF 3 | ©

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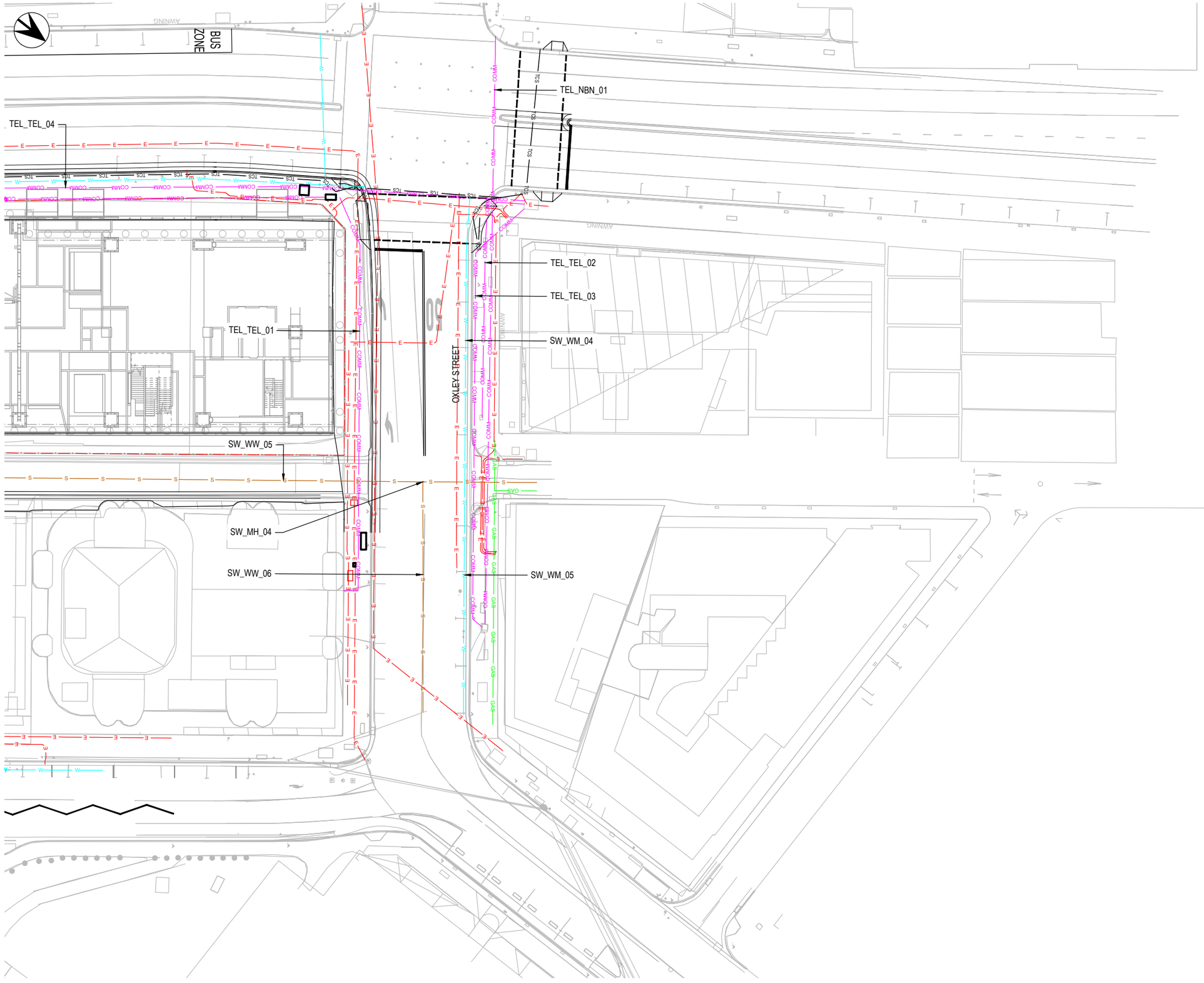
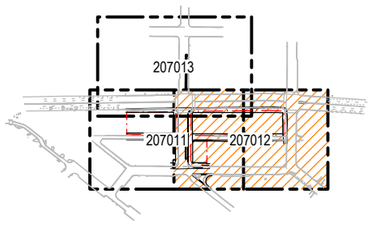


LEGEND

- PROPERTY BOUNDARY
- W — EXISTING WATER MAIN
- GAS — EXISTING GAS MAIN
- COMM — EXISTING COMMUNICATIONS CABLE
- E — EXISTING ELECTRICAL ROUTE
- S — EXISTING SEWER MAIN
- TCS — EXISTING TRAFFIC SIGNAL CONDUIT

KEY PLAN



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DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: CNDC Crows Nest Design Consortium

DRAWN MICHAEL TARRANT
DESIGNED PULITH VIDANAPATHIRANA
DRG CHECK MICHAEL TARRANT
DESIGN CHECK
APPROVED

SYDNEY METRO
CROWS NEST STATION
UTILITY DESIGN
EXISTING UTILITIES
PLAN

STATUS: FOR INFORMATION | SHEET 2 OF 3 | ©

DRG No SMCSWSCN-SMC-SCN-UT-DWG-217012 | REV. A

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

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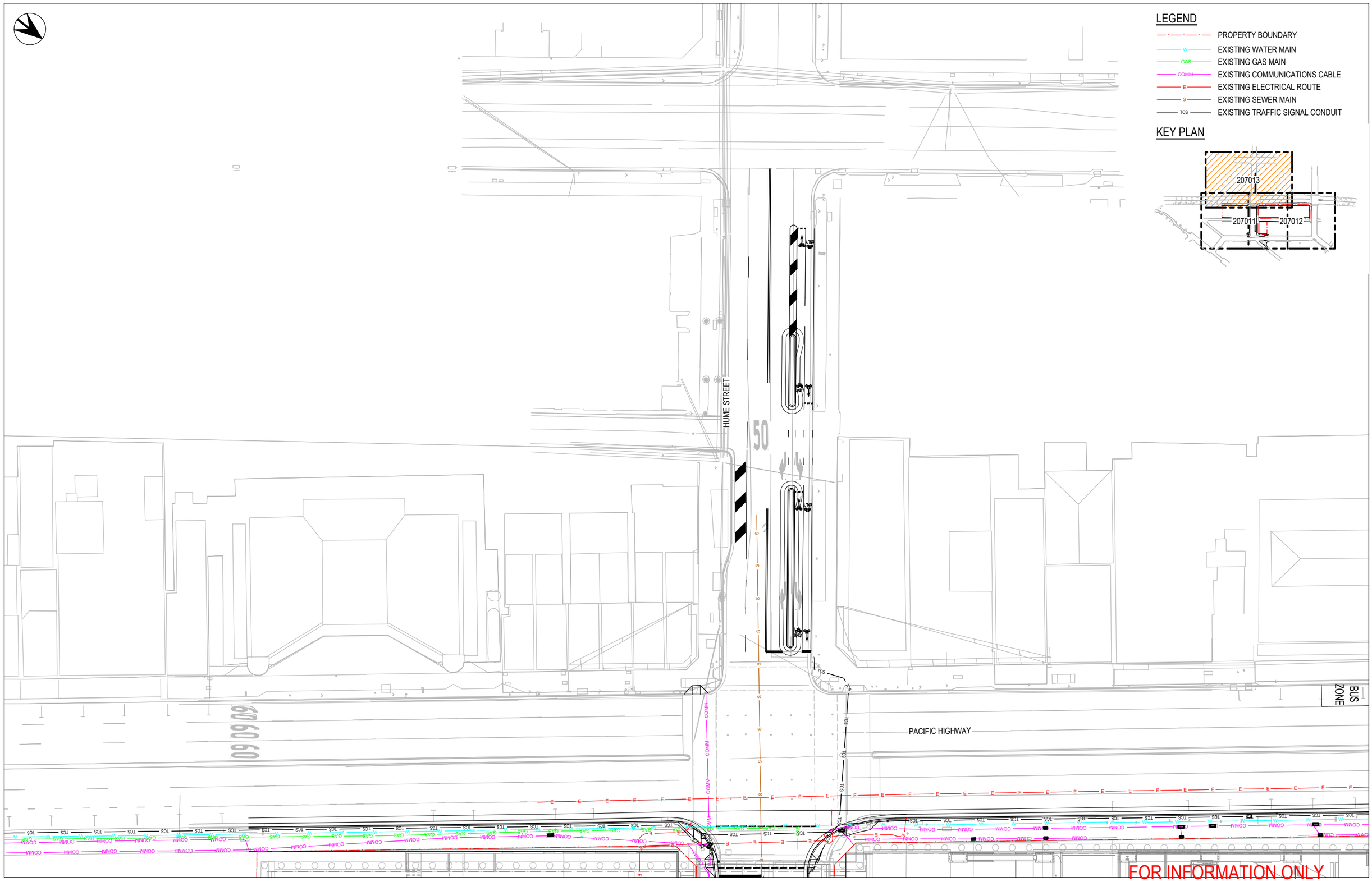

LEGEND

- PROPERTY BOUNDARY
- W — EXISTING WATER MAIN
- GAS — EXISTING GAS MAIN
- COMM — EXISTING COMMUNICATIONS CABLE
- E — EXISTING ELECTRICAL ROUTE
- S — EXISTING SEWER MAIN
- TCS — EXISTING TRAFFIC SIGNAL CONDUIT

KEY PLAN

FOR INFORMATION ONLY

WORK IN PROGRESS

REV.	BY	DATE	DESCRIPTION	APPD.
A	MT			M.S

SCALES
2.5 0 2.5 5 7.5m
1:250 FULL SIZE A1

CHECK PRINT — PRELIM. ☐ FINAL ☐

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: CNDC Crows Nest Design Consortium

DRAWN MICHAEL TARRANT
DESIGNED PULITH VIDANAPATHIRANA
DRG CHECK MICHAEL TARRANT
DESIGN CHECK
APPROVED

SYDNEY METRO
CROWS NEST STATION
UTILITY DESIGN
EXISTING UTILITIES
PLAN

STATUS: FOR INFORMATION | SHEET 3 OF 3 | ©

DRG No SMCSWSCN-SMC-SCN-UT-DWG-217013 | REV. A

A1 Original	Co-ordinate System: MGA Zone 56	Height Datum: A.H.D.	This sheet may be prepared using colour and may be incomplete if copied

NOTE: Do not scale from this drawing.

ALT. DRG No [Alt. Drg. No.]

Cad File: V:_Vault\Projects\30012631\CADD\WG\UT_UTILITIES_DESIGN\SMC\SWSCN-SMC-SCN-UT-DWG-217013.dwg
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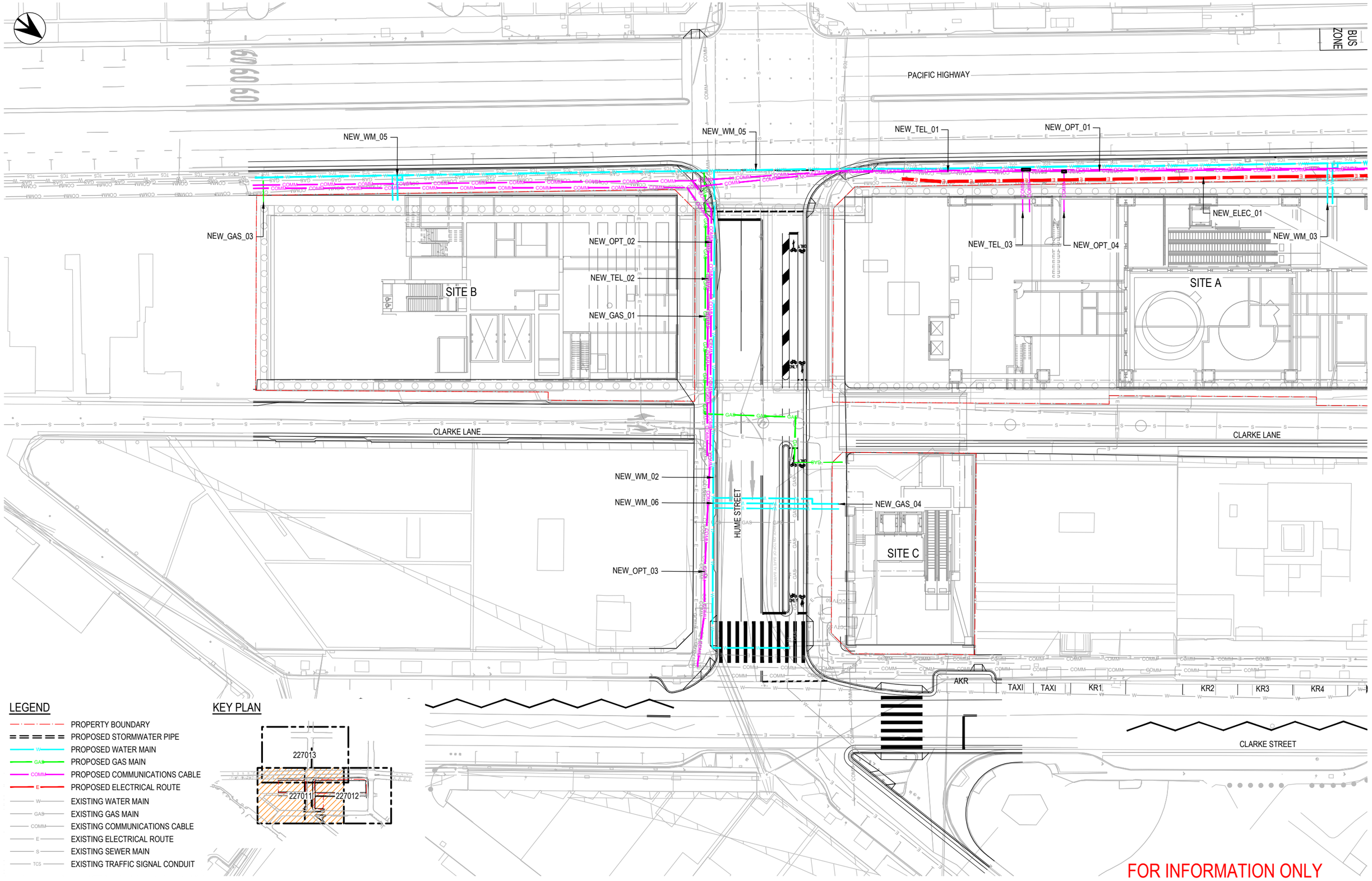
100mm AT FULL SIZE



LEGEND

- PROPERTY BOUNDARY
- PROPOSED STORMWATER PIPE
- PROPOSED WATER MAIN
- PROPOSED GAS MAIN
- PROPOSED COMMUNICATIONS CABLE
- PROPOSED ELECTRICAL ROUTE
- EXISTING WATER MAIN
- EXISTING GAS MAIN
- EXISTING COMMUNICATIONS CABLE
- EXISTING ELECTRICAL ROUTE
- EXISTING SEWER MAIN
- EXISTING TRAFFIC SIGNAL CONDUIT

KEY PLAN

FOR INFORMATION ONLY

REV.	BY	DATE	DESCRIPTION	APPD.
A	MT		WORK IN PROGRESS	M.S

SCALES: 2.5 0 2.5 5 7.5m — 1:250 FULL SIZE A1

CHECK PRINT — PRELIM. ☐ FINAL ☐

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

CLIENT: NSW GOVERNMENT | sydney METRO

SERVICE PROVIDERS: CNDC Crows Nest Design Consortium

DRAWN: MICHAEL TARRANT
DESIGNED: PULITH VIDANAPATHIRANA
DRG CHECK: MICHAEL TARRANT
DESIGN CHECK:
APPROVED:

SYDNEY METRO
CROWS NEST STATION
UTILITY DESIGN
PROPOSED UTILITIES
PLAN

STATUS: FOR INFORMATION | SHEET 1 OF 3 | ©

DRG No SMCSWSCN-SMC-SCN-UT-DWG-227011 | REV. A

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

Cad File: V:\..\Vault\Projects\3001263\1CAD\DWG\UT_UTILITIES_DESIGN\SMCSWSCN-SMC-SCN-UT-DWG-227011.dwg
Plot Date: 09/10/19 - 11:31
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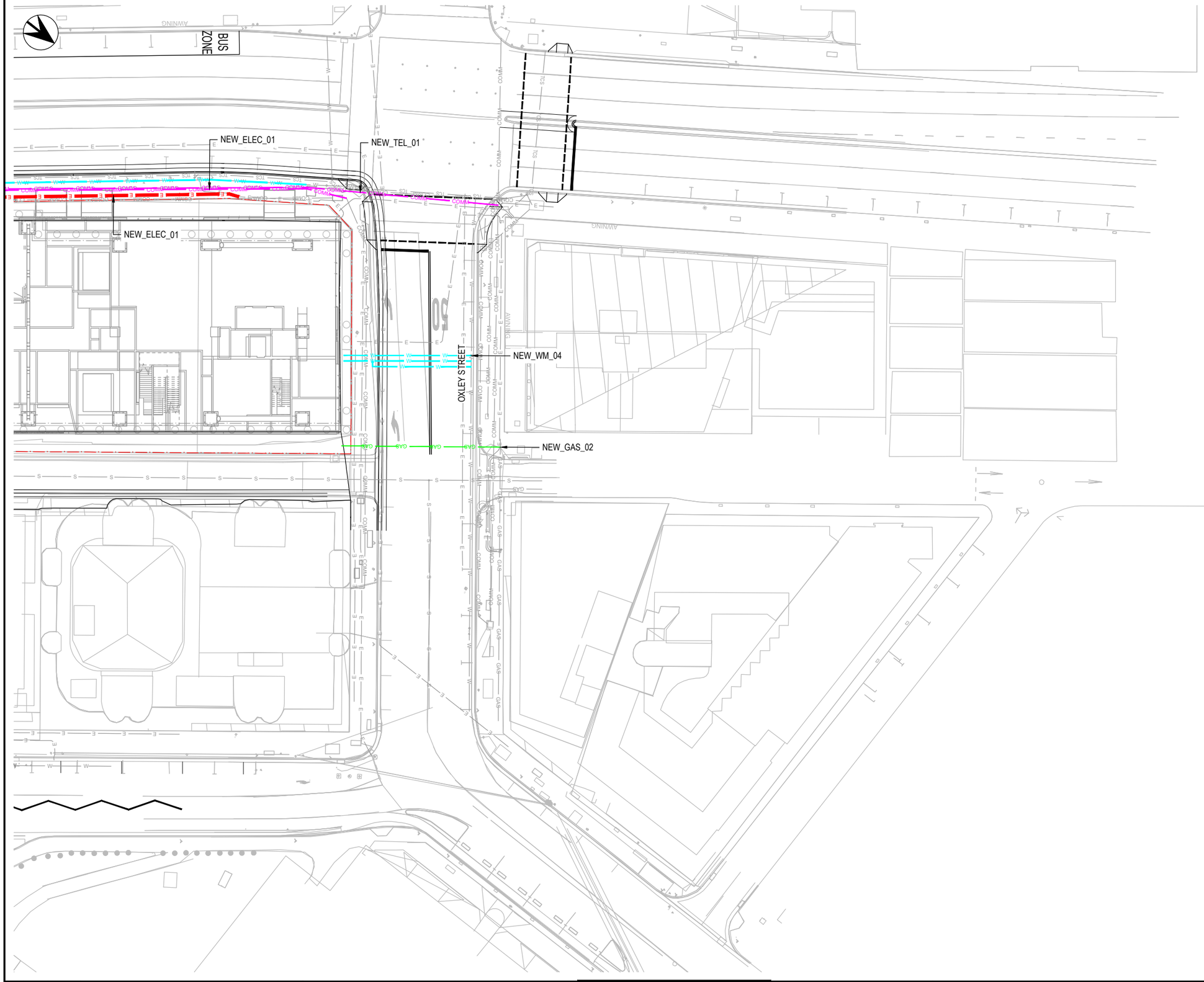
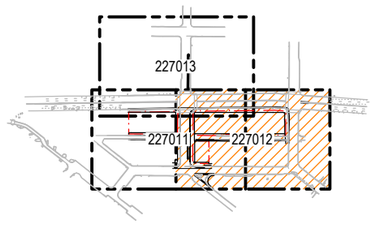


LEGEND

- PROPERTY BOUNDARY
- PROPOSED STORMWATER PIPE
- PROPOSED WATER MAIN
- PROPOSED GAS MAIN
- PROPOSED COMMUNICATIONS CABLE
- PROPOSED ELECTRICAL ROUTE
- EXISTING WATER MAIN
- EXISTING GAS MAIN
- EXISTING COMMUNICATIONS CABLE
- EXISTING ELECTRICAL ROUTE
- EXISTING SEWER MAIN
- EXISTING TRAFFIC SIGNAL CONDUIT

KEY PLAN



FOR INFORMATION ONLY

REV.	BY	DATE	DESCRIPTION	APPD.
A	MT		WORK IN PROGRESS	M.S

SCALES
2.5 0 2.5 5 7.5m
1:250 FULL SIZE A1

CHECK PRINT — PRELIM. ☐ FINAL ☐

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

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SERVICE PROVIDERS: CNDC Crows Nest Design Consortium

DRAWN MICHAEL TARRANT
DESIGNED PULITH VIDANAPATHIRANA
DRG CHECK MICHAEL TARRANT
DESIGN CHECK
APPROVED

SYDNEY METRO
CROWS NEST STATION
UTILITY DESIGN
PROPOSED UTILITIES PLAN

STATUS: FOR INFORMATION | SHEET 2 OF 3 | ©

DRG No SMCSWSCN-SMC-SCN-UT-DWG-227012 | REV. A

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

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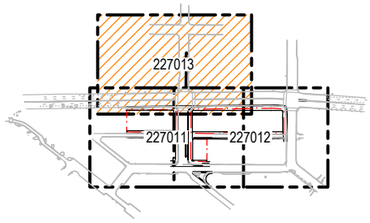
Plot Date: 09/10/19 - 11:34
100mm A1 FULL SIZE

LEGEND

- PROPERTY BOUNDARY
- PROPOSED STORMWATER PIPE
- PROPOSED WATER MAIN
- PROPOSED GAS MAIN
- PROPOSED COMMUNICATIONS CABLE
- PROPOSED ELECTRICAL ROUTE
- EXISTING WATER MAIN
- EXISTING GAS MAIN
- EXISTING COMMUNICATIONS CABLE
- EXISTING ELECTRICAL ROUTE
- EXISTING SEWER MAIN
- EXISTING TRAFFIC SIGNAL CONDUIT

KEY PLAN



HUME STREET

50

PACIFIC HIGHWAY

BUS ZONE

FOR INFORMATION ONLY

WORK IN PROGRESS

REV.	BY	DATE	DESCRIPTION	APPD.
A	MT			M.S

SCALES

2.5 0 2.5 5 7.5m

1:250 FULL SIZE A1

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

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DESIGNED PULITH VIDANAPATHIRANA
DRG CHECK MICHAEL TARRANT
DESIGN CHECK
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SYDNEY METRO

CROWS NEST STATION
UTILITY DESIGN
PROPOSED UTILITIES
PLAN

STATUS: FOR INFORMATION | SHEET 3 OF 3 | ©

DRG No SMCSWSCN-SMC-SCN-UT-DWG-227013 | REV. A

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

Cad File: V:_Vault\Projects\30012631\CADD\DWG\UT_UTILITIES_DESIGN\SMCSWSCN-SMC-SCN-UT-DWG-227013.dwg
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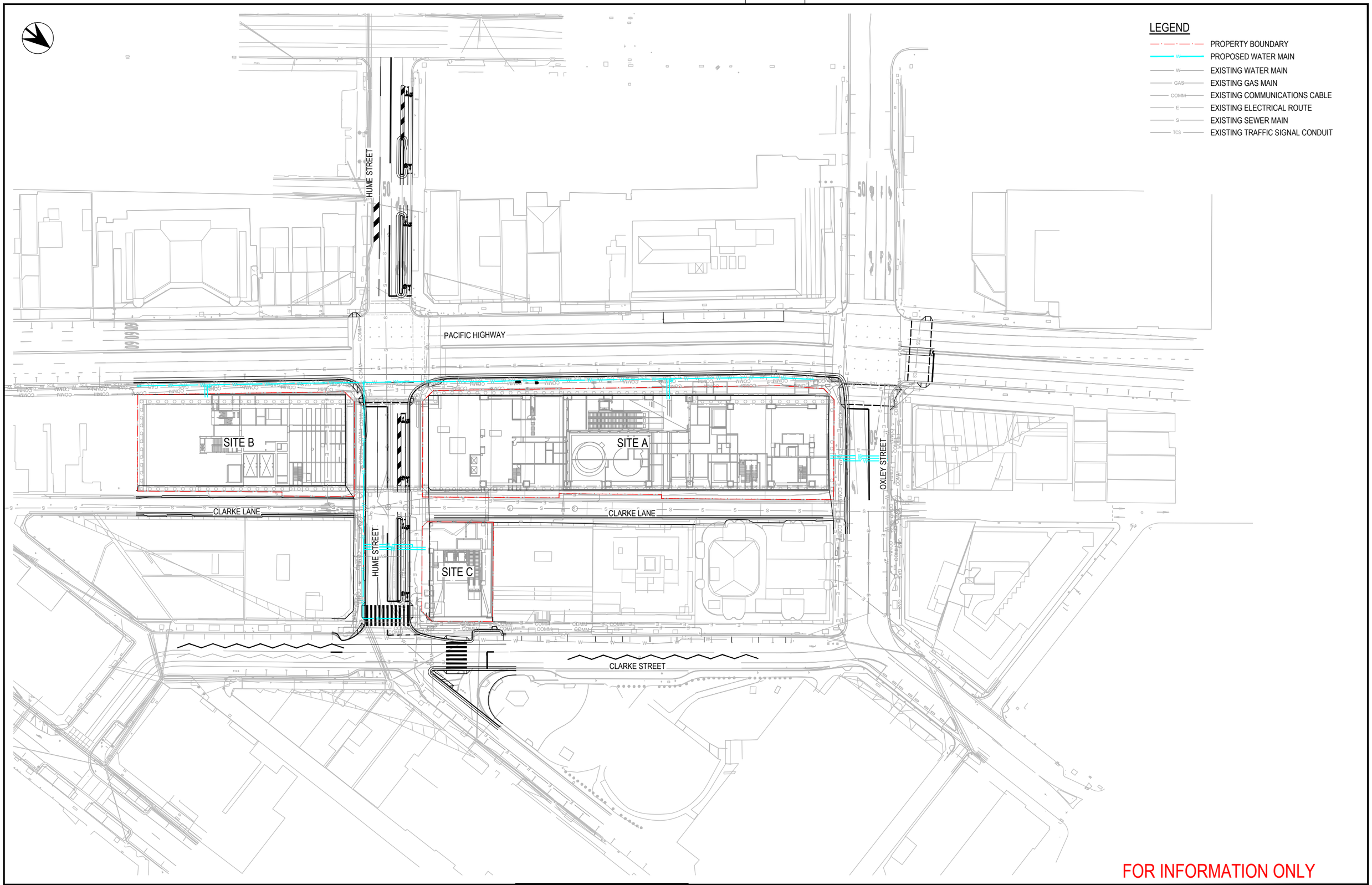

FOR INFORMATION ONLY

WORK IN PROGRESS

REV.	BY	DATE	DESCRIPTION	APPD.
A	MT			M.S

SCALES
5 0 5 10 15m
1:500 FULL SIZE A1

CHECK PRINT — PRELIM. ☐ FINAL ☐

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

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DESIGNED PULITH VIDANAPATHIRANA
DRG CHECK MICHAEL TARRANT
DESIGN CHECK
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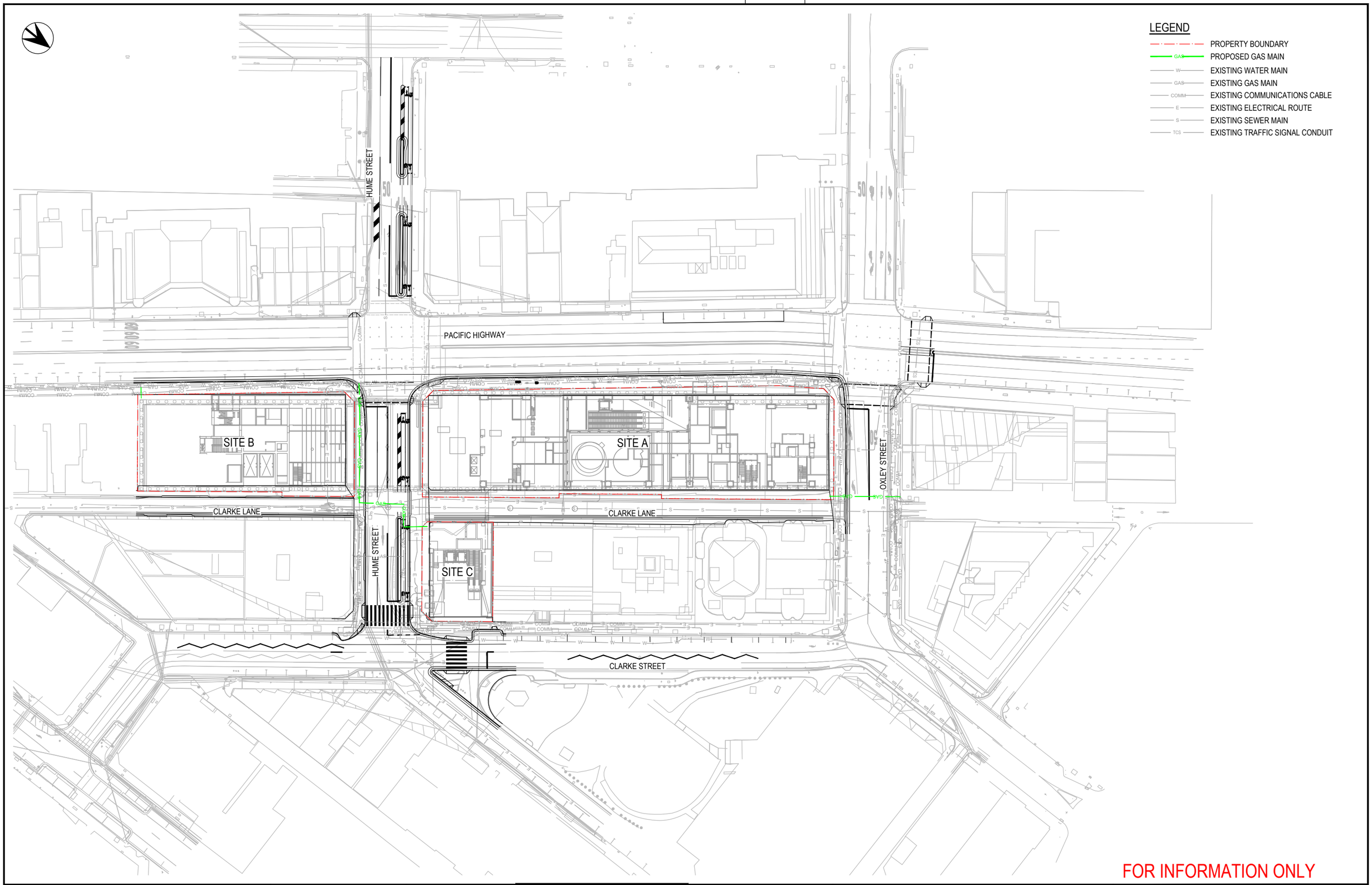
SYDNEY METRO
CROWS NEST STATION
UTILITY DESIGN
PROPOSED WATER
PLAN

STATUS: FOR INFORMATION | SHEET 1 OF 1 | ©
DRG No SMCSWSCN-SMC-SCN-UT-DWG-227021 | REV. A

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



FOR INFORMATION ONLY

WORK IN PROGRESS

REV.	BY	DATE	DESCRIPTION	APPD.
A	MT			M.S

SCALES

5 0 5 10 15m

1:500 FULL SIZE A1

CHECK PRINT

	PRELIM. INITIAL	FINAL DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
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DESIGNED PULITH VIDANAPATHIRANA

DRG CHECK MICHAEL TARRANT

DESIGN CHECK

APPROVED

SYDNEY METRO

CROWS NEST STATION

UTILITY DESIGN

PROPOSED GAS

PLAN

STATUS: FOR INFORMATION | SHEET 1 OF 1 | ©

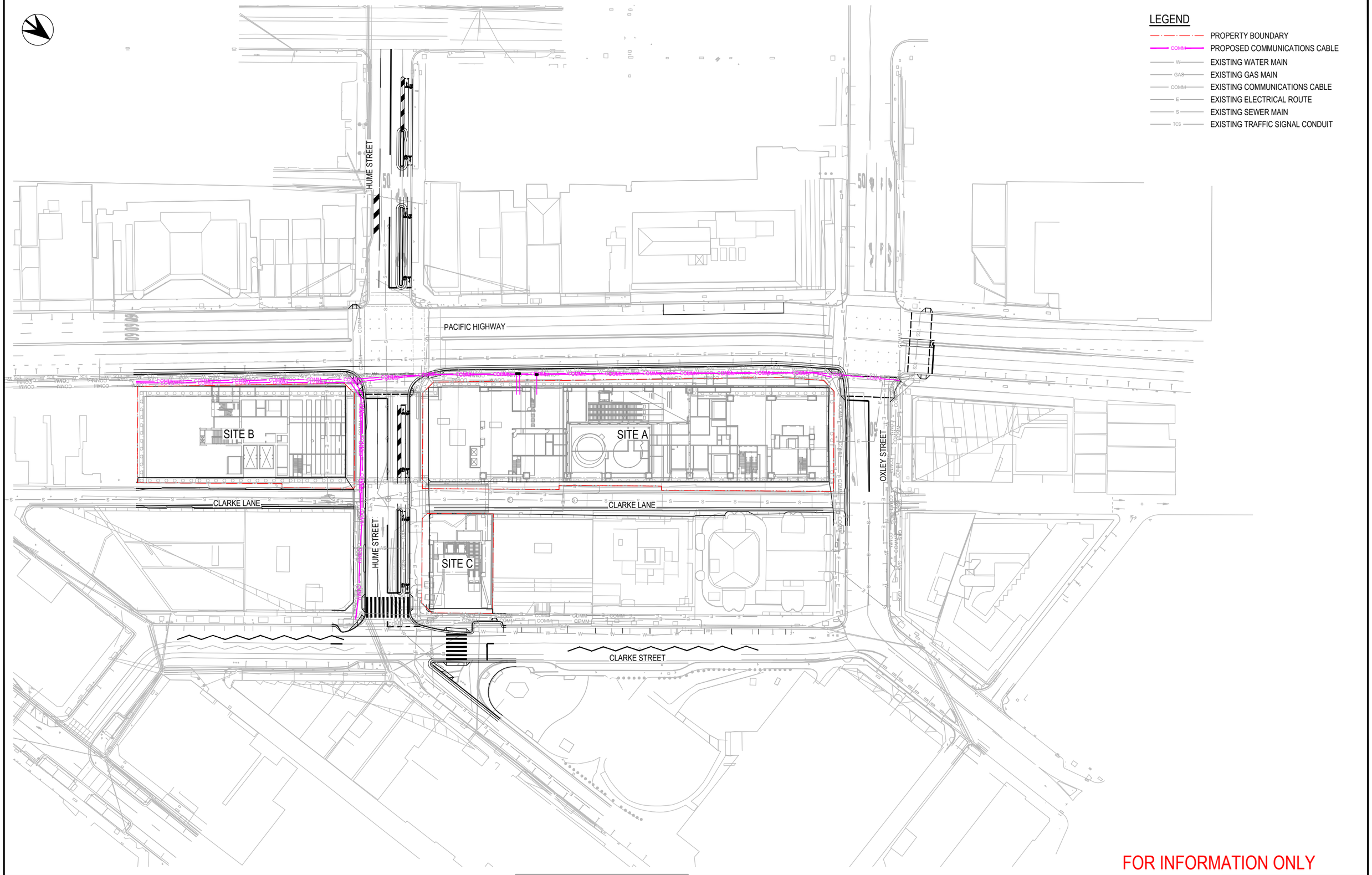
DRG No SMCSWSCN-SMC-SCN-UT-DWG-227031 | REV. A

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

Cad File: V:_Vault\Projects\300126311CAD\DWG\UT_UTILITIES_DESIGN\SMCSWSCN-SMC-SCN-UT-DWG-227031.dwg

Plot Date: 09/10/19 - 11:51

100mm AT FULL SIZE



FOR INFORMATION ONLY

REV.	BY	DATE	DESCRIPTION	APPD.
A	MT			M.S

WORK IN PROGRESS

SCALES
5 0 5 10 15m
1:500 FULL SIZE A1

CHECK PRINT — PRELIM. ☐ FINAL ☐

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

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DESIGNED PULITH VIDANAPATHIRANA
DRG CHECK MICHAEL TARRANT
DESIGN CHECK
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SYDNEY METRO
CROWS NEST STATION
UTILITY DESIGN
PROPOSED COMMUNICATIONS
PLAN

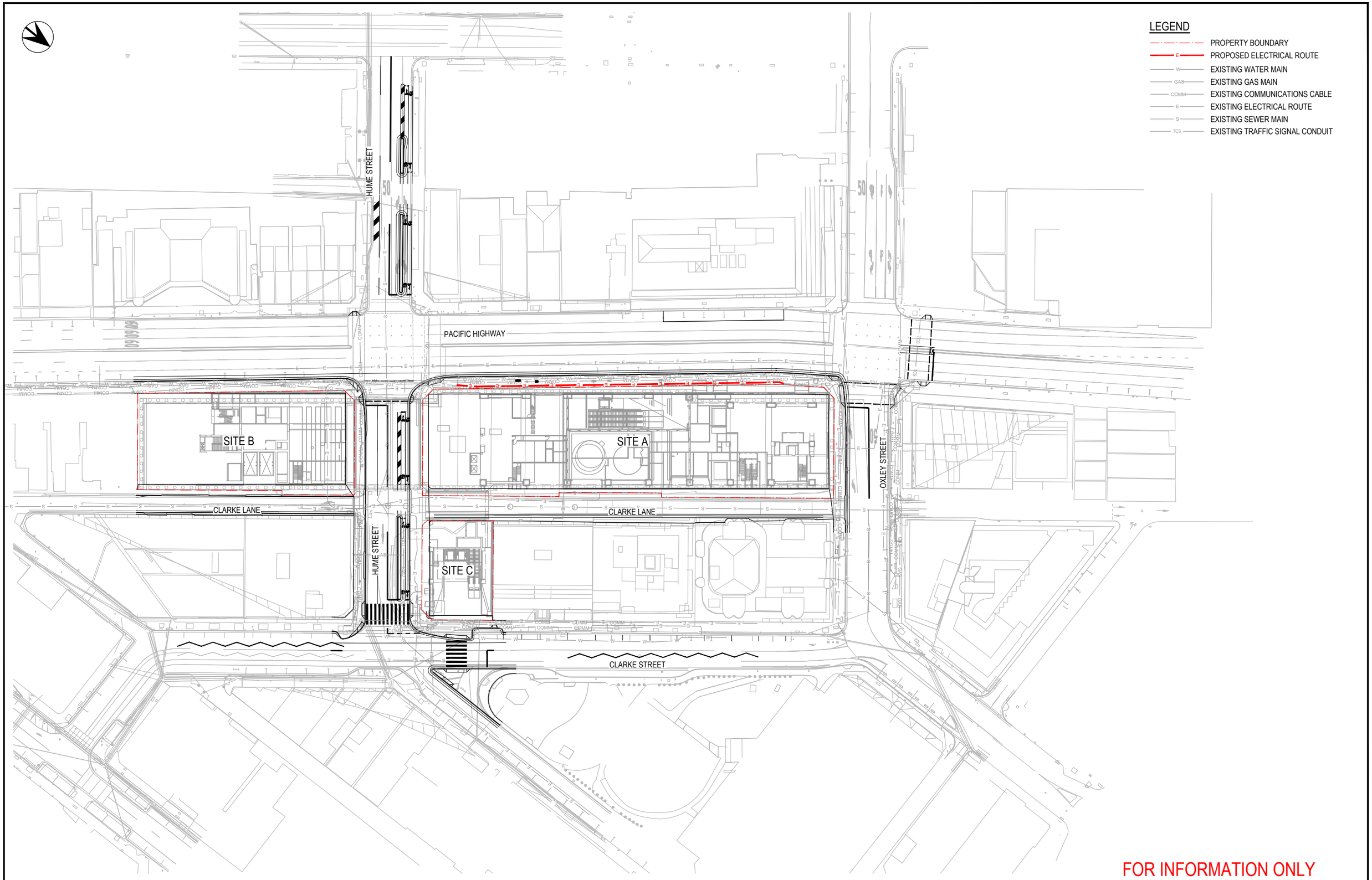
STATUS: FOR INFORMATION | SHEET 1 OF 1 | ©

DRG No SMCSWSCN-SMC-SCN-UT-DWG-227041 | REV. A

A1 Original	Co-ordinate System: MGA Zone 56	Height Datum: A.H.D.	This sheet may be prepared using colour and may be incomplete if copied

NOTE: Do not scale from this drawing.

ALT. DRG No [Alt. Drg. No.]



FOR INFORMATION ONLY

REV.	BY	DATE	DESCRIPTION	APPD.
A	MT			M.S

WORK IN PROGRESS

SCALES
5 0 5 10 15m
1:500 FULL SIZE A1

CHECK PRINT — PRELIM. ☐ FINAL ☐

	INITIAL	DATE
DISCIPLINE		
DISCIPLINE		
DISCIPLINE		
BACKDRAFTED/CORRECTED		
CONFIRMED		

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SERVICE PROVIDERS
CNDC Crows Nest Design Consortium

DRAWN MICHAEL TARRANT
DESIGNED PULITH VIDANAPATHIRANA
DRG CHECK MICHAEL TARRANT
DESIGN CHECK
APPROVED

SYDNEY METRO
CROWS NEST STATION
UTILITY DESIGN
PROPOSED ELECTRICAL PLAN

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DRG No SMCSWSCN-SMC-SCN-UT-DWG-227051 | REV. A

A1 Original	Co-ordinate System: MGA Zone 56	Height Datum: A.H.D.	This sheet may be prepared using colour and may be incomplete if copied	NOTE: Do not scale from this drawing.

ALT. DRG No [Alt. Drg. No.]