Sydney Metro West:

Planning Proposal for Hunter Street Over Station Development Integrated Water Management Plan

Document Number: SMWSTEDS-SMD-SCB-SN100-SD-PLN-044001

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Contents

List of Figures

List of Tables

Glossary

Term	Definition
AEP	Annual Exceedance Probability The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. In this study AEP has been used consistently to define the probability of occurrence of flooding. The following relationships between AEP and ARI applies to this study (Ball et al, 2019).
ARI	Average Recurrence Interval The long-term average number of years between the occurrences of a flood as big as or larger than the selected flood event. For example, floods with a discharge as great as or greater than the 20-year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event. Also refer to Average Exceedance Probability (AEP), which is the industry standard terminology for definition of design flood events.
ARR	Australian Rainfall and Runoff (ARR) is a national guideline document used for the estimation of design flood characteristics in Australia. Reference is made to either ARR1987 (3rd edition) or ARR2019 (4th edition) as specified. .
Catchment	The land area draining through the mainstream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.
CC	Climate Change
Concept SSD Application	A concept development application as defined in Section 4.22 the EP&A Act, *as a development application that sets out concept proposals for the development of a site, and for which detailed proposals for the site or for separate parts of the site are to be the subject of a subsequent development application or applications*.
Council	City of Sydney
CSSI approval	Critical State Significant Infrastructure Approval
Stage 1 CSSI Approval	SSI-10038 approved 11 March 2021 all major civil construction works between Westmead and The Bays, including station excavation and tunnelling, associated with the Sydney Metro West railway line
DCP	Development Control Plan
EP&A Act	Environmental Planning and Assessment Act 1979
EPA	NSW Environment Protection Authority
ESD	Ecologically Sustainable Design
GFA	Gross Floor Area
Hydrologic modelling	Hydrologic modelling refers to the conversion of the design rainfall and runoff into flow hydrographs that are applied to the hydraulic model to define flood depths, flood extents, velocities and hazards for a range of design storms.
Hydrology	The study of the rainfall and runoff process; in particular, the evaluation of peak flows, flow volumes and the derivation of hydrographs for a range of floods.

Term	Definition
Hydraulic modelling	Hydraulic modelling uses the rainfall, catchment and watercourse topography to predict flood behaviour including flood levels, flood extents, flood velocities and the duration of inundation in the catchment and watercourse.
OSD	Proposed Hunter Street Over Station Development
PMF	Probable Maximum Flood
PSD	Permissible Site Discharge
SEPP	State Environmental Planning Policy
SRD SEPP	State Environmental Planning Policy (State and Regional Development) 2009
SSDA	State Significant Development Application
Sydney Metro West	Construction and operation of a metro rail line and associated stations between Westmead and the Sydney CBD as described in **Section 1.2**
TfNSW	Transport for New South Wales
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
WQ	Water Quality Treatment
WSUD	Water Sensitive Urban Design

Executive summary

The Integrated Water Management Plan involved the analysis of the existing stormwater quantity and water quality conditions for Hunter Street Over Station Development Planning Proposal Request. The report aims to provide a hydraulic and water quality analysis and preliminary design of on-site detention systems and water quality treatment measures according to relevant stormwater and water quality standards.

The baseline investigations involved analysing the existing drainage network, catchment and topography, and the existing stormwater performance. Sydney Water was consulted on the on site detention and PSD for the Hunter Street East and West station sites. Sydney Water advised for the West site a minimum site storage of 59m^3 is to be provided with a maximum PSD of 138 L/s. There was no requirement for site storage or PSD for the East site. A DRAINS model was set up to analyse the 5% and 1% AEP storm events including climate change.

The initial design of the on site detention involved modelling the storage requirements set by Sydney Water and assessing PSD compliance. The modelling results indicated that a larger on site detention tank would be required to account for the increase in rainfall from climate change and an on site detention would be recommended on the East to ensure post-development flows do not exceed the pre-development state. The East on site detention also presents opportunities to incorporate stormwater treatment devices. The design of on site detention for the West site was optimised to 100m^3 and for the East site to 30m^3. It should be noted that the on site detention design is subject to changes as the OSD design develops.

MUSIC software was used to model the existing catchment for both sites and design the treatment train to meet City of Sydney water quality targets. The proposed treatment process involves treating stormwater runoff through the OceanGuard® before discharging into the on site detention tank with a cascade separator and Storm Filter. The model results indicate that the design is compliant with City of Sydney Water Quality reduction targets.

1 Introduction

1.1 Purpose

The Planning Proposal Request for the Hunter Street Station OSD, has been prepared to support an amendment to the *Sydney Local Environmental Plan 2012* (SLEP 2012) and is consistent with the Planning Proposal: Central Sydney.

The purpose of the Integrated Water Management Plan is to summarise existing stormwater quantity and water quality conditions, provide a hydraulic and water quality analysis and design of required infrastructure and protection measures according to relevant stormwater quantity and quality standards.

1.2 Objectives and intended outcomes

- The Planning Proposal Request has been prepared to address the following objectives for future development on the Eastern and Western sites: Be a catalyst for positive change by regenerating and invigorating the city with new development that engages with the precinct, raises the urban quality and enhances the overall experience of the city.
- Facilitate future development that promotes design excellence and is consistent with the objectives of the Central Sydney Planning Framework.
- Deliver high quality employment generating floorspace that aligns with the objectives for development within the tower cluster areas identified within the Central Sydney Planning Framework.
- Contribute towards the establishment of an integrated transport hub within the Sydney CBD which strengthens Sydney's rail network improving connectivity.
- Delivers employment density alongside the delivery of significant new public transport infrastructure servicing the site and surrounding precinct.

The intended outcomes of the requested amendments include:

- To amend the maximum building height and maximum floor space ratio (FSR) permitted for both the east and west sites under the Sydney Local Environmental Plan 2012 (Sydney LEP 2012) and allow an alternative approach to design excellence to deliver integrated station development that optimises the development potential of both sites
- To facilitate new development that demonstrates an appropriate distribution of built form and floor space as part of the delivery of the integrated station development.

1.3 Planning process

1.3.1 State Significant Infrastructure

Sydney Metro West was declared as State Significant Infrastructure (SSI) and Critical State Significant Infrastructure (CSSI) under sections 5.12(4) and 5.13 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) respectively on 23 September 2020.

Sydney Metro West is being assessed as a staged infrastructure application under Section 5.20 of the *Environment Planning & Assessment Act 1979*. The approved Concept and major civil construction work for Sydney Metro West between

Westmead and The Bays (Stage 1 of the planning approval process application number SSI-10038) were approved on 11 March 2021.

Stage 2 of the planning approval process (application number SSI-19238057) includes all major civil construction work, including station excavation and tunnelling, between The Bays and Sydney CBD (an Environmental Impact Statement for this application was exhibited between 3 November and 15 December 2021).

Stage 3 of the planning approval process (application number SSI-22765520, being the application for the tunnel fit-out, construction of stations, ancillary facilities and station precincts, and operation and maintenance of the Sydney Metro West line. This application seeks approval for the construction of the Hunter Street Station, including above and below ground structures, public domain works, and spatial provisioning and works to facilitate the construction and operation of an OSD above the two station entries which are described further in this report.

1.3.2 Over Station Development

The OSD components of the Hunter Street integrated station development are not declared as SSI or CSSI under *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). As such, separate development consent is required to be granted for the construction and operation of development above the Hunter Street Station.

The primary land use of the OSD sites is anticipated to be 'commercial premises' which has a capital investment value of more than $30 million, and which are located within a rail corridor and/or are associated with railway infrastructure. Consequently, the future OSD will be classified as State Significant Development. The Sydney LEP 2012 is a relevant environmental planning instrument for the future development, though the Sydney Development Control Plan 2012 (Sydney DCP 2012) will not apply to the OSD sites.

To inform the planning controls relevant for the Hunter Street OSD sites, amendments are proposed to the Sydney LEP 2012 to provide additional Maximum Height of Building and floor space ratio (FSR) controls. Further, as the Sydney DCP 2012 does not apply to the land, the Proponent will prepare a design and amenity guideline to support the planning proposal to inform the future built form on the site including details such as street frontage heights, setbacks, massing and tapering, development adjacent to heritage items, building exteriors, and managing wind impact.

The inter-relationship of the scope of Sydney Metro EIS 3 (part of Critical State Significant Infrastructure CSSI) and this planning proposal is illustrated in Figure 1-1.

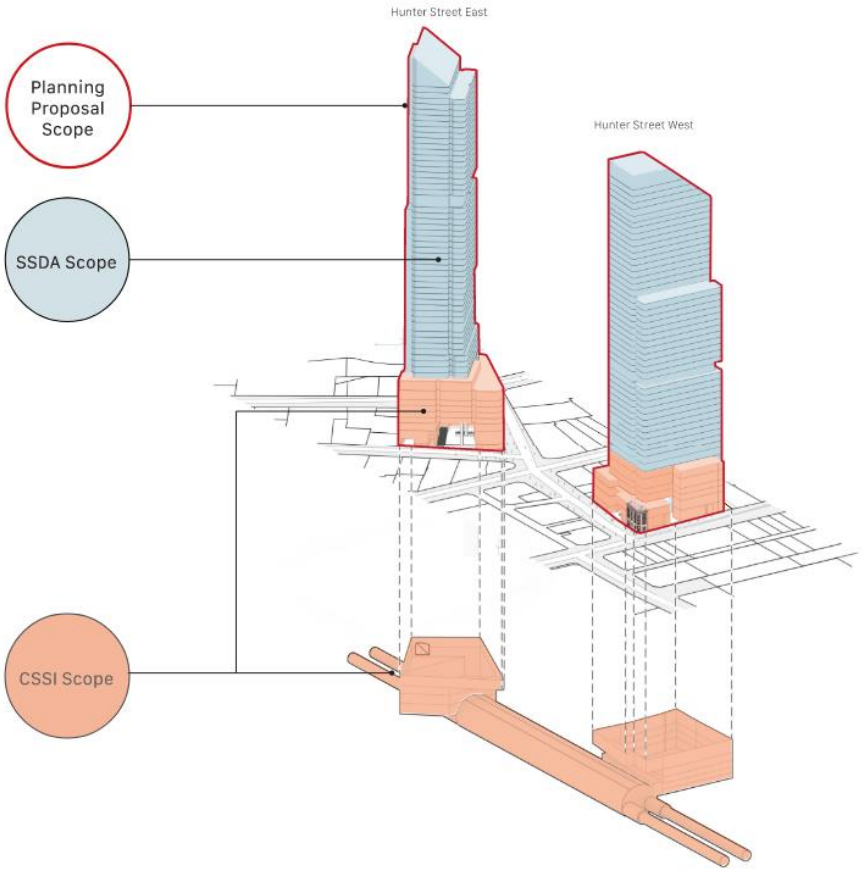


Figure 1-1 Hunter Street Station and proposed OSD

1.3.3 Planning proposal

The planning proposal seeks to amend the *Sydney Local Environmental Plan 2012* to enable development on the site(s) as follows:

- Establish a maximum Height of Buildings control and maximum FSR control on the identified land, being the Hunter Street Station East and West sites.
- Enable the development of a commercial office building on the Hunter Street Station East and West sites
- Integration with the Hunter Street Station, the subject of a separate application process
- Adaptive reuse of the existing Former Skinners Family Hotel within the overall development on the West site
- Include site-specific controls which ensure the provision of employment and other non-residential land uses only on both the Hunter Street Station East and West sites.
- Include site-specific control allowing the provision of up to a maximum of 70 car parking spaces maximum total across both the Hunter Street Station East and West sites.
- Include a site-specific design guideline within the site-specific controls to guide future development sought under a State Significant Development Application process.

- Establish an alternative design excellence process for the Hunter Street Station East and West sites that responds to the integration of the development with the Sydney Metro West project and specifically the Hunter Street Station.

A summary of the key development outcomes resulting from the Planning Proposal is set out in Table 1-1 below.

Table 1-1 Proposed concept built form outcomes

Built form component	Proposed development outcome
East Site	**Based on a site area of 3,666 sqm**
Height	Building height of 257.7m (RL 269.10)
FSR	22.82:1
GFA	Up to 84,287 sqm of GFA
Land use(s)	Non-residential land uses only
West Site	**Based on a site area of 3,735 sqm**
Height	Building height of 213.0m (RL 220.00), including a setback interface from the heritage-listed Skinner Family Hotel
FSR	18.71:1
GFA	Up to 69,912 sqm of GFA
Land use(s)	Non-residential land uses only
Cl 7.6 – Carparking for office and business premises	Up to 70 car parking spaces, maximum total across both the Eastern and Western sites

1.4 Site context

1.4.1 The site

The Hunter Street integrated station development is located in the northern part of the Sydney CBD, within the commercial core precinct of Central Sydney, within the Sydney Local Government Area.

The east site is located on the corner of O'Connell Street, Hunter Street and Bligh Street adjacent to the existing CBD and South East Light Rail that extends from Circular Quay to Moore Park, Kensington and Kingsford. The east site is adjacent to the new Martin Place Station which forms part of the Sydney Metro City and Southwest, Australia's biggest public transport project connecting Chatswood to Sydenham and extending to Bankstown.

The west site is located on the corner of George and Hunter Street, including De Mestre Place and land predominantly occupied by the existing Hunter Connection retail plaza.

Refer to Figure 1-2 below which illustrates the location of the Hunter Street Station within its regional context.

Figure 1-2 Location of the new Sydney Metro West station at Hunter Street

1.4.2 Local context

The Sydney CBD is a highly developed commercial core with a ride range of commercial, retail, health, government and community-based uses, as well as high density residential developments.

A number of key commercial buildings are located in or around the Sydney CBD, including educational facilities, historic buildings and structures, law courts, public gathering spaces and places of worship. Significant areas of open space, such as the Botanical Gardens, the Domain and Hyde Park are also located within or near the Sydney CBD area, as well as the World Heritage Sydney Opera House and iconic Sydney Harbour Bridge.

Land uses surrounding the Hunter Street Station (Sydney CBD) sites include:

- North of the sites is a major commercial area comprising high density commercial towers along George Street, Pitt Street, and Bridge Street, including the MetCentre and Australia Square buildings. The area also comprises tourism and entertainment related uses including hotels, shops, restaurants, cafes, nightclubs and bars, with the area around Circular Quay and the Rocks a major tourism precinct and providing significant support for the night time economy.
- East of the sites are major commercial towers along Hunter Street, including Chifley Tower, 8 Chifley Square, Aurora Place and Deutsche Bank Place. Beyond Hunter Street, the State Library of NSW and the NSW Parliament House front onto Macquarie Street, and beyond that lies the public open space of The Domain.

- South of the sites, the land use remains predominantly multi-storey commercial offices but also includes cafes, bars and nightclubs, including the Ivy complex. Martin Place is a significant east–west pedestrian thoroughfare which contains many culturally significant buildings and structures including the Cenotaph memorial and the General Post Office building, as well as Martin Place Station. Beyond Martin Place the Sydney CBD continues towards Town Hall, Haymarket and the Central Station precinct.
- West of the sites, the land use remains predominantly high-density commercial offices, anchored by Wynyard Station. George Street contains the Sydney Light Rail (L2 Randwick Line and L3 Kingsford Line) and is a major north–south axis through the CBD, and along with Pitt Street connects Circular Quay, Wynyard, Town Hall and Central. East of Wynyard, the CBD continues towards the major commercial and entertainment areas around King Street Wharf and Barangaroo, which also contain significant high density residential apartment buildings.

1.4.3 Site description

The Hunter Street (Sydney CBD) ISD relates to the following properties:

- 28 O'Connell Street, 48 Hunter Street, and 37 Bligh Street, Sydney (East Site); and
- 296 George Street, 300 George Street, 312 George Street, 314-318 George Street, 5010 De Mestre Place (Over Pass), 5 Hunter Street, 7-13 Hunter Street, 9 Hunter Street and De Mestre Place, Sydney (West Site).

Table 1-2 and Table 1-3 below set out the address, legal description and area of the parcels of land that comprise the Hunter Street Station (Sydney CBD) land that is the subject of this Planning Proposal.

Table 1-2 – Legal Description of Hunter Street Station (Sydney CBD) East Site

Address	Lot and DP
28 O'Connell Street, Sydney	Lot 1, DP217112
28 O'Connell Street, Sydney	Lot 1, DP536538
28 O'Connell Street, Sydney	Lot 1, DP1107981
48 Hunter Street, Sydney	Lot 1, DP59871
48 Hunter Street, Sydney	Lot 2, DP217112
33 Bligh Street, Sydney	Lot 1, DP626651
37 Bligh Street, Sydney	CP and Lots 1-14, 21-31, 33-36, and 40, SP58859
37 Bligh Street, Sydney	CP and Lots 41-49, SP61852
37 Bligh Street, Sydney	CP and Lots 50-57, SP61922
37 Bligh Street, Sydney	CP and Lots 58-65, SP61923
37 Bligh Street, Sydney	CP and Lots 66 and 67, SP63146
37 Bligh Street, Sydney	CP and Lots 67-70, SP63147
37 Bligh Street, Sydney	CP and Lot 72, SP74004
37 Bligh Street, Sydney	CP and Lots 75-82, SP87437
37 Bligh Street, Sydney	CP and Lots 73-74, SP87628

Address	Lot and DP
	Total Area: 3,694 sqm

Table 1-3 – Legal Description of Hunter Street Station (Sydney CBD) West Site

Address	Lot and DP
296 George Street, Sydney	Lot 1, DP438188
300 George Street, Sydney	CP and Lots 1-43, SP596
312 George Street, Sydney	Lot 1, DP211120
314-318 George Street, Sydney	Lot 13, DP622968
5010 De Mestre Place, Sydney (Over Pass)	Lot 1, DP1003818
9 Hunter Street, Sydney	Lot 2, DP850895
5 Hunter Street, Sydney (Leda House & Hunter Arcade)	CP and Lots 1-63, SP71068
5 Hunter Street, Sydney (Leda House & Hunter Arcade)	CP and Lots 1-14, SP65054
7-13 Hunter Street, Sydney (Hunter Connection)	CP and Lots 1-53, SP50276
7-13 Hunter Street, Sydney (Hunter Connection)	Lots 57 and 58, SP61007
7-13 Hunter Street, Sydney (Hunter Connection)	Lots 54, 55 and 56, SP60441
7-13 Hunter Street, Sydney (Hunter Connection)	Lots 59, 60 and 61, SP62889
7-13 Hunter Street, Sydney (Hunter Connection)	Lots 62, 63, 64 and 65, SP69300
7-13 Hunter Street, Sydney (Hunter Connection)	Lots 66 and 67, SP77409
7-13 Hunter Street, Sydney (Hunter Connection)	Lot 2, SP50276
De Mestre Place, Sydney	N/A
	Total Area: 3,735 sqm

2 Methodology

The scope of this report is to summarise existing stormwater and water quality conditions and detail required upgrades, infrastructure and protection measures required to satisfy the relevant stormwater and water quality standards.

The stormwater and water quality requirements are summarised below along with the location where they have been addressed within this report:

- Stormwater discharge from development site shall have no adverse impacts on upstream and downstream drainage system as per City of Sydney DCP 2014. Further details outlined in Section 6.5 and Section 6.6.
- Provision of on site detention system as required by Sydney Water as summarised in Section 6.6
- Development site stormwater quality to meet City of Sydney targets as outlined in Section 6.5

It is noted that this assessment relates to the proposed building envelopes and associated reference design of the on site detention for the planning proposal. Additionally, this report identifies preliminary development staging and stormwater consultation, the final staging and delivery of stormwater and water quality infrastructure will form part of subsequent design stages.

The stormwater and water quality assessment involved:

- Undertaking a desktop review of publicly available data to characterise existing surface water (baseline) conditions at the proposal site including climate, catchment history, topography, hydrology, the soil landscape and environmental values.
- Reviewing relevant legislation, plans, policies and guidelines for water management within NSW and local council.
- Identifying the types of surface water impacts which may occur due to the proposal.
- Identifying mitigation measures to address potential surface water impacts.

A separate *Hunter Street Planning Proposal Preliminary Flooding Report* has been developed for this site, refer SMWSTEDS-SMD-SCB-SN100-SD-RPT-044001.

A separate *Hunter Street Planning Proposal Ecologically Sustainable Development (ESD) Report* has been developed for this site, refer to SMWSTEDS-SMD-SCB-SN100-SB-RPT-044003. Key indicatives that might be applicable for this site include:

- Target a 6 star Green Star Buildings rating
- Commit to a 6 Star NABERS Energy for Offices and 4.5 star NABERS Water for Offices performance, respectively
- Deliver a 40% reduction in annual water consumption when compared to a reference building

2.1 Design standards

The design has been undertaken in compliance with relevant Australian standards and local government guidelines. City of Sydney standards have generally been adopted for the development. Key documents used as guidance for the design are summarised below in Table 2-1.

Table 2-1 Stormwater design standards

Document No.	Document Name	Version or Date
City of Sydney	Sydney Streets Technical Specifications: A4 Stormwater Drainage Design	2016
RMS R11	RMS Specification R11	
AR&R	Australian Rainfall and Runoff: A Guide to Flood Estimation	2019
AS 3500.3	Australian Standard AS3500.3: Plumbing and Drainage Code – Stormwater Drainage (2003)	2021

2.2 Basis of design

In developing the civil concept design, information from a variety of sources has been used. A summary of this information is contained below in Table 2-2.

Table 2-2 Stormwater basis of design

Document No.	Document Name	Version or Date
NA	City of Sydney Development Control Plan	2016
NA	Local Planning for Healthy Waterways using NSW Water Quality Objectives	June 2006
NA	City of Sydney WSUD Technical Guidelines	2014

2.3 Consultation

The IWMP integrates correspondence and comments from Sydney Water. Details of this consultation are contained within *Appendix A.*

2.4 Design criteria

The design criteria applied to the stormwater works are summarised in Table 2-3Table 2-3 below:

Table 2-3: Stormwater design criteria

Item	Standard	Adopted
Hydrology & Hydraulics		
Hydrological Model	Sydney Street Technical Specifications: A4 Stormwater Drainage	DRAINS model Time and Area method - ILSAX
Minor Design Storm	Sydney Street Technical Specifications: A4 Stormwater Drainage	20yr Average Recurrence Interval (5% AEP)
Major Design Storm	Sydney Street Technical Specifications: A4 Stormwater Drainage	100yr Average Recurrence Interval (1% AEP)
Design Rainfall	Sydney Street Technical Specifications: A4 Stormwater Drainage	AR&R 2016 values

Item	Standard	Adopted
Urban Rainfall Losses	AR&R Datahub	Pervious IL = 28mm Pervious CL = 0.64mm/h Imperv. IL = 1mm Imperv. CL = 0.0mm/h
Pipe Size	Sydney Street Technical Specifications: A4 Stormwater Drainage	Min 150mm diameter (pipes located in private property) Min 375mm diameter (pipes owned by City of Sydney)
Pit Spacing	Sydney Street Technical Specifications: A4 Stormwater Drainage	Max. 40m (pipes 375mm to 750mm dia.) Max. 60m (pipes 750mm to 1500 mm dia.)
Pit Losses	Sydney Street Technical Specifications: A4 Stormwater Drainage	Missouri Charts
Pit Blockage Factors	Sydney Street Technical Specifications: A4 Stormwater Drainage	Grated Inlet Pits: 90% Kerb Inlet Pits <=1.0 m • On-Grade: 50% • Sag: 70% Kerb Inlet Pits > 1.0 m • On-Grade: 20% • Sag: 50%
Overland Flow Safety Criteria	AR&R	Max Depth x Velocity = 0.4m²/s
Climate Change Rainfall Factor	AR&R 2019	1.213 multiplier to rainfall intensities
Water Quality		
Pollution reduction targets	TfNSW City of Sydney DCP 2012	Gross Pollutants 90% TSS 85% TP 65% TN 45%

2.5 Stormwater quantity control requirements

Sydney Water (the authority responsible stormwater quantity control requirement for City of Sydney) has advised of the required stormwater quantity controls for the sites, summarised below in Table 2-4.

Table 2-4 Sydney water quantity control requirements

Site	On site detention	Permitted Site Discharge (PSD)
Hunter St EAST	Not Required	Not Required
Hunter St WEST	59m³	138L/s

Sydney Water has further clarified that the above requirement in an email dated 29 September 2021, a copy of which is provided in Appendix A. It states that:

'Approval for the On Site Detention would only be given as part of the Section 73 application for this development. The On Site Detention is to be designed according to the above values and submitted to Sydney Water for approval with the Section 73 application.'

Approval of the on site detention system will be sought under the CSSI application.

2.6 City of Sydney Development Control Plan 2012

The future over station development will be for a 'commercial premises' that have a capital investment value of more than $30 million and is located within a rail corridor and/or associated with railway infrastructure. As such the future OSDs will be classified as State Significant Development. As such the SLEP 2012 is a relevant environmental planning instrument for the future development, however the Sydney Development Control Plan 2012 (SDCP 2012) will not apply to the site. Notwithstanding, the relevant provisions of the SDCP 2012 are considered in the preparation of this report to demonstrate that a suitable stormwater condition can be achieved on the site and surrounding properties resulting from an increase in development density on the site.

The City of Sydney Development Control Plan (DCP) details planning and design guidelines to support the planning controls throughout the City of Sydney local government area (LGA) which include the management of stormwater. The DCP requirements are outlined in Section 3.7 of the Sydney DCP 2012.

Specific key requirements in the DCP which relate to stormwater include:

- A site-specific flood study should be prepared to support the development of the site
- The connection to the existing stormwater network is not to reduce the capacity of that infrastructure by more than 10%
- Post development run-off from impermeable surfaces is to be managed by stormwater source measures that: contain frequent low-magnitude flows; maintain the natural balance between run-off and infiltration; remove some pollutants prior to discharge into receiving waters; prevent nuisance flows from affecting adjacent properties; and enable appropriate use of rainwater and stormwater
- The stormwater quality management approach will involve integrating Water Sensitive Urban Design (WSUD) techniques in the proposed stormwater drainage system. The water quality requirements are summarised below:
- Reduce the baseline and annual pollutant load for litter and vegetation larger than 5mm by 90%
- Reduce the baseline annual pollutant load for total suspended solids by 85%
- Reduce the baseline annual pollutant load for phosphorous by 65%
- Reduce the baseline annual pollutant load for total nitrogen by 45%.

3 Assessment

3.1 Baseline investigations

3.1.1 Existing drainage network

The drainage network around the site consists of road kerb and gutter system, local piped drainage and a trunk drainage system (the Tank Stream and Bennelong sewer) which discharge to Sydney Harbour to the north. The trunk drainage system is owned by the Sydney Water Corporation.

The existing drainage network within the existing sites at Hunter Street East and West are both unknown. It is assumed that the stormwater runoff is collected and discharged to the nearby kerb inlet pits and kerb & gutter channels.

The existing stormwater networks are presented in drawings in Appendix B.

3.1.2 Catchment and topography

The station sites are located in the City Area catchment within the City of Sydney LGA. The existing sites at Hunter Street East and West are both fully developed. The surrounding sites are comprised of paved public spaces and high rise buildings which provides minimal water infiltration due to the high level of impervious areas.

The catchments for Hunter Street East and West consist of the development site area which is assumed to be roof area only. The existing and proposed catchments are the same as shown in Table 3-1.

Table 3-1 Hunter Street Station catchment areas

Catchment	Catchment area (ha)	Catchment area – % impervious
West	0.3735	100
East	0.3694	100

The existing catchment areas for the site is shown in Figure 3-1.

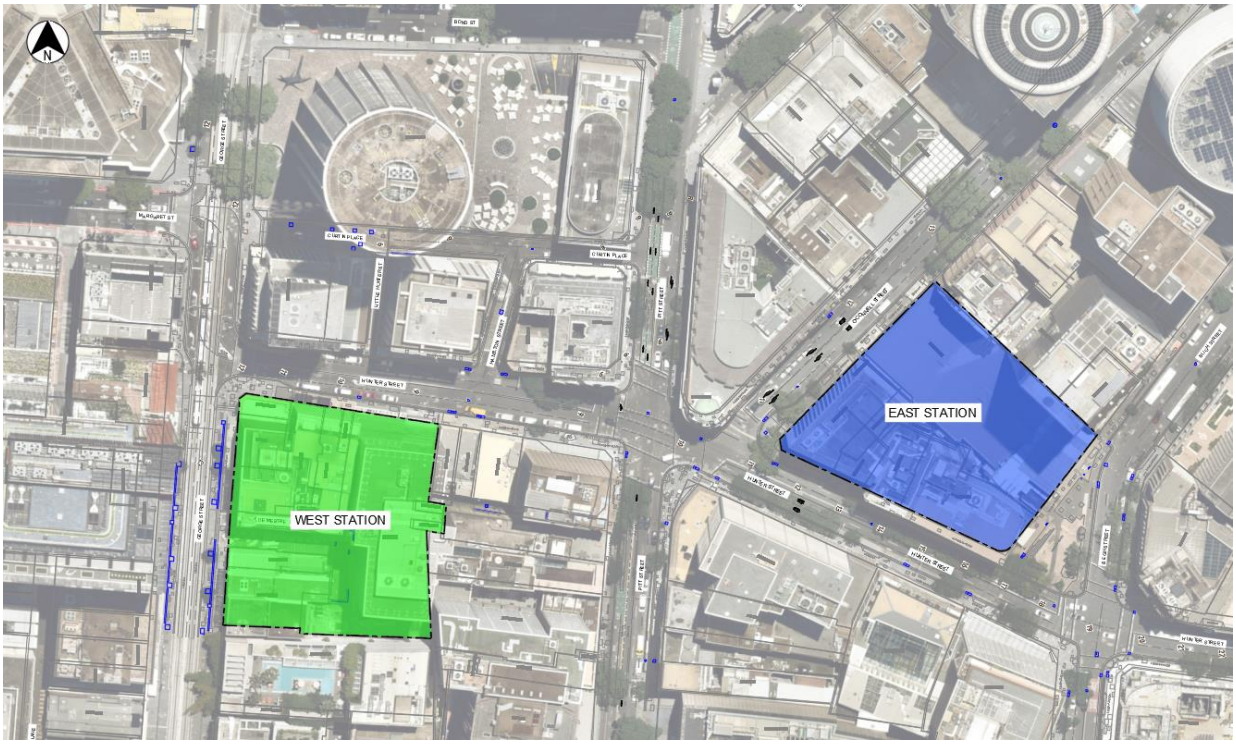


Figure 3-1 Hunter Street Station catchment areas

3.1.3 Existing stormwater performance

A hydrological model of the catchment was formulated using the DRAINS software package and was analysed to assess the performance of the site stormwater network. The DRAINS program typically performs design and analysis calculations for urban stormwater systems behaviour on both rural and urban catchments. The DRAINS model prepared for this site is shown in Figure 3-2 and results are summarised in Section 3.2.2. The DRAINS Model shown below includes the Pre-development and Post-development catchments for the East and West station sites. The on-site detention tanks are also modelled to be connected to the council pits.

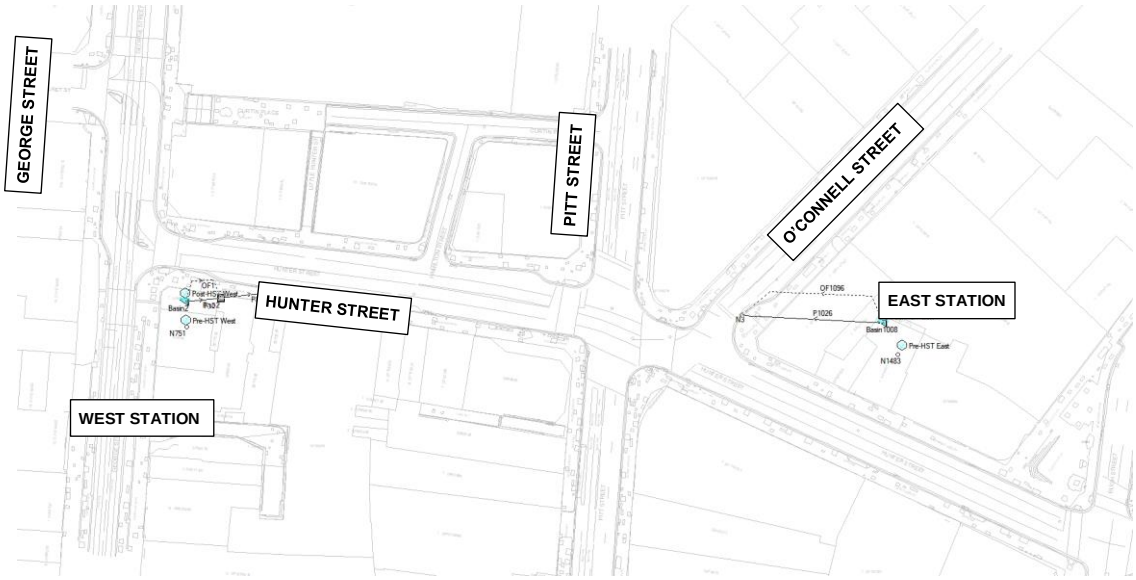


Figure 3-2: Hunter Street DRAINS Model, East and West sites

The existing stormwater network surrounding the two station sites was also modelled in TUFLOW to produce flood maps to assess the flood depths and existing conditions. Flood depths around the sites are outlined below:

- Western site: flood depths up to 0.35 metres occur in the 1% AEP Climate Change flood event at the north eastern portion of the site between the northern site boundary and Hunter Street. However, the 5% AEP Climate Change flood event has much shallower depths up to 0.04m. Outside of the northern boundary, there are flood depths up to 0.2 metres between the western boundary and George Street in the 1% AEP Climate Change flood event. A similar trend is seen in the PMF flood event with the worst-case flooding occurring at the northern boundary with depths up to one metre. The western boundary is inundated up to 0.4 metres in the PMF flood event.
- Eastern site: flood depths up to 0.06 metres occur in the 5% AEP Climate Change flood event and 0.25 metres occur in the 1% AEP Climate Change flood event between the southern boundary and Bligh Street. Elsewhere Hunter Street is inundated up to 0.07 metres in the 1% AEP Climate Change flood event and O'Connell Street experiences less than 0.1 metres. Flooding with the 5% AEP Climate Change flood event in these roads are very minor (0.02m). In the PMF flood event both Hunter Street and the southern portion of the site have flood depths up to 0.3 metres whilst O'Connell Street has depths up to 0.15 metres.

Preliminary flood depth mapping and flood hazard mapping are presented in the Preliminary Flood Report (Ref: SMWSTEDS-SMD-SCB-SN100-SD-RPT-044001). The flood hazards for the sites are outlined below:

- Western site: In the 5% AEP Climate Change flood event all roads surrounding the site are within a low H1 hazard category. In the 1% AEP Climate Change flood event the northern portion of the site along Hunter Street has a H5 hazard along with a small section of George Street. The remainder of the site surrounds appears to be within the low H1 hazard category (generally safe for vehicles, people and buildings) and as expected, the PMF flood event produces higher hazard categories of H5 and H6 with only pockets of the streets falling within the low hazard (H1).
- Eastern site: In the 5% AEP Climate Change flood event all roads surrounding the site are within a low H1 hazard category. In both the 1% AEP Climate Change and PMF flood events, Hunter Street falls within a H5 hazard category whereas O'Connell and Bligh Street are both within the H1 hazard category.

In order to model the tail water influence at the discharge or existing connection pit in the DRAINS model, the tail water level is estimated using the flood depths at the connection point from the flood maps. The tailwater can impact the stormwater modelling and design as it creates downstream condition that impacts the size and location of any stormwater storage and discharge system. Table 3-2 summarises the tail water levels for the West and East drainage connection points to the nearest council stormwater pits.

Table 3-2: Hunter Street Tail Water levels

Catchment	Location of Connection Point	5% AEP Flood Depth (m)	5% AEP Tail Water Level (mAHD)	1% AEP Flood Depth (m)	1% AEP Tail Water Level (mAHD)
West	Hunter Street kerb inlet pit	0.05	9.65	0.10	9.70
East	O'Connell Street kerb inlet pit	0.05	11.05	0.05	11.05

3.2 Stormwater quantity

3.2.1 Stormwater strategy

The proposed stormwater drainage and runoff system for the Hunter Street Station development will comply with the design requirements as identified in Section 2.4 with the main design considerations summarised below:

- Post development stormwater runoff connections into existing drainage infrastructure will match predevelopment case where feasible. (i.e. building connection to either Hunter St for West site or O'Connell St for the East site)
- Compliance with Sydney Water total Permissible Site Discharge (PSD) requirements of 138L/s (assuming 3,735 m² area) and On Site Detention of 59m³ for the West site
- On Site Detention is to be situated above the 100 year ARI flood levels to facilitate discharge into potentially fully charged stormwater pipes
- Management of water quantity to ensure no increase in stormwater discharge rate from the sites for the 20 and 100 year ARI storms.

A DRAINS model was developed to assess the existing hydrological and hydraulic conditions for the site and revised to estimate the stormwater discharge from the site under the proposed future conditions.

3.2.2 Proposed stormwater design

On site detention is required as a part of the station construction. However, the detention requirements would apply to both that station and the over station development. For clarity, the requirements for on site detention are detailed below, the coordination and integration of the metro station system will be included in subsequent detailed designs as the building hydraulic design of both progresses.

The proposed stormwater strategy is to provide an on site detention system for the Hunter Street West development as outlined in Section 3.2.1. That on site detention

volume requirement, of 59m^3, was modelled in DRAINS to analyse the stormwater flows post-development. As per the City of Sydney DCP 2012, post development flows are to be managed and stormwater management design is to ensure flows are less than pre-development conditions.

The catchment areas and impervious areas of the East and West sites in the post-development scenario is the same as the pre-development because the existing site conditions is the same as a built-up commercial building with 100% impervious area. The proposed drainage system is to be sized to convey the 5% AEP storm event, with climate change in accordance with Australian Rainfall & Runoff and council requirements as outlined in Section 2. 4. The catchment flow results for the 5% AEP and 1% AEP storm events are summarised in Table 3-4 below.

The Hunter Street East development post development flows are expected to be greater than the pre-development due to the application of a climate change (CC) factor in the hydrological model. Although Sydney Water does not have a storage requirement for the East site, the post development flows accounting for climate change will result in adverse impacts on the local stormwater drainage system due to the 21.3% volume increase of rainfall required as part of that assessment. The City of Sydney A4 drainage manual requires stormwater connections to have no adverse impacts on the private property due to the development. As such, an on site detention system has been designed using DRAINS to control the flows. The design of the proposed on site detention system basin for the East will be undertaken to ensure the post developed flow with climate change does not exceed the pre-developed flow for 5% and 1% AEP storm events. This approach, including the climate change factor in the post development assessment, is conservative at this stage and may not be required based on future consultation with Council.

A summary of the Hunter Street development concept on site detention design is provided in Table 3-3.

Table 3-3: Hunter Street On Site Detention Summary

Catchment	Volume (m^3)	Orifice Diameter (mm)	Outlet Pipe Diameter (mm)	Weir Width (m)
West	100	230	375	2
East	30	375	375	2

Table 3-4: Hunter Street On Site Detention Catchment flow rates

Catchment	5% AEP Pre Flow (m^3/s)	5% AEP Post Flow (m^3/s)	1% AEP Pre Flow (m^3/s)	1% AEP Post Flow (m^3/s)
West	0.197	0.111	0.261	0.132
East	0.192	0.187	0.254	0.229

An initial hydraulic analysis of the Hunter Street West on site detention based on Sydney Water storage requirement of 59m^3 showed that the tank would have insufficient capacity to meet the Sydney Water PSD in the1% AEP post development flow including climate change storm event. Further modelling of the West on site detention tank indicates that the volume will be 100m^3 to meet the requirement of 0.138 m^3/s PSD, As shown in Table 3-4, the West on site detention flow rates are compliant in controlling post development flows to the required PSD.

The Hunter Street East post-development flows also show no adverse impacts on the stormwater system. The post flows are less than the pre flows for both the 5% and 1% AEP storm events including climate change when allowance is made from on site detention system. The inclusion of an on site detention system, which is not required

by council or Sydney Water standards, is dependent on the need to accommodate extra catchment runoff due to climate change. If the increased flows from climate change are not required to be mitigated to pre-development conditions then there would be no need for an on site detention system as the development has 'like for like' conditions compared to the existing. The need for on site detention at the East station may also be mitigated by the provision of water recycling assets such as rainwater tanks.

The provision of an on site detention system also provides opportunity to implement stormwater quality control devices as discussed further in 3.3.2Section 3.3.

Due to the elevated tailwater levels in the council stormwater network, detailed in 3.1.3Section 3.1.3, it is unlikely that a detention system can be buried at ground level as it will become inundated in high storm events. The placement of the detention system will be coordinated between the station and OSD design to provide a practical, well performing and value for money solution.

3.2.3 Proposed stormwater works

A summary of the proposed stormwater works on site are summarised below.

For the East site OSD contract:

- Construction of stormwater pipe network and associated storage and rainwater tanks within the OSD.

For the West site OSD contract:

- Construction of stormwater pipe network and associated storage and rainwater tanks within the OSD.

3.3 Stormwater quality

3.3.1 Existing stormwater quality measures

There are no known stormwater quality treatment measures on the existing development sites.

Hunter Street (Sydney CBD) Station is located to the east of Darling Harbour catchment, a sub-catchment of Sydney harbour catchment. The Darling Harbour catchment, comprising of Haymarket, Surry Hills, Pyrmont and Sydney CBD, is a receiving environment of both Pyrmont Station and Hunter Street Station (Sydney CBD) sites. The harbour and its surrounding environment are fully developed with urban and commercial usage giving water very little opportunity to infiltrate due to large amounts of impervious areas. As a result, the harbour is characterised by elevated nutrient, heavy metal concentrations and high turbidity. The total catchment covers approximately 307 hectares which drains to Sydney Harbour at various locations (RPS Australia East, 2014).

Prior to this proposal, major civil construction works will be undertaken at Hunter Street (Sydney CBD) Station site as part of the approved Concept and major civil construction work for Sydney Metro West between Westmead and The Bays. This includes the installation of a temporary construction water treatment plant at Hunter Street (Sydney CBD) Station site which will discharge treated water to Circular Quay via the local stormwater network. The water treatment plant would be configured so that treated water is compliant with the ANZECC/ANZG (2018) guideline values.

A review of available data indicates the watercourses relevant to this proposal are generally in poor condition and are representative of a heavily urbanised system (Jacobs, 2020). The watercourses which discharged water will be released to from the Hunter Street station temporary water treatment plant has been assessed against

the ANZECC/ANZG guidelines as part of Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD (Sydney Metro, 2020) is provided in Table 3-5.

Table 3-5: Existing water quality conditions of watercourses relevant to Hunter Street Station (Sydney CBD)

Site	Watercourse	Water quality characteristic relevant to ANZECC/ARMCANZ (2000) Indicators
Hunter Street Station	Circular Quay	• Elevated nutrient concentrations • Elevated heavy metal concentrations • High turbidity

3.3.2 Proposed stormwater quality strategy

The stormwater quality strategy has been developed in accordance with the requirements of City of Sydney's stormwater quality reduction targets as well as the *Local Planning for Healthy Waterways using NSW Water Quality Objectives* (June 2006) and *Managing Urban Stormwater – Harvesting and Reuse Guidelines* (December 2006).

Modelling of the proposed works was undertaken using Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software. The software was utilised to simulate urban stormwater systems operating at a range of temporal and spatial scales.

MUSIC models the total amounts of gross pollutants and nutrients produced within various types of catchments. It allows the user to simulate the removal rates expected when implementing removal filters to reduce the increased gross pollutant and nutrient levels created by the proposed development.

The council water quality targets, as included from section 2.6 are:

- 90% reduction in post-development loads for Gross Pollutants (GP)
- 85% reduction in post-development loads for Total Suspended Solids (TSS)
- 65% reduction in post-development loads for Total Phosphorus (TP)
- 45% reduction in post-development loads for Total Nitrogen (TN).

The following methodology and parameters were incorporated into the MUSIC modelling for the proposed site.

3.3.3 Rainfall data and model parameters

- Rainfall pluviograph and catchment data was implemented using the City of Sydney Council MUSIC-link within the model.
- The pollutant concentration parameters used within the model were based on the recommended model defaults for different land use categories as specified in City of Sydney Council's MUSIC-link data. The catchments utilised within the model were classified as summarised in Table 3-9 below.
- Sandy loam soil properties were adopted as the site conditions at Hunter Street development were classified as Gymea according to City of Sydney WSUD Technical Guidelines (2014).

3.3.4 Gross pollutant trap (GPT) model parameters

For primary treatment of the stormwater runoff within station areas where the use of green infrastructure treatment is limited, a Gross Pollutant Trap (GPT) is to be provided. The Ocean Protect OceanGuard® GPT is proposed and is a gully pit inset or basket designed to remove gross pollutants, total suspended solids and attached pollutants in residential and commercial developments. Each OceanGuard® is able to treat up to 20L/s and multiple traps can be installed within the same structure to treat higher flows. The MUSIC node from Ocean Protect was used with the input data as summarised in Table 3-6.

It is noted that this product has been chosen for analysis of the system at this stage, an approved equivalent may be adopted as long as the water quality targets are being met.

Table 3-6 OceanGuard® GPT 200µm – MUSIC input parameters

Pollutant	Input	Output	Adopted reduction rate
Suspended Solids (mg/L)	Varies (Max. 121)	Varies (Max. 30)	Approx. 75%
Phosphorus (mg/L)	10	7	30%
Nitrogen (mg/L)	50	39.5	21%
Gross Pollutants (kg/ML)	20	0	100%

3.3.5 StormFilter Model Parameters

The Ocean Guard StormFilter® is an underground cartridge treatment system which is used to remove suspended solids and other water pollutants from stormwater runoff. Each filtration cartridge provides a membrane surface area which allows runoff to travel through the membrane while removing the pollutants. The MUSIC node from Ocean Protect was used with the input data as summarised in Table 3-7.

Table 3-7: Ocean Protect StormFilter® – MUSIC Input Parameters

Pollutant	Input	Output	Adopted rate
Suspended Solids (mg/L)	1000	66	93.4%
Phosphorus (mg/L)	10	1.39	86.1%
Nitrogen (mg/L)	100	44.1	55.9%
Gross Pollutants (kg/ML)	14.9	0	100%

It is noted that this product has been chosen for analysis of the system at this stage, an approved equivalent may be adopted as long as the water quality targets are being met.

3.3.6 Proposed treatment train

The proposed treatment train is to treat stormwater runoff through the OceanGuard® GPT before discharging into the on site detention with a cascade separator and Storm Filter. The OceanGuard® is typically installed in gully pits however due to the site and spacing constraints of treating water within the station development, it is proposed to install an above ground pit with multiple OceanGuard® baskets to capture pollutants. The OceanGuard® above ground pits will be located in the same water quality treatment room with the on site detention and StormFilter®. The number of

OceanGuard® required has been calculated based on the 4EY storm event flow rate. The proposed water quality treatment process is summarised in Table 3-8.

Table 3-8: Proposed treatment train

Catchment	Treatment train
West	1. 4 x OceanGuard within above ground pits 2. 5 x 690mm PSORB Stormfilter within a 9m^2 chamber inside the on site detention tank
East	1. 4 x OceanGuard within above ground pits 2. 5 x 690mm PSORB Stormfilter within a 9m^2 chamber inside the on site detention tank

The water quality treatment train has been modelled in MUSIC as shown in Figure 3-3 below.

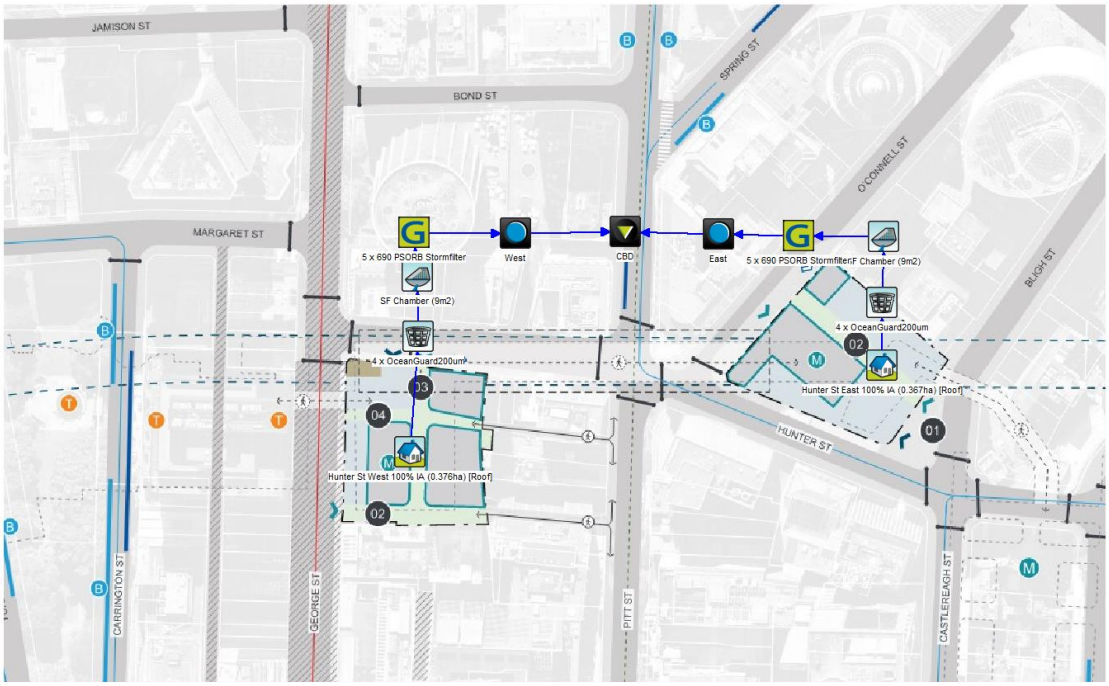


Figure 3-3: Hunter Street MUSIC model

The current design assumed that the catchment area will be 100% roof area. The catchment source nodes used in MUSIC has been summarised in Table 3-9. As the design further develops, the MUSIC model and catchment classifications will be updated.

Table 3-9: Hunter Street Station water quality catchment areas

Catchment	Open Space Catchment Area (ha)	% Impervious	Roof Catchment Area (ha)	% Impervious
West	-	100	0.3758	100
East	-	100	0.3667	100

The resulting percentage reduction for each of the catchments for total suspended solids, phosphorus, nitrogen and gross pollutants are as summarised in Table 3-10 and for the total catchment are summarised in Table 3-11 below.

The overall total percentage reduction for the proposed treatment train meets the targets as set by City of Sydney and therefore meet the water quality requirements.

Table 3-10: Hunter Street Station Catchment MUSIC Results

Pollutant	CoS Reduction Targets (%)	West - % Reduction	WQ Target Achieved	East - % Reduction	WQ Target Achieved
Total Suspended Solids (kg/yr)	85	87.2	Yes	87.6	Yes
Total Phosphorus (kg/yr)	65	72	Yes	71.9	Yes
Total Nitrogen (kg/yr)	45	51.6	Yes	52.1	Yes
Gross Pollutants (kg/yr)	90	100	Yes	100	Yes

Table 3-11: Hunter Street Overall MUSIC Results

Pollutant	CoS Reduction Targets (%)	Overall % Reduction	WQ Target Achieved
Total Suspended Solids (kg/yr)	85	87.4	Yes
Total Phosphorus (kg/yr)	65	72	Yes
Total Nitrogen (kg/yr)	45	51.8	Yes
Gross Pollutants (kg/yr)	90	100	Yes

3.4 Authority consultation

As a part of this assessment process, consultation was undertaken with Sydney Water

The responses are contained with *Appendix A.*

4 Conclusion

As outlined through this report, subject to detailed design development prepared in accordance with the standard industry practice, a suitable stormwater condition can be achieved on the site as a result of increased rainfall due to climate change and the high impervious area of the proposed site within the Planning Proposal. This Integrated Water Management Plan summarises the stormwater quantity and quality analysis process, results, and design.

The stormwater quantity design has been developed in accordance with CoS and Sydney Water guidelines, providing storage within the building developments and connection to the existing council buried pipe network. The required on site detention tank sizes are summarised below with further details in Section 3.2.2:

- West – 100 m^3 with 230mm orifice
- East – 30 m^3 with 375mm outlet

The stormwater quality design has been developed in accordance with CoS DCP. The proposed WSUD measures have achieved the required mitigation targets. The recommended water quality treatment train is summarised below with further details in Section 3.3.6:

- West – 4 x OceanGuard within above ground pits followed by 5 x 690 mm PSORB Stormfilter within a 9 m^2 chamber inside the on site detention tank
- East – 4 x OceanGuard within above ground pits followed by 5 x 690 mm PSORB Stormfilter within a 9 m^2 chamber inside the on site detention tank

Future work that is required to finalise the stormwater and water quality design, will be part of the Stage 1 design of the Hunter Street metro station and coordinated with the SSDA Detailed Design process by the developer, to ensure requirements are met. This will include the following:

- Design of connection to existing council drainage system.
- Final onsite detention requirements based on the finalised architectural scheme.
- Further authority coordination as required.

Appendix A – Authority consultation

Walker, Heather

From: Stormwater <Stormwater@sydneywater.com.au>
Sent: Wednesday, 29 September 2021 11:01 AM
To: Walker, Heather
Cc: jonny.killen@transport.nsw.gov.au
Subject: [EXTERNAL] RE: Hunter St Station, Sydney Metro West - OSD requirements

Follow Up Flag: Follow up
Flag Status: Flagged

Heather,

The On Site Detention requirements for the Hunter Street Station at Hunter Street, Sydney, are as follows:

Hunter Street East Side (intersection of O'Connell, Hunter and Bligh Streets)

On Site Detention is not required for this site.

Hunter Street West Side (SE corner of the George St and Hunter St)

- Total Site Area 3,758 Square meters
- On Site Detention 59 cubic meters
- Permissible Site Discharge 138 L/s

The approval for the On Site Detention would only be given as part of the Section 73 application for this development. The On Site Detention is to be designed according to the above values and submitted to Sydney Water for approval with the Section 73 application. The following details are to be included in your submission for On Site Detention approval:

- Location of the On Site Detention in relation to the development
- Location of the On Site Detention in relation to overall stormwater network of the property
- Plan and Elevation of the On Site Detention tank with all dimensions
- Orifice plate calculation

Best Regards

Planning and Technical
City Growth and Development
Business Development

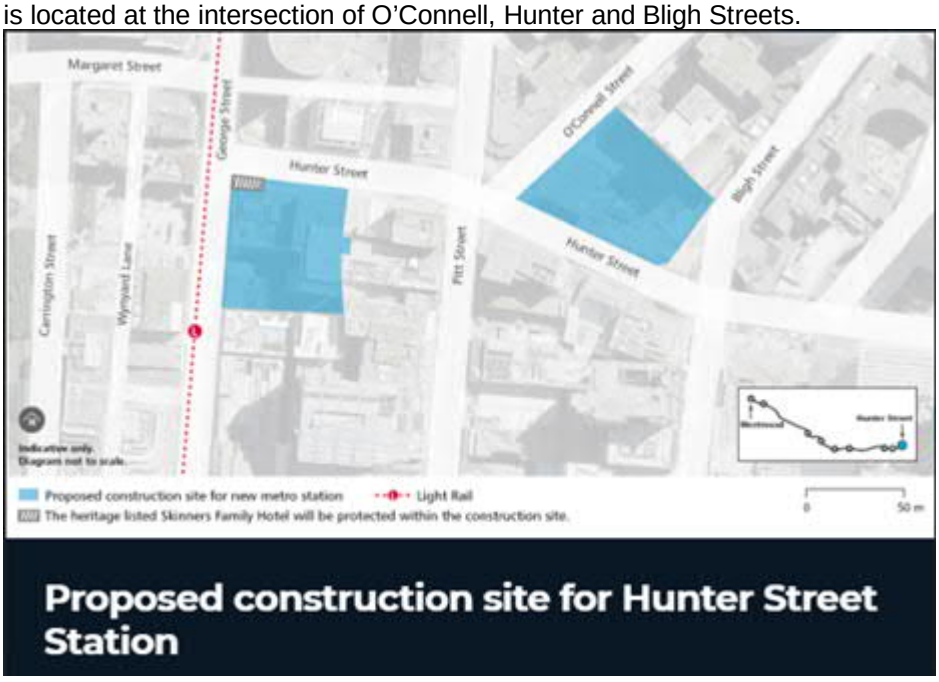
Level 13, 1 Smith Street
Parramatta NSW 2150

Sydney WATER

From: Walker, Heather <Heather.Walker@aecom.com>
Sent: Tuesday, 28 September 2021 4:54 PM
To: Stormwater <Stormwater@sydneywater.com.au>
Cc: jonny.killen@transport.nsw.gov.au
Subject: [External] Hunter St Station, Sydney Metro West - OSD requirements

Hello,

I am working with Sydney Metro on the Sydney Metro West project. I am writing to request the stormwater discharge requirements for a site. The Hunter Street Station is comprised of 2 sites in the Sydney CBD as shown in the figure below. The western site is located on the SE corner of the George St and Hunter St intersection and the eastern site is located at the intersection of O'Connell, Hunter and Bligh Streets.



Proposed construction site for Hunter Street Station

Hunter Street WEST Site

- Site Area = 3,758 m²
- Existing site % impervious = 100%
- Proposed site % impervious = 100%

Hunter Street EAST Site

- Site Area = 3,667 m²

- Existing site % impervious = 100%
- Proposed site % impervious = 100%

Could I please request the OSD requirements for the above sites? Happy to discuss should clarification be required.

Regards,
Heather

Heather Walker

Senior Civil Engineer, ANZ NAC
M +61434985188
heather.walker@aecom.com

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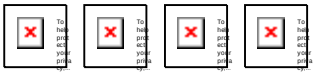
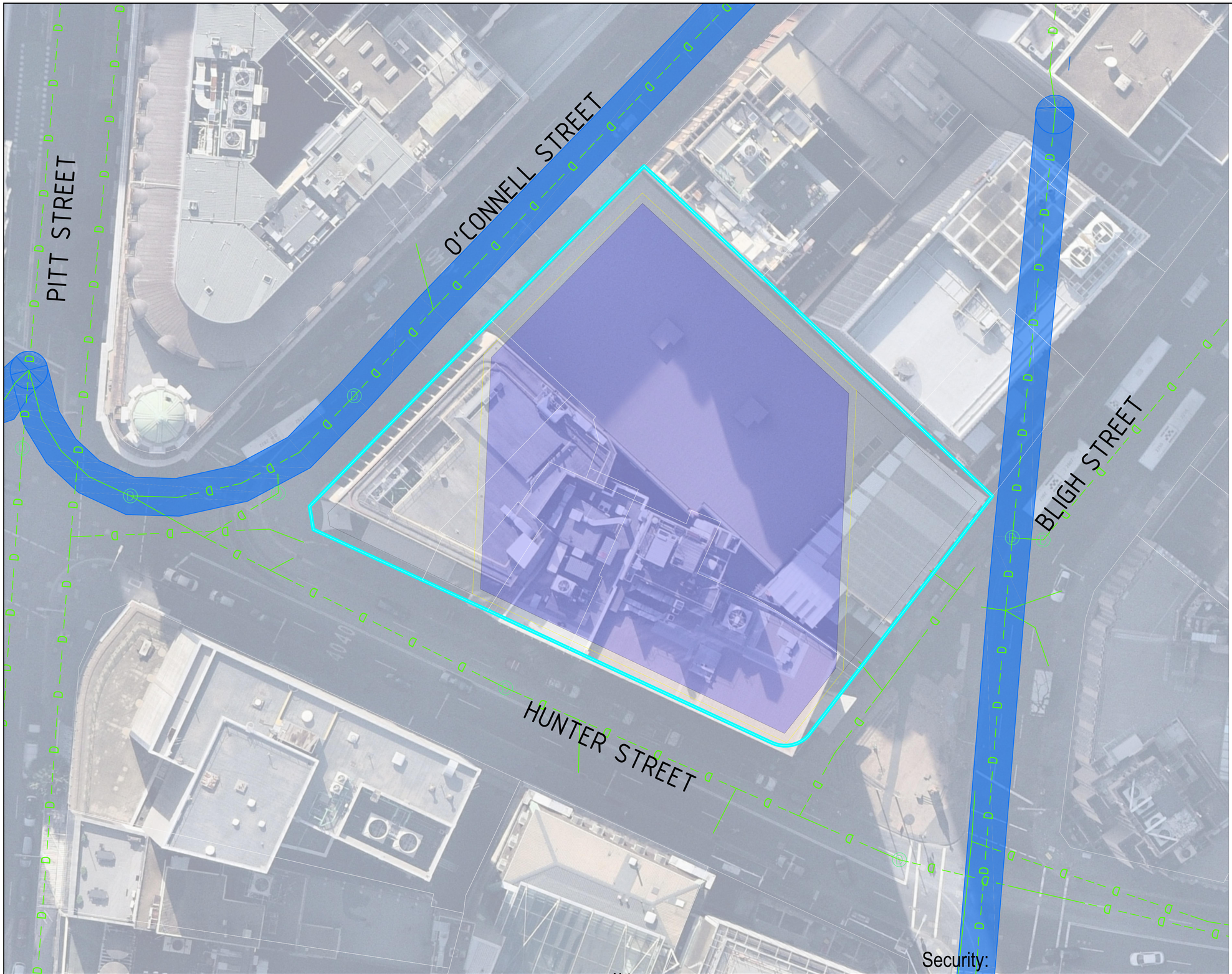
Monday	Tuesday	Wednesday	Thursday	Friday
WFH	**WFH**	**WFH**	***x***	***x***



Appendix B – Existing stormwater network



Legend:
Existing Services:

- MP Gas
- LP Gas
- Electrical - High Voltage
- Electrical - Substation
- Electrical Cable Manhole
- Comms - Optical Fibre (Uecomm)
- Comms - Optical Fibre (Optus)
- Comms - Optical Fibre (TPG)
- Comms - (Telstra)
- Comms - Optical Fibre Pit
- Stormwater
- Water
- Sewer
- Bennelong Sewer (Heritage)
- Tank Stream Sewer (Heritage)
- Telstra Tunnel
- Station Box
- Skinner Hotel (Heritage)
- Station Designation
- Comms Tower

NOTES:

1. ALL UTILITY SERVICES LAYOUTS ARE INDICATIVE ONLY. SITE INVESTIGATIONS ARE REQUIRED TO CONFIRM LOCATIONS. SURVEY MAY INDICATE ADDITIONAL EXISTING MAINS REQUIRING DIVERSION TO AVOID IMPACTING THE PROPOSED DEVELOPMENT FOOTPRINTS.
2. DECOMMISSIONED UTILITIES FROM WESTCONNEX ROZELLE INTERCHANGE PROJECT ARE ASSUMED TO BE REMOVED AND THUS NOT SHOWN FOR CLARITY.
3. PROPOSED UTILITY SERVICES WILL REQUIRE FURTHER DETAILED DESIGN AND COORDINATION WITH UTILITY AUTHORITIES TO DETERMINE FINAL LAYOUTS AND EASEMENTS. THE PROPOSED WORKS PRESENTED IN THIS DRAWINGS HAVE NOT BEEN REVIEWED WITH THE UTILITY AUTHORITIES.
4. SCOPE OF INFRASTRUCTURE WORKS SHOULD BE CONSIDERED IN PARALLEL WITH DIVERSION REQUIREMENTS FOR DELIVERY OF THE PROPOSED STATION AND ANY ROAD UPGRADES WHICH HAVE NOT BEEN IDENTIFIED AT THIS STAGE.
5. NO CATCHMENT ANALYSIS HAS BEEN UNDERTAKEN TO INFORM POTENTIAL UPGRADES OF EXISTING MAINS. SCOPE OF POTENTIAL CONNECTION POINTS PRESENTED IN THIS DRAWING HAVE BEEN BASED ON PREVIOUS EXPERIENCE WITH SIMILAR SCALES OF REDEVELOPMENT.
6. NO MANHOLE SURVEY HAS BEEN UNDERTAKEN TO CONFIRM GRADES AND THEREFORE CONNECTIVITY OF GRAVITY INFRASTRUCTURE.
7. INDICATIVE BUILDING LAYOUTS ONLY. MULTIPLE CONNECTIONS ALLOWED FOR, IF CONSOLIDATED TO ONE LOT, CONNECTIONS CAN BE RATIONALISED.

Security:

NOT FOR CONSTRUCTION

No.	Amendment Description	Design by	Verified by	Approved by	Date

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CLIENT
NSW GOVERNMENT
sydney METRO
Engineering Design Solutions
An enterprise partnership of Mott MacDonald and Sydney Metro
tbAEOSuppName

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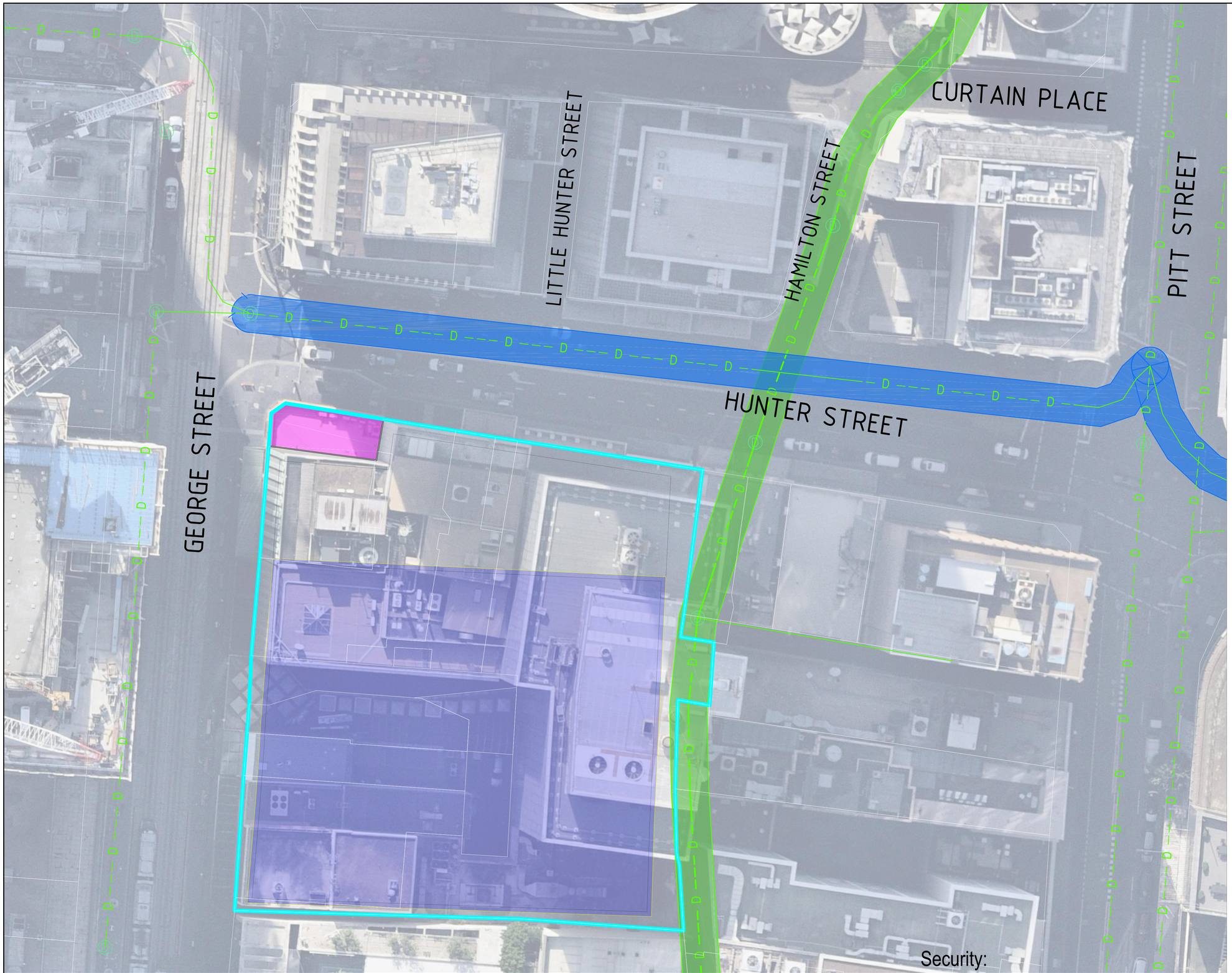

Legend:
Existing Services:

G	MP Gas
G	LP Gas
E	Electrical - High Voltage
	Electrical - Substation
ECM	Electrical Cable Manhole
OF	Comms - Optical Fibre (Uecomm)
OF	Comms - Optical Fibre (Optus)
	Comms - Optical Fibre (TPG)
T	Comms - (Telstra)
OFP	Comms - Optical Fibre Pit
D	Stormwater
W	Water
S	Sewer
D	Bennelong Sewer (Heritage)
D	Tank Stream Sewer (Heritage)
T	Telstra Tunnel
	Station Box
	Skinner Hotel (Heritage)
	Station Designation
	Comms Tower

NOTES:

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2. DECOMMISSIONED UTILITIES FROM WESTCONNEX ROZELLE INTERCHANGE PROJECT ARE ASSUMED TO BE REMOVED AND THUS NOT SHOWN FOR CLARITY.
3. PROPOSED UTILITY SERVICES WILL REQUIRE FURTHER DETAILED DESIGN AND COORDINATION WITH UTILITY AUTHORITIES TO DETERMINE FINAL LAYOUTS AND EASEMENTS. THE PROPOSED WORKS PRESENTED IN THIS DRAWINGS HAVE NOT BEEN REVIEWED WITH THE UTILITY AUTHORITIES.
4. SCOPE OF INFRASTRUCTURE WORKS SHOULD BE CONSIDERED IN PARALLEL WITH DIVERSION REQUIREMENTS FOR DELIVERY OF THE PROPOSED STATION AND AHY ROAD UPGRADES WHICH HAVE NOT BEEN IDENTIFIED AT THIS STAGE.
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Security:

NOT FOR CONSTRUCTION

No.	Amendment Description	Design by	Verified by	Approved by	Date

SCALES

Meters
10 0 10 20
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CLIENT

NSW GOVERNMENT
sydney METRO
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