# Transport for NSW

# Central Precinct Renewal Program Utilities and Infrastructure Servicing Report

July 2022

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# Acknowledgement of Country

We respectfully acknowledge the Traditional Custodians of the Central Precinct, the Gadigal and recognise the importance of place to Aboriginal people and their continuing connection to Country and culture. We pay our respect to Elders past, present and emerging.



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# Document control

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# Versions

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0.1	Final for CPRP Public Exhibition 2022

# Abbreviations

Abbreviation	Definition
BD	Building Distribution
BOOS	Bondi Ocean Outfall Sewer
CBD	Central Business District
CoS	City of Sydney
CPRP	Central Precinct Renewal Project
DA	Development application
DAS	Distributed Antennae System
DBYD	Dial Before You Dig
DCP	Development control plan
DPE	NSW Department of Planning and Environment
ESD	Ecological Sustainable Development
GANSW	Government Architect NSW
GFA	Gross floor area
GFA	Gross Floor Area
GIS	Geographic Information System
LGA	The City of Sydney local government area
LGA	Local Government Area
MDD	Maximum Daily Demand
NABERS	National Australian Built Environment Rating System
NOR	Notice of Requirement
PSFR	Probable Simultaneous Flow Rate
PV	Photo Voltaic
SCAMP	Sewer Catchment Area Management Plan
SEA	Specialist Engineering Assessment
SEPP	State Environmental Planning Policy
SSDA	State significant development application
SSP	State Significant Precinct
WSA	Water Supply Code of Australia
WSC	Water Sydney Co-ordinator

# Definitions

Term	Definition
Amenity	The extent to which a place, experience or service is pleasant, attractive or comfortable. Improved features, facilities or services may contribute to increase amenity.
Catchment	Area from which a location or service attracts people
Central Precinct	Central Precinct State Significant Precinct
Central Sydney	Land identified as Central Sydney under the Sydney Local Environmental Plan 2012 and represents the Metropolitan Centre of Sydney. Central Sydney includes Sydney's Central Business District
Character	The combination of the attributes, characteristics and qualities of a place (GANSW, 2021, Draft Urban Design Guide)
Community	Particular types of stakeholder and refers to groups of people in particular places who are both affected by our work and experience the outcomes and benefits of our activities
Control	A numerical standard that is applied in a prescriptive manner
Corridor	A broad, linear geographical area between places
Council	The City of Sydney Council
Customers	Those who use transport networks and services. They include car drivers, heavy vehicle operators, public transport and point to point passengers, pedestrians, cyclists and freight and goods providers
Department	The Department of Planning and Environment
Determination	The approval made in accordance with the <i>Environmental Planning and Assessment (EP&amp;A) Act 1979</i> . In relation to Central Precinct SSP, a determination will be made by the Minister for Planning and Public Spaces
District Plan	means the Eastern City District Plan
Gateway	Cities that provide state level services and facilities to support a broad population catchment while also having international connections through their cities airport and/or port.
Goods Line	The official name for the partly elevated walkway from Central Station to Darling Harbour following the route of a disused railway line
Grand Concourse	Part of Central Station
Greater Sydney's Green Grid	The link between parks, open spaces, bushland and walking and cycling paths
Interchange	A facility to transfer from one mode of transport or one transport service to another. For example, a station with an adjoining light rail stop
Mobility	The ability to move or be moved easily and without constraints
Mortuary Station	The building formerly used as a railway station on the Rookwood Cemetery railway line, now disused
NABERS	A national rating system that measures the environmental performance of Australian buildings and tenancies

Term	Definition
Objective	A statement of a desired future outcome, generally expressed in a qualitative manner that enables merit based assessment
Place	An intersection of transport infrastructure with social infrastructure and commercial activity. These are the areas within and around transit stops where people live and commute. Places can be created as an outcome of Placemaking
Planning instrument	<ul> <li>Means any of the following:</li> <li>strategic plan (comprising regional strategic plans and district strategic plans) and local strategic planning statements</li> <li>environmental planning instrument (comprising State environmental planning policies and local environmental plans)</li> <li>development control plan</li> </ul>
Planning Secretary	The Secretary of the Department of Planning
Precinct	Geographical area with boundaries determined by land use and other unique characteristics. For example, an area where there is an agglomeration of warehouses may be termed a freight precinct
Principal development standards	Matters addressed in Part 4 of the Standard Instrument
Proponent	Transport for NSW
Proposal	Proposed amendments to the planning framework
Provisions	means a broad term covering objectives and controls
Public spaces	means areas that are publicly accessible where people can interact with each other and make social connections
Rail network	means the rail infrastructure in NSW
Railway corridor	The land within Central Precinct on which a railway is built; comprising all property between property fences, or if no fences, everywhere within 15m from the outermost rails. Under planning legislation rail corridor is defined as land: a) that is owned, leased, managed or controlled by a public authority for the purpose of a railway or rail infrastructure facilities: or b) that is zoned under an environmental planning instrument predominately or solely for development of the purpose of a railway or rail infrastructure facilities
Reference Master Plan	A non-statutory document that shows one way in which the precinct may develop in the future in accordance with the proposed amendments to the planning framework
	Note: Refer to the GANSW Advisory Note v2, dated 12/09/2018 for further guidance
Region Plan	The Greater Sydney Region Plan - A Metropolis of Three Cities
Rezoning	Amendments to environmental planning instruments, in particular for land use zones and principal development standards such as height of buildings and floor space ratio
Shocks and stresses	The acute short term damaging events or long term trends causing inequity impacting a city's resilience
Siding	A short stretch of rail track used to store rolling stock or enable trains on the same line to pass
Social procurement	Purchasing decisions based on good social outcomes
Standard Instrument	The Standard Instrument—Principal Local Environmental Plan

Term	Definition
State	The state of New South Wales
State-led rezonings	A focus on precincts where there is a strategic imperative for the Department of Planning to lead the process, including places that benefit from current or future city-shaping infrastructure or investment, and where we can create great public spaces in collaboration with councils and communities. These rezonings generally occur under a SEPP
State Significant Precinct	The areas with state or regional planning significance because of their social, economic or environmental characteristics
Strategic Framework	The document prepared by Transport for NSW for Central Precinct in 2021 that addresses key matters including vision, priorities, public space, strategic connections, design excellence, identify sub-precincts for future detailed planning and also outlines the next steps in the State Significant Precinct process for Central Precinct
Strategic plan	The regional strategic plan, district strategic plan or a local strategic planning statement
Sub-precinct	The definable areas within Central Precinct SSP due to its unique local character, opportunities and constraints, either current or future. The Western Gateway is a sub-precinct
Sydney Metro	A fully-automated, high frequency rail network connecting Sydney
Tech Central	The State government initiative as set out in The Sydney Innovation and Technology Precinct Panel Report 2018. Previously known as the Sydney Innovation and Technology Precinct. Tech Central is located south of the Sydney central business district, surrounded by the suburbs of Redfern, Ultimo, Haymarket, Camperdown, Chippendale, Darlington, Surry Hills and Eveleigh
Transport for NSW	The statutory authority of the New South Wales Government responsible for managing transport services in New South Wales.
Transport interchange	A facility designed for transitioning between different modes, such as a major bus stop or train station
Transport modes	The five public transport modes are metro, trains, buses, ferries and light rail. The two active transport modes are walking and cycling
Urban renewal	A planned approach to the improvement and rehabilitation of city areas with new infrastructure, new commercial/mixed uses, improved services and renovation or reconstruction of housing and public works
Vibrant streets / places	Places that have a high demand for movement as well as place with a need to balance different demands within available road space

## **Executive Summary**

Arcadis has been engaged by Transport for NSW to prepare this Utilities and Infrastructure Servicing Report as part of the Central State Significant Precinct (SSP) Study for the Central Precinct Renewal Project (CPRP). This assessment addresses the study requirements issued by the NSW Department of Planning, Infrastructure and Environment (the Department) to guide preparation of the SSP Study, specifically the requirement to prepare a Utilities and Infrastructure Servicing Report

This report identifies and assesses the existing utility services constraints, opportunities, key issues and network capacity to service the CPRP and identifies any augmentation and servicing options to support the proposal. Initial investigations indicate that connections to the existing networks can be made and may require local amplifications to potable water, recycled water, waste water, communications and electrical delivery systems to service increased demand from the CPRP.

Due to the CPRP being situated within the Sydney Central Business District (CBD), there are a number of significant utilities running through and around Central Precinct which require further coordination, protection and potential modification.

Ecological Sustainable Development (ESD) initiatives have the potential to improve the energy and resource efficiencies of the existing Central Precinct. The following are key ESD initiatives recommended for further investigation and assessment:

- Rainwater harvesting
- Water recycling (grey or black water treatment plant)
- Connection to City of Sydney (CoS) Council Recycled Water Network
- Elimination or replacement of fossil fuels and Investigation into net-zero carbon alternatives
- Energy storage and on-site generation (solar PV, wind turbines)
- Centralised heat extraction system
- Passive designs such as:
  - o External sunshades
  - o Efficient façade/fabric
  - o Natural ventilation
  - o Natural glazing

A preliminary calculation based on the Reference Master Plan has been undertaken to forecast services demands and assist in identifying any required augmentation to existing infrastructure. The calculations conducted estimate the following demands:

- Potable water demand = 3,294 kL MDD, 1,697 kL ADD
- Sewer loading = 28.28 L/s ADF, 136 L/s PDWF
- Electrical demand = 45,051 kVA (with gas), 56,295 kVA (full electrification)

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## 1. Introduction

Located within the heart of Eastern Harbour City, Central Precinct is Australia's busiest transport interchange. The precinct currently holds latent potential with all its inherent advantages of location and transport connections to revitalise Central Sydney. Capitalising on Central Precinct's prime location within Tech Central, a NSW Government commitment to create the biggest technology hub of its kind in Australia, Central Precinct presents the ultimate transformative opportunity to deliver a connected destination for living, creativity and jobs. The renewal of Central Precinct will provide a world-class transport interchange experience, important space for jobs of the future, improved connections with surrounding areas, new and improved public spaces and social infrastructure to support the community.

## 1.1 Tech Central

### 1.1.1 Overview

The NSW Government is committed to working with the local community to develop the biggest innovation district of its kind in Australia. Bringing together six neighbourhoods near the Sydney CBD (Haymarket, Ultimo, Surry Hills, Camperdown, Darlington North Eveleigh and South Eveleigh), Tech Central is a thriving innovation ecosystem that includes world-class universities, a world-leading research hospital, 100 + research institutions, investors and a wide range of tech and innovation companies. The vision for Tech Central is for it to be a place where universities, startups, scaleups, high-tech giants and the community collaborate to solve problems, socialise and spark ideas that change our world. It is also for it to be place where centring First Nations voices, low carbon living, green spaces, places for all people and easy transport and digital connections support resilience, amenity, inclusivity, vitality and growth.

Tech Central is an essential component of the Greater Sydney Region Plan's Eastern Harbour City Innovation Corridor. It aims to leverage the existing rich heritage, culture, activity, innovation and technology, education and health institutions within the precinct as well as the excellent transport links provided by the Central and Redfern Station transport interchanges.

The Central Precinct is located within the Haymarket neighbourhood of Tech Central. Planned to become the CBD for Sydney's 21st century, this neighbourhood is already home to The Quantum Terminal (affordable coworking space in the iconic Central Station Sydney Terminal Building) the Scaleup Hub (affordable and flexible workspace for high-growth technology scaleups) and is soon to be the home of Atlassian's headquarters. It is also in close proximity to a number of important education and research institutions.

The planned urban renewal of the Central Precinct has been identified as a key project to achieving the vision for Tech Central.

### 1.1.2 Background & Context

In August 2018, the NSW Government established the Sydney Innovation and Technology Precinct Panel (the Panel) comprising representatives from various industry, health, education, government agencies and key community members. In December 2018 'The Sydney Innovation and Technology Precinct Panel Report' was produced, setting out the Panel's recommendations for a pathway to delivering a successful innovation and technology district at Tech Central. In February 2019, the NSW Government adopted the Panel's report and committed to delivering the following:

- 25,000 additional innovation jobs
- 25,000 new STEM and life sciences students
- 200,000 m<sup>2</sup> for technology companies, and
- 50,000 m<sup>2</sup> of affordable space for startups and scaleups

In February 2019, the Greater Sydney Commission released a Place Strategy for the area that is now known as Tech Central (Camperdown-Ultimo Collaboration Area Place Strategy, GSC). The Place Strategy, developed collaboratively by a range of stakeholders involved in planning for Tech Central's future, was prepared to inform public and private policy and investment decisions by identifying and recognising the complex, place-specific issues inhibiting growth and change. The strategy identifies shared objectives for the place and sets out priorities and actions to realise the vision for the area under the key themes of Connectivity, Liveability, Productivity, Sustainability and Governance.

Both the Panel Report and Place Strategy recognise the importance of the Central Precinct to Tech Central's future.



In July 2019, Central Precinct was declared a nominated State Significant Precinct (SSP) in recognition of its potential to boost investment and deliver new jobs. The SSP planning process for Central Precinct will identify a new statutory planning framework for Central Precinct. This involves two key stages:

- **Stage 1**: Development of a draft Strategic Vision which has since evolved into the Central Precinct Strategic Framework
- **Stage 2**: Preparation of an SSP study with associated technical analysis and community and stakeholder consultation.

In March 2021, the <u>Central Precinct Strategic Framework</u> was adopted representing the completion of Stage 1 of the planning process to develop a new planning framework for Central Precinct. The Strategic Framework outlines the vision, planning priorities, design principles, and the proposed future character of sub-precincts within Central Precinct. This is intended to inform and guide further detailed planning and design investigations as part of this SSP Study (Stage 2 of the SSP planning process).

This SSP Study intends to amend the planning controls applicable to Central Precinct under the SSP SEPP 2005 to reflect the vision and planning priorities set for the Precinct under the Strategic Framework. Study Requirements were issued in December 2020 to guide the investigations and the proposed new planning controls.

## 1.2 Central Precinct vision

Central Precinct will be a vibrant and exciting place that unites a world-class transport interchange with innovative and diverse businesses and high-quality public spaces. It will embrace design, sustainability and connectivity, celebrate its unique built form and social and cultural heritage and become a centre for the jobs of the future and economic growth.

## 1.3 Case for change

Over the coming years, Central Station will come under increasing pressure as technological innovations progress, investment in transport infrastructure increases and daily passenger movements increase.

Sydney Metro, Australia's biggest public transport project, will result in the delivery of a new generation of world-class, fast, safe, and reliable trains enabling faster services across Sydney's rail network. In 2024, Sydney Metro's Central Station will open with daily passenger movements forecast to increase from 270,000 persons to 450,000 persons over the next 30 years.

In its current state, Central Station is underperforming as Australia's major transport interchange – it's currently a hole in the heart of Sydney's CBD, lacking connectivity, activation and quality public spaces.

The renewal of Central Precinct will expand and revitalise Central Station, and transform this underutilised part of Sydney from a place that people simply move through to one where they want to visit, work, relax, connect and socialise. Its renewal also presents the potential to deliver on the strategic intent and key policies of regional, district and local strategic plans, providing for a city-shaping opportunity that can deliver economic, social and environmental benefit. Specifically, it will:

- make a substantial direct and indirect contribution to achieving the Premier's Priorities by facilitating upgrades to Sydney's largest and most significant public transport interchange, improving the level of service for users and visitors, and supporting the creation of new jobs and housing
- implement the recommendations of the NSW State Infrastructure Strategy 2018-2038, in particular the upgrading of the major transport interchange at Central to meet future customer growth
- contribute to key 'Directions' of the Greater Sydney Region Plan, to deliver 'a city supported by infrastructure', help create 'a city of great places', support 'a well connected city', deliver new 'jobs and skills for the city' and create 'an efficient city'
- implement the outcomes envisaged within the Eastern City District Plan including reinforcing the Harbour CBD's role as the national economic powerhouse of Australia and supporting its continued growth as a Global International City

- deliver on the shared objectives and priorities for Tech Central, the future focal point of Sydney's innovation and technology community, which aims to boost innovation, economic development and knowledge intensive jobs while creating an environment that foster collaboration and the exchanging of ideas
- deliver an outcome that responds to the overarching vision and objectives of the Central Sydney Planning Strategy. In particular it will assist with implementing a number of 'key moves' outlined in the strategy, including to 'ensure development responds to its context', 'ensure infrastructure keeps pace with growth', 'move people more easily', 'protect, enhance and expand Central Sydney's heritage, public places and spaces', and to 'reaffirm commitment to design excellence.'

### 1.4 About this report

The purpose of this report is to provide a detailed utilities and infrastructure servicing assessment of the proposed changes, and consider any potential impacts that may result within and surrounding the Central Precinct. This report addresses study requirement 10.1. Utilities and Infrastructure Servicing Report. The relevant study requirements, considerations and consultation requirements, and location of where these have been responded to is outlined in **Table 1** below.

### 1.4.1 SSP Study requirements

### Table 1: Study requirements, considerations, and consultation requirements

Ref	Requirement or consideration	Summary response	Where addressed	
Study requirement				
10.1	Prepare a utilities and infrastructure servicing report that:	This report as a whole addresses the utilities existing situation and future required capacity, coordination, augmentations, modifications and approvals to service CPRP. This report aims to support and inform the proposed planning framework	-	
10.1_A	Identifies the existing situation, including constraints, opportunities, key issues and existing network capacity	-	Chapters 3 to 9	
10.1_B	Assesses the capacity of the relevant service infrastructure networks to service the Precinct, impacts on the networks resulting from the proposal and identify any augmentation and servicing options proposed to support the proposal	-	Sections 4.2, 4.3, 4.5 Sections 5.2, 5.3 Sections 6.2, 6.3, 6.5 Sections 7.2, 7.3, 7.5 Sections 9.3	
10.1_C	Assesses the implications of any proposed land use for local and regional infrastructure and service delivery	-	Chapter 3, Sections 4.5, 6.5, 7.5, 9.4, Chapter 12	
10.1_D	Informs and supports the preparation of the proposed planning framework including any recommended planning controls or DCP/Design Guideline.	-	Chapter 12	

Ref	Requirement or consideration	Summary response	Where addressed			
Study co	Study considerations					
10.1	The Study is to demonstrate consideration of:	-	-			
	Key service infrastructure including electricity, alternative energy systems, water, sewer, gas and telecommunications;		Chapters 4 to 9			
	Digital and telecommunications infrastructure which is inclusive of and not limited to precinct- wide Wi-Fi, fibre to the premises and supporting data centres;	Once further definition of the requirements and demand of the Central Precinct is developed, an accurate demand calculation for telecommunications can be supplied.	Chapter 9			
	Forecast peak demand and generation forecasts based on proposed yields;		Sections 4.3, 5.2, 6.3, 7.3, 9.3			
	On-site electricity generation and storage, facility site requirements, easement requirements and any asset locations required;	-	Chapter 3, Sections 4.5, 6.5, 7.5, 9.4, Chapter 12			
	Integrated water cycle management, alternative water supply, on-site generation and water recycling, end uses of drinking and non-drinking water. The potential for the Precinct to connect to the recycled water pipeline that runs along the CBD light rail route;	-	Sections 4.2, 4.4, 4.5, 4.6 and Chapter 5			
	The location of service assets in the Precinct and outline how asset risk is managed; and	-	Chapter 3, Sections 4.1, 5.1, 6.1, 7.1, 8.1, 9.1			
	Costs, timing and delivery	Due to the early phases of the CPRP development, it is too early to provide specific costs, timing, phasing and delivery of the utilities services for the project. Costs, timing, and delivery of utilities services have been discussed at high levels throughout this report	-			
Consultat	Consultation					
10.1	The Study is to demonstrate that it has been undertaken in consultation with Ausgrid and Sydney Water, digital infrastructure and telecommunications providers and any other relevant providers.	-	Chapter 10 and Appendix B			
Author						
10.1	The study is to be prepared by a suitably qualified professional(s) with the necessary experience and expertise to undertake the required works. In particular:	This report has been authored by: Rhys Harvey – Senior Civil Engineer – CPEng NER, Bachelor Engineering (Environmental)	-			

Ref	Requirement or consideration	Summary response	Where addressed
		Kakoli Das – Technical Director – Electrical Services, Bachelor Engineering (Electrical)	
		Max Hough – Associate Technical Director – Hydraulic and Fire Services – CPEng, CFSP, Master of Design Science (Building Services)	
	The water utilities component should be prepared by a suitably qualified hydraulic consultant; and	As a suitably qualified consultant has addressed potable and wastewater utilities	Chapters 4 and 6 respectively
	The power utility requirements should be prepared by a suitably qualified (ASP) consultant	As a suitably qualified consultant has addressed power utilities	Chapter 7
	TfNSW to consult with relevant utility providers for details of contemporary guidance documents.	-	Section 11
Guidance documents			
10.1	The following documents provide guidance for this Study:		Sections 1.7.3, 1.7.4 & 1.7.5
	TfNSW to consult with relevant utility providers for details of contemporary guidance documents.	-	Chapter 11

## 1.5 Study Area

Central Precinct is located at the south-east edge of Central Sydney (refer to **Figure 1**). Central Precinct is surrounded by a number of suburbs including, Haymarket to the north, Chippendale to the south and Surry Hills to the south-east. It is located within the City of Sydney local government area (LGA) with an approximate gross site area of 24 hectares of Government owned land. The precinct comprises land bounded by Pitt Street and Regent Street to the west, Cleveland Street to the south, Eddy Avenue, Hay Street and Goulburn Street to the north and Elizabeth Street and Chalmer Street to the east.

Central Precinct has been an important site for transport operations for over 150 years. Today, Central Station is Australia's busiest transport interchanges and is the anchor of New South Wales's (NSW) rail network. It provides 24 platforms for suburban and Intercity and Regional train connections as well as a direct link to Sydney Airport. The broader transport interchange also caters for light rail, bus, coach and point to point connections such as taxis. The transport interchange will also form part of the Sydney Metro network, with new underground platforms to be provided for Sydney Metro services under Platform 13, 15 and 16 at Central Station. Sydney Metro services will begin in 2024. The precinct also comprises several significant heritage items including the state-heritage listed Sydney Terminal Building and the Clock Tower.

As part of the Strategic Framework, eight sub-precincts have been defined that reflect and positively respond to the varying character of the surrounding areas. These sub-precincts are:

- Central Station
- Northern Over Station Development

- Western Gateway
- Regent Street Sidings
- Southern Over Station Development
- Prince Alfred Sidings
- Eastern Gateway
- Goulburn Street.

The location of these sub-precincts and relevant boundaries is illustrated in Figure 2.



### **Figure 1: Location plan of Central Precinct**

**Figure 2: Central Precinct and sub-precincts** 



### 1.5.1 Planning priorities

To help realise the vision of Central Precinct and the desired local character of the subprecincts, the following planning priorities have been developed and are grouped into five key themes as outlined in **Table 2** below.

Table 2: Central Precinct planning prioritie	planning priorities
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Theme	Planning priorities			
Place and destination	<ul> <li>Unite the city by reconnecting with the surrounding suburbs</li> <li>Shape a great place that is vibrant, diverse, active, inclusive and has a high level of amenity</li> <li>Deliver a precinct which responds to its urban context and embeds design excellence Improve existing and providing additional connected public space in the precinct of high environmental amenity and comfort</li> <li>Protect and celebrate the Precinct's heritage values</li> <li>Create a people focussed precinct through a focus on public transport, cycling and walkability</li> <li>Facilitate the precinct's focus on transport and economic diversity in tourism and across commercial sectors including office, business and retail.</li> </ul>			
People and community	<ul> <li>Design public spaces that promote health, equality and well-being</li> <li>Promote social cohesion by providing spaces for gathering, connection, exchange, opportunity and cultural expression</li> <li>Honour and celebrate the cultural heritage and identity of the Precinct's past and present Aboriginal community</li> <li>Create a safe and intuitive precinct that promotes social access and inclusion</li> <li>Support programs and initiatives that benefit communities and people</li> </ul>			

Theme	Planning priorities		
	• Create a precinct that responds to the current and future needs of transport customers, workers, residents and visitors, including those of the broader local community.		
Mobility and access	<ul> <li>Provide a world class, integrated and seamless transport interchange</li> <li>Maintain the precinct's role as NSW's main transport interchange</li> <li>Improve the transport customer experience, including wayfinding, pedestrian flows and interchange between different transport modes</li> <li>Facilitate and enhancing connections within and towards key locations in southern Central Sydney</li> <li>Deliver a people focussed precinct that is walkable, well connected, safe and puts people first</li> <li>Design infrastructure that will adapt to future changes in transport and mobility.</li> </ul>		
Economy and innovation	<ul> <li>Advance Sydney's status as a global city</li> <li>Support the creation of jobs and economic growth including new and emerging industries such as innovation and technology and explore the provision of space for cultural and creative uses and start-ups</li> <li>Provide an active and diverse commercial hub with a rich network of complementary uses that nurture and support business</li> <li>Support both the day and night economies of the precinct through diverse complementary uses, promoting liveability and productivity</li> <li>Foster collaboration between major institutions in the precinct including transport, education, health and business</li> <li>Create a smart precinct that incorporates digital infrastructure to support research and innovation.</li> </ul>		

### 1.5.2 Reference Master Plan

Architectus and Tyrrell Studio have prepared a Place Strategy, Urban Design Framework and a Public Domain Strategy which establishes the Reference Master Plan for Central Precinct. The Urban Design Framework and Public Domain Strategy provides a comprehensive urban design vision and strategy to guide future development of Central Precinct and has informed the proposed planning framework of the SSP Study.

The Reference Master Plan includes:

- Approximately 22,000 sqm of publicly accessible open space comprising:
  - Central Green a 6,000 square metre publicly accessible park located in immediately south of the Sydney Terminal building
  - Central Square 7,000 square metre publicly accessible square located at the George Street and Pitt Street junction
  - Mortuary Station Gardens a 4,470 square metre publicly accessible park (excluding Mortuary Station building) located at Mortuary Station
  - Henry Deane Plaza a publicly accessible plaza located in the Western Gateway subprecinct
  - Eddy Avenue Plaza a 1,680 square metre publicly accessible plaza located in the north-eastern portion of the Sydney Terminal building

- Western Terminal Extension Building Rooftop a 970sqm publicly accessible space above the Western Terminal Extension Building Rooftop.
- Approximately 269,500 square metres of office gross floor area (GFA)
- Approximately 22,850 square metres of retail GFA
- Approximately 53,600 square metres of hotel GFA
- Approximately 84,900 square metres of residential accommodation GFA, providing for approximately 850 dwellings (assuming 1 dwelling per 100sqm GFA). The Central Precinct SSP Study will include the commitment to deliver 15 percent of any new residential floor space as affordable housing.
- Approximately 47,250 square metres of education/tech space GFA
- Approximately 22,500 square metres of student accommodation GFA
- Approximately 14,300 square metres of community/cultural space GFA.

The key features of the Indicative Reference Master Plan, include:

- A network of new and enhanced open spaces linked by green connections. This will include:
  - A Central Green (Dune Gardens) at the north of Central Precinct that will create a new civic public realm extension of the Sydney Terminal building and a new vantage point for Central Sydney
  - A new Central Square which will deliver on the vision for a new public square at Central Station, as one of three major public spaces within Central Sydney connected by a people-friendly spine along George Street
  - Mortuary Station Park at Mortuary Station that will be a key public domain interface between Chippendale and the over-station development. that will draw on the story of Rookwood Cemetery and the Victorian Garden context with the established rail heritage of the Goods Line and the rail lines
  - Henry Deane Plaza which will prioritise the pedestrian experience, improving connectivity and pedestrian legibility within the Western Gateway sub-precinct and provide clear direct links to and from the State heritage listed Central Station and its surrounds
  - Eddy Avenue Plaza will transform into a high-amenity environment with significant greening and an enhanced interface with the Sydney Terminal building.
- A new network of circulation that will establish a clear layer of legibility and public use of the place. This will include:
  - A 15 24 metre wide Central Avenue that is laid out in the spirit of other street layouts within Central Sydney and which responds to the position of the Central clocktower, providing new key landmark views to the clocktower. Central Avenue will be a place for people to dwell and to move through quickly. It brings together the threads of character from the wider city and wraps them
  - Three over-rail connections to enhance access and circulation through Central Precinct, as well as provide pedestrian and bicycle cross connections through the precinct

- The extension of public access along the Goods Line from Mortuary Station Gardens, offering a new connection to Darling Harbour
- New vertical transportation locations throughout the precinct allowing for seamless vertical connections.
- An active recreation system supports health and well-being through its running and cycling loops, fitness stations, distributed play elements, informal sports provision, and additional formal recreation courts.
- a network of fine grain laneways that are open to the sky

The proposed land allocation for Central Precinct is described in Table 3 below.

# Table 3 Breakdown of allocation of land within Central Precinct (note: below figures, except for total Central SSP area, excludes WGP)

Land allocation	Proposed
Open-air rail corridor	101,755 sqm
Developable area	119,619 sqm
Public open space	19,185 sqm / 16% of Developable area
Other publicly accessible open space (Including movement zones, streets and links)	41,773 sqm / 35% of Developable area
Building area	58,661 sqm / 49% of Developable area
Central SSP total area (incl. WGP)	23.8 ha

The Indicative Reference Master Plan for Central Precinct is illustrated in Figure 3 below.

Figure 3: Reference Master Plan

Sub	precinct	Total GFA per sub-precinct (sqm)*
(5)	Station (terminal building)	15,800
		15,800
۲	OSD Block A	165,400
	Al	66,900
-	A2	48,900
	A3	39,400
-	A4	4,100
	A5	3,000
	A6	3,100
	OSD Block B	88,900
	B1	42,700
_	B2	37,200
_	B3	4,000
	B4	5,000
0	OSD Block C	109,700
	C1	32,700
	C2	28,500
	C3	42,800
	C4	3,400
	C5	2,300
0	Regent Street Sidings Block D	65,000
_	D1	33,300
-	D2	31,700
(2)	Prince Alfred Sidings Block E	20,900
1	Goulburn St Car Park	49,200
Tota Gate	l GFA (excluding Western way)	514,900
_	Western Cateway	275.000





Source: Architectus and Tyrrell Studio

### 1.6 Demand assessment yields

Preliminary demand calculations were undertaken during the initial design stages of the CPRP for the purpose of early stakeholder consultations. Revised development yields have been developed due to subsequent masterplan updates *"Central Precinct Draft SSP Metrics"* and architect Gross Floor Area (GFA) updates. The latest masterplan GFA schedule is summarised in **Table 4**, as sourced from *"211217\_Built form option\_Area schedule\_extended.xlsx"*.

GFA's discussed below are provided for the purpose of assessing the feasibility and required utility infrastructure upgrades and are subject to change as part of regular design development. It has been assumed the Reference Master Plan has made sufficient spatial allowance for the utility service infrastructure.

Individual project areas have been based on the average number of dwellings and proposed Gross Floor Area (GFA) for retail and commercial development outlined in **Table 4** below.

Block	Building label	Gross Floor Area Totals (m <sup>2</sup> )
Station Precinct	Grand Terminal Building	16,495
А	A1	68,245
	A2	48,860
	A3	40,105
	A4	4,098
	A5	2,621
	A6	3,164
В	В1	42,459
	B2	37,112
	В3	4,036
	B4	4,962
C	C1	32,664
	C2	28,505
	C3	42,790
	C4	3,411
	C5	2,352
D	D1	35,425
	D2	31,899
E	E1	20,921
F	F1	49,167
Total (m <sup>2</sup> )		519,291

#### Table 4: Revised Masterplan Gross Floor Area Schedule

# 2. Existing environment

The existing environment of Central Precinct has been investigated based on a review of utility data sourced from TfNSW, Sydney Water, Dial Before You Dig (DBYD) and other publicly available sources.

Being a developed precinct in a highly urbanised environment, there are a large number of utility assets within and immediately surrounding the existing Central Precinct.

For each utility a summary of the existing public assets has been provided in the following **Chapter 4** to **Chapter 9** with a focus on those considered public assets.

**Table 5** provides details of the risk category matrix, which was created to provide aquantifiable criterion to assess the overall risk rating of each utility asset. The risks below havebeen assessed against assets that are both impacted and not impacted by the Central PrecinctRenewal Project (CPRP). This is to highlight critical public services that could be impacted bythe CPRP as the design and construction methodology develops.

Utility/Risk Level	Low	Medium	High	High Major
Potable Water	<300mm	≥300 ≤450	>450 ≥900	900mm or greater
Sewer	<225mm	≥225 ≤450	>450≥750	750mm or greater
Electrical	<11kV	11kV	Transmission 33-66kV	Transmission 132kV plus
Gas	Up to 7kPA	> 7 ≤400kPa	+400kPa	Transmission
Communications	2 pair local phone	<200 pair <36 fibre	>200 pair >36 fibre	20 ducts or more

### Table 5: Utilities risk category matrix

# 3. Utilities and infrastructure services overview

The following is a brief overview of the specific utilities and infrastructure services existing conditions, constraints, opportunities, key issues and capacity assessments. Refer to subsequent **Chapter 4** to **Chapter 9** for further detailed information.

## 3.1 General

Any augmentation works required for the Central Precinct Renewal Project (CPRP) utility servicing strategy will impact the surrounding areas with temporary service disruptions, temporary road and pedestrian closures and excavations. The development of a holistic Utilities and Services Management Strategy (The Strategy) is recommended to coordinate construction efforts for the precinct as a whole and reduce the size and duration of construction impacts on the surrounding areas and infrastructure.

Once The Strategy is developed further, consultation with the relevant services provider is recommended to determine any further implications on land use to facilitate easements, access, and maintenance for the assets.

Future services strategies are to refer to the climate change impact risks outlined in the "The Central Precinct Renewal Program Environmental Sustainability, Climate Change and Waste Management Report (TfNSW, 2022). The Strategy is to support the proposed aims and adaptation measures to reduce climate change impacts.

It is recommended that The Strategy and design support the aims and ambitions of the "Central Precinct Renewal Program Environmental Sustainability, Climate Change and Waste Management Report" (TfNSW, 2022) and the "Central Precinct Renewal Program Green Infrastructure Study "(TfNSW, 2022).

## 3.2 Water

Sydney Water are the water service provider for the CPRP. No Sydney Water potable water trunk mains traverse the existing Central Precinct, however there are a number of trunk water mains and smaller reticulation mains within the immediate vicinity of the site.

It is expected that the CPRP will increase the load on the surrounding Sydney Water network and which will require augmentation to provide an adequate water supply. This shall pose physical and staging issues to the development of the CPRP that will be addressed during further detailed design. Refer to **Section 4.2, Section 4.3** and **Section 4.5** for further discussion about the potable water network.

It is noted that there are considerable opportunities for the CPRP to reduce the potable water demand through water recycling and reuse technologies/techniques and through the connection to the CoS Recycled Watermain. Refer to **Section 4.4** and **Section 5** for further discussion.

### 3.3 Sewer

Sydney Water currently services the existing Central Precinct within the Sydney West Sewer Catchment Area Management Plan which is a part of the Bondi Wastewater System and represents a significant increase in demand within the system.

A number of Sydney Water sewer mains surround the site with three mains traversing the existing Central Precinct site. The heritage listed brick oviform sewer (Bondi Ocean Outfall Sewer) crossing the northwest of the site from Lee Street to Eddy Avenue is a high value and high risk asset that requires further coordination and consideration during subsequent design stages.

As the CPRP will increase the load on the existing Sydney Water network augmentation of the surrounding network is required. This shall pose physical and staging issues to the development of the CPRP that will be addressed during further detailed design. Refer to **Section 6.2, Section 6.3** and **Section 6.5** for further discussion about the sewer water network.

## 3.4 Electrical

Ausgrid and Sydney Trains provide electrical services to the existing Central Precinct site with a large number of high voltage cables surrounding the site and crossing the site along the Devonshire Tunnel.

A Ausgrid "Preliminary Enquiry Application" has been processed for the CPRP to review power supply options and related network requirements to support the development. The application noted in an increase in demand on the network and proposed various augmentation options as discussed in **Section 7.5**.

Significant opportunities are available for the CPRP to reduce the electrical demand through ESD initiatives discussed in **Section 7.4**. The elimination of gas as a power supply shall have an increased electrical demand for the CPRP as discussed in **Section 7.2**.

### 3.5 Gas

Jemena owns and operates the gas network infrastructure in the vicinity of the existing Central Precinct with a number of secondary gas mains and smaller distribution mains in the area.

In the development of ESD initiatives, it has been requested that there is to be no gas supply to CPRP and to provide full building electrification in lieu. Current calculations for CPRP electrical demand show demand with gas, and full electrification (elimination of gas) for comparison.

## 3.6 Telecommunications

There is substantial data and communications infrastructure owned and operated by several communication providers present throughout the existing Central Precinct site. Due to the scale and nature of the CPRP, it is expected that the new telecommunications servicing will be provided by the National Broadband Network Company (NBN Co.).

NBN have confirmed during initial consultation the ability to provide CPRP connection to their telecommunication network. It was highlighted during discussions that staging information will be critical to the rollout and supply of telecommunications.

The NSW Government is investing in the creation of the Tech Central precinct and is planned to be the future focal point of Sydney's innovation and technology community. As such, further discussion, assessment and coordination are required with data and telecommunication stakeholders to ensure the vision of the future Tech Central is achieved, with the potential need to develop a precinct wide telecommunications strategy.

### 3.7 Forecast services demand

A preliminary calculation based on the Reference Master Plan has been undertaken to determine a forecast services demand and assists in the identification of required augmentation to existing infrastructure. The calculations conducted estimate the following:

- Potable water demand = 3,294 kL MDD, 1,697 kL ADD
- Sewer loading = 28.28 L/s ADF, 136 L/s PDWF
- Electrical demand = 45,051 kVA (with gas), 56,295 kVA (full electrification)

At this stage of consultation, it is expected the proposed demand from the CPRP will require upgrades or augmentation works to the water, sewer, electrical and telecommunication networks. This is to be refined during further stages of design, Refer to subsequent sections for further detailed descriptions of baseline service demand and their impacts on the surrounding networks.

### 3.8 Key risks

Risks have been discussed throughout this report, with an additional "Line of Sight Table" in **Appendix A** with key Issues, Aspirations and Solutions. Refer to **Chapter 2** for the existing utilities risk category matrix, and subsequent **Sections 4.1, 5.1, 6.1, 7.1, 8.1** and **9.1** for a description of key existing assets surrounding and servicing the existing Central Precinct.

The following is a brief overview of key risks affecting the CPRP and which may require suitable risk management throughout the project lifecycle.

- The modification or redesign of the CPRP masterplan may be required to provide sufficient servicing strategies to the site and avoid negative project impacts
- Risks to project costs and timelines may occur due to unforeseen circumstances such as
  ongoing coordination with service providers and unknown finds or clashes during
  construction activities.
- Due to the location and age of the Central Precinct, there are a number of heritage elements and existing high-risk utilities throughout the existing Central Precinct. These items will require close coordination, stakeholder consultation, protection and potential modification.
- Design specific risks relating to the CPRP include:
  - Construction works resulting in road closures, road diversions, pedestrian and cyclist impacts;
  - o Construction works resulting in temporary service disconnections;
  - o CPRP service demands requiring significant local infrastructure augmentation;
  - Redesign and reconstruction works as the result of inadequate survey, 3d modelling and unknown belowground items; and
  - Co-ordination with high-risk asset stakeholder assets including Telstra Tunnel, Sydney Light Rail; and Sydney Water BOOS.

The above is to help facilitate further discussion and design development for the CPRP and is not exhaustive, nor replace a detailed risk assessment.

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## 4. Water

## 4.1 Background and existing assets

The preliminary information gathering exercise considered data from a range of sources. Primarily these were obtained from Dial Before You Dig (DBYD) requests, Sydney Water Geographic Information System (GIS), authority infrastructure reports and master plans.

The Potts Hill Water Delivery System is interconnected with the Woronora Water Delivery System and supplies potable water to the existing Central Precinct with the main storage in Warragamba Dam. During drought conditions, the existing Central Precinct may also receive water from Sydney Desalination Plant as illustrated in **Figure 4**.



### Figure 4: Sydney Water Potable Water Supply

According to the information available, no Sydney Water potable water trunk mains that traverse the existing Central Precinct. There are a number of trunk water mains and smaller reticulation mains within the immediate vicinity of the existing Central Precinct as illustrated in **Figure 5.** 

Figure 5: Existing potable water mains



Key existing potable water infrastructure, working clockwise around the site perimeter, include:

- A 250mm CICL trunk main along Eddy Avenue
- A 600mm CICL trunk main along Elizabeth Street
- A 200mm CICL reticulation main along Chalmers Street
- A 300mm CICL main within Prince Alfred Park
- A 750mm GRP trunk main along Cleveland Street
- A 300mm CICL trunk main along Regent Street
- A 150mm CICL reticulation main along Lee Street
- A 150mm CICL reticulation main along Pitt Street

It is noted that the above discussion is focused on supply from Sydney Water infrastructure. Further consideration will be given as to whether Sydney Trains water infrastructure located within the Central Precinct footprint can be incorporated into the overall strategy.

The City of Sydney (CoS) Council has installed a recycled water pipe along the length of George Street, from Circular Quay to beyond Central Station with the intention of supplying recycled water to the city. Currently, there are no connections to the recycled water pipe and there is no defined timeframe for when it will be operational. However, the recycled water pipe does provide an opportunity for a recycled water supply for Central Precinct in the future. Refer to **Section 5** for further discussion.

### 4.2 Demand assessment

An assessment of the estimated increase in potable water demand generated from the development has been calculated to determine the required network connections and infrastructure upgrades. Demand forecasting has been based on the average number of residential dwellings and Gross Floor Area (GFA) for retail and commercial development outlined in **Section 1.6.** 

For the purpose of current engagement with Sydney Water, it has been assumed that no potable water savings are achieved through black and grey water recycling or rainwater harvesting in order to establish a "baseline" in demand.

Demand estimates for potable water have been estimated based on the methods described in the Water Supply Code of Australia WSA Part 1: Planning and Design (Sydney Water Edition), common industry practice, and is based on Maximum Daily Demand.

The final Probable Simultaneous Flow Rate (PSFR) for each building will be subject to the final number of fixtures and associated loading units in accordance with AS/NSZ3500.1 and required fire protection flow rates, once the design of each building has been sufficiently developed.

### 4.3 Forecast demand

An estimate of the future potable water demand to supply the Central Precinct Renewal Project (CPRP) has been calculated based on the development yields discussed in **Section 1.6**.

The cumulative Maximum Daily Demand (MDD), average day demand peak hour flow for the CPRP is summarised in **Table 6.** 

Potable Water				
Block	Max. Day Demand (kL)	Average Day Demand (kL)	Peak Hour Flow (kL)	
Station Precinct	106.69	55.91	19.78	
A	1039.9	540.13	197.6	
В	514.4	268.87	96.09	
C	695.28	362.05	132.12	
D	500.07	250.04	104.18	
E	118.62	59.31	24.71	
F	319.19	160.66	65.44	
Total (kL)	3,294	1,697	274.51	

### Table 6: Estimated cumulative maximum demands for potable water

Notes: Peak Hour Flow represents a diversified flow across all buildings rather than the total of the flow rates to each individual building using the methods outlined in the Water Supply Code of Australia (Sydney Water Edition).

The Average Day Demand flow has been calculated as the sum of the average day demand to each building.

### 4.4 Potential ecological sustainable development initiatives

This report outlines the "baseline" potable water demand and coordination however Ecological Sustainable Development (ESD) initiatives have the potential to reduce potable water demand for the CPRP.

The "Central Precinct Renewal Program Environmental Sustainability, Climate Change and Waste Management Report" (TfNSW, 2022) has nominated a 5 Star NABERS Water rating through best practice water conserving systems, equipment, fixtures, fittings and appliances. Typically, it is very difficult for buildings to achieve a 4.5 NABERS rating or higher without some form of recycled water. This can be achieved via either on-site wastewater treatment or by connection to a non-potable water main supplying recycled water, refer to **Section 5** for further discussion.

The following ESD Initiatives are recommended for further investigation for the reduction and smart use of water demand for CPRP:

- Rainwater harvesting (various forms)
- High-efficiency water fixtures
- Water recycling (potentially grey or black water treatment plant)
- Connection to CoS Recycled Water Network (drawing from the network).

It is recommended that ESD initiatives support the aims and ambitions of the "Central Precinct Renewal Program Environmental Sustainability, Climate Change and Waste Management Report" (TfNSW, 2022) and "Central Precinct Renewal Program Green Infrastructure Study" (TfNSW, 2022) integrated water cycle management and supply of water for planting.

### 4.5 Augmentation and servicing options

Ongoing coordination and development are required with Sydney Water where augmentation is required to their network for the supply of CPRP water demands which will be subject to the timeframe for development commencement, the staging programme and the ESD initiatives adopted.

A preliminary feasibility request was submitted to Sydney Water with their letter response found in **Appendix B**. Within the feasibility response, Sydney Water requested modelling of the surrounding Sydney Water network for firefighting pressures and further application submission for potable water through their Tap in<sup>™</sup> service. Modelling of the network and addressing other items in the feasibility letter is to be conducted in subsequent stages of design to address local network issues.

Utility meters, water pumps, grease arrestors and sewer pump outs and all other associated plant and equipment will be located either within integrated basements off the OSD deck and remote from the buildings or within each building at OSD deck level.

Fire water storage tanks along with associated pumps, and booster valve assembly will also be located in suitable locations in accordance with Fire and Rescue NSW requirements.

Further consultation and coordination are required with Sydney Water in subsequent stages of design to establish any potential relocation and protective works required for their water assets.

Once the water servicing strategy is developed further, consultation with Sydney Water is required to agree on easements, access, and maintenance for the assets.

### 4.6 Approvals and next steps

Following the finalisation of the Reference Master Plan, Sydney Water will be contacted to assist with the planning of any future modelling, connections, or infrastructure upgrades.

Sydney Water formal approvals are typically provided as a part of a Section 73 process, these will likely be required for each stage of development. However, site-wide strategy drawings can be submitted to Sydney Water as a part of the applications to establish a Head Deed.

The potable water strategy is to be confirmed through hydraulic modelling, with separate reports outlining the modelling outcomes to be submitted to Sydney Water.

The key next steps in progressing the delivery of potable water infrastructure through detailed design, including the formal approval process for Sydney Water infrastructure consists of the following:

- 1) The CPRP is to consider commercial agreements with Sydney Water to provide further service checks, system capacity's modelling, required easements and access, and further collaboration commitments
- 2) Undertake hydraulic modelling to confirm the extent of any lead-in infrastructure upgrades required
- 3) Undertake site investigations to confirm the precise locations of existing on-site infrastructure (including non-Sydney Water infrastructure)
- 4) Ongoing review and amendment of the overall water master plan for Central Precinct based on staging considerations

- 5) Develop diversion strategy (including any interim works to suit staging) and protection/build-over requirements for infrastructure that cannot be diverted
- 6) Establish a Head Deed to be signed by required parties (Sydney Water, Designer, WSC, Developer, Constructor)
- 7) Submit application/s for individual detailed design packages to be submitted to SWC with drawings of proposed works in stages, Section 73
- 8) SWC to issue additional Notice of Requirements (NOR) with their requirements for water main layout, sizing and funding matters confirmed
- 9) Detailed design to be progressed based on the NOR and submitted to Sydney Water for approval.

It is expected that the buildings/precincts will require separate applications for connection for their respective stage of development.

The point of separation for the CPRP network and the Sydney Water network, and then private reticulation to individual buildings or separate connection points for each building, will be developed during subsequent stages of design.

# 5. Recycled water

## 5.1 Background and existing assets

At present, there is no recycled water supplied directly to the existing Central Precinct from external sources.

A stormwater harvesting tank is located beneath the Pitt Street loading dock which roof runoff and stormwater runoff from Ambulance Avenue, and potentially a portion of the rail track drainage, discharge into. Additional rainwater tanks appear evident in the Pitt Street loading dock area.

The harvested stormwater has been used to supply the Grand Concourse toilet facilities. However, poor water quality has prevented this reuse at times. It is currently assumed that the existing stormwater harvesting functionality will remain unchanged and continue servicing the Sydney Trains platforms.

To provide recycled water to Central Precinct, there are currently three main recycled water strategies:

- Connection to existing City of Sydney (CoS) Council Recycled Water Network
- Precinct wide wastewater treatment system
- Localised wastewater treatment and reuse within individual buildings.

### 5.2 Demand assessment

An assessment of the estimated recycled water demand generated from the development will be conducted in subsequent design stages once further progress is made with staging development and the Ecological Sustainable Development (ESD) initiatives.

## 5.3 Augmentation and servicing options

There are currently three options strategies being investigated to supply recycled water to the Central Precinct Renewal Project (CPRP). Key criteria in the assessment of the three options include upfront, and operational costs, maintainability, and functionality. A determination of the recycled water servicing options will be completed during subsequent design stages.

### 5.3.1 Option 1 – CoS council recycled water network

During stakeholder consultation with Sydney Water and the CoS Council, it was confirmed that a recycled water pipeline had been constructed as part of the recent Sydney Light Rail construction to facilitate the CoS Council Recycled Water Network strategy.

Therefore, a recycled water pipeline forming part of the CoS Council Recycled Water Network is now present along Eddy Avenue and Chalmers Street bordering the north and east of the site, and within nearby George Street.

At this stage of the investigation, the recycled watermain pipeline has been confirmed not to be connected to any premises and is yet to be commissioned. It is noted that the system could potentially be operational by the time the CPRP buildings are developed.

Sydney Water and CoS Council are currently investigating options to supply recycled water to the George Street pipeline in line with the collaboration commitment under the signed MOU. Refer to **Figure 6** below for a schematic view of the potentially available recycled water pipeline.





\*Sewer opportunities are indicative average dry weather flows.
The scope of connecting to the CoS Council Recycled Water Network and any other external infrastructure modifications is to be confirmed based on further design development of the recycled water strategy and in consultation with CPRP, Sydney Water and CoS Council.

### 5.3.2 Option 2 – Precinct wide wastewater treatment system

A precinct wide wastewater treatment system would require a centralised black or grey water treatment plant located in either one or both integrated basements servicing all of the CPRP. The centralised treatment plant will rely upon wastewater from the CPRP gravitating via pipes from the precinct buildings. The wastewater would be collected, treated, and redistributed back to the CPRP via a pumped reticulation system. Any surplus recycled water could be used to feed into the CoS Council Recycled Water Network (if connected).

### 5.3.3 Option 3 – Localised wastewater treatment and reuse

A localised wastewater treatment plan would involve the decentralised installation of a grey water treatment and re-use in the individual CPRP buildings basements. The wastewater would be collected directly from each building before being treated and re-used locally. Any surplus recycled water could be used to feed into the CoS Council Recycled Water Network (if connected).

### 5.4 Approvals and next steps

All of the above-mentioned options will be explored in more detail as the project enters subsequent design stages. It is likely that on-site wastewater treatment (localised or precinct wide) will be adopted to meet the ESD initiatives given the high risk that a recycled water main with sufficient capacity may not be available for connection when the buildings become operational, nor have the capacity to meet the demands of the precinct.

The development of an integrated water cycle management strategy outlining sustainable water management across the CPRP is required in future stages of design.

The potential point of separation for the CPRP network and the CoS Council Recycled Water Network, and then private reticulation to individual buildings or separate connection points for each building, will be developed during subsequent stages of design.

# 6. Sewer

## 6.1 Background and existing assets

The preliminary information gathering exercise considered data from a range of sources. Primarily these were obtained from Dial Before You Dig (DBYD) requests, Sydney Water Geographic Information System (GIS), authority infrastructure reports and master plans.

Sydney Water currently services the existing Central Precinct within the Sydney West Sewer Catchment Area Management Plan which is a part of the Bondi Wastewater System and represents a significant increase in demand within the system. The sewerage discharging to the Bondi Sewerage Treatment Plant. **Figure 7** below shows a map of the existing wastewater collection system, including pipes and pumping stations within the city.



Figure 7: Sydney Water Bondi Wastewater Collection System

The existing sewer network, as illustrated in **Figure 8**, has been sourced from Sydney Water GIS information provided in 2019. Three sewer assets traverse the existing Central Precinct site:

- The heritage listed 1371x1676 (DBYD) brick oviform sewer (Bondi Ocean Outfall Sewer) crossing the northwest of the site from Lee Street to Eddy Avenue.
- 400mm Vitrified Clay pipe sewer located beneath the Devonshire Tunnel
- 450mm PVC pipe sewer crossing from Prince Alfred Park through to Mortuary Station and Regent Street.

#### Figure 8: Existing sewer mains



It is noted that the above discussion is focused on supply from Sydney Water infrastructure. Further consideration will be given as to whether Sydney Trains sewer infrastructure located within the Central Precinct footprint can be incorporated into the overall strategy.

### 6.2 Demand assessment

An assessment of the estimated increase in sewer loading generated from the CPRP has been conducted to determine the required network connections and infrastructure upgrades. Demand forecasting has been based on the average number of residential dwellings and Gross Floor Area (GFA) for retail and commercial development outlined in **Section 1.6**.

The average and peak water and sewer demands do not allow for grey/black water treatment and locally generated non-potable water reuse. Additionally, if a non-potable water main will be available in the future, the water demand will be split between potable and non-potable use. The extent of grey/black water treatment and non-potable water use and associated reduction in the utility water and sewer loads is subject to the final ESD initiative outcomes. Provisions may still be required to provide the full demand from the utility network in case of on-site equipment failure/maintenance shut down.

The design criteria used to forecast future sewer loading have been estimated based on the methods described in the Sewerage Code of Australia WSA 02 Part 1: Planning and Design (Sydney Water Edition) and common industry practice and is expressed as an Equivalent Population for a particular land use.

### 6.3 Forecast demand

An estimate of the future waste loading demand of the Central Precinct Renewal Project (CPRP) has been calculated based on the development yields discussed in **Section 1.6**. The average daily and peak demand water flow are summarised in **Table 7**.

Plack	Sewer					
BIOCK	Average Daily Flow (L/s)	Peak Demand Water Flow (L/s)				
Station Precinct	1.26	9.83				
А	8.8	68.67				
В	4.91	38.3				
С	6.3	49.14				
D	3.6	28.11				
E	1.19	9.25				
F	2.21	17.25				
Total (L/s)	28.28	136				

Table 7: Estimated Average Daily flow and Peak Demand Water Flow for Sewer

Notes: The Peak Demand Water Flow (L/s) represents a diversified flow across all buildings rather than the total of the flow rates for each individual building using the methods outlined in the Sewer Code of Australia (Sydney Water Edition).

### 6.4 Potential Ecological Sustainable Development initiatives

This report outlines the "baseline" sewer loading and coordination however Ecological Sustainable Development (ESD) initiatives have the potential to reduce the overall sewer loading for Central Precinct. The following ESD Initiatives are recommended for further investigation:

- High-efficiency water fixtures
- Water recycling (potentially grey or black water treatment plant)
- Connection to the City of Sydney (CoS) Council Recycled Water Network (contributing to the network).

It is recommended that ESD initiatives support the aims and ambitions of the "Central Precinct Renewal Program Environmental Sustainability, Climate Change and Waste Management Report" (TfNSW, 2022) and "Central Precinct Renewal Program Green Infrastructure Study" (TfNSW, 2022) integrated water cycle management and supply of water for planting.

### 6.5 Augmentation and servicing options

Further coordination and development is required with Sydney Water where augmentation or modification is required to their network for the acceptance of CPRP sewer demands.

A preliminary feasibility request based upon previous masterplan information was submitted to Sydney Water with their letter response found in **Appendix B**. Within the feasibility response, Sydney Water requested a detailed planning study (modelling) and further application submission for sewer connection through their Tap in<sup>TM</sup> service. A detailed planning study (including modelling) and addressing other items in the feasibility letter are to be conducted in subsequent stages of the design.

Due to the size of the precinct, multiple connection points will be required. The reticulation paths need to be further explored in the next stage of design to account for the position of Central Precinct over existing Sydney Trains tracks.

Servicing options will be established against the ultimate development to address local network issues. The current study is focused on utility supply infrastructure, and it should be noted that there are potentially some adjustments to existing infrastructure to suit site works that will be determined at the detail design stage.

The existing heritage listed Bondi Ocean Outfall Sewer (BOOS), of brick construction traverses through the site and is a key consideration. The current recommendation is to leave it in situ and protect the BOOS during any works, due to its heritage status, shallow grades, and depth. Any relocation of the BOOS will likely incur significant cost, timing, and delivery impacts to CPRP.

Further consultation and coordination are required with Sydney Trains in subsequent stages of design to establish any potential relocation and protective works required for their waste water assets.

Once the sewer servicing strategy is developed further, consultation with Sydney Water is required to agree on easements, access, and maintenance for the assets.

### 6.6 Approvals and next steps

Following the finalisation of the Reference Master Plan, Sydney Water will be contacted to assist with the planning of any future modelling, connections, or infrastructure upgrades.

Sydney Water formal approvals are typically provided as a part of a Section 73 process, these will likely be required for each stage of development. However, site-wide strategy drawings can be submitted to Sydney Water as a part of the applications to establish a Head Deed.

The sewer strategy is to be confirmed through hydraulic modelling, with separate reports outlining the modelling outcomes to be submitted to Sydney Water.

The key next steps in progressing the delivery of potable water infrastructure through detailed design, including the formal approval process for Sydney Water infrastructure, consists of the following:

- 1) The CPRP is to consider commercial agreements with Sydney Water to provide further service checks, system capacity modelling, required easements and access, and further collaboration commitments
- 2) Undertake hydraulic modelling to confirm the extent of any lead-in infrastructure upgrades required
- 3) Undertake site investigations to confirm the precise locations of existing on-site infrastructure (including non-Sydney Water infrastructure)
- 4) Ongoing review and amendment of the overall sewer master plan for the Central Precinct including staging considerations
- Develop diversion strategy (including any interim works to suit staging) and protection/build-over requirements for infrastructure that cannot be diverted; (Including the BOOS)
- 6) Establish a Head Deed to be signed by required parties (Sydney Water, Designer, WSC, Developer, Constructor)
- 7) Submit application/s for individual detailed design packages to be submitted to SWC with drawings of proposed works in stages, Section 73
- 8) SWC to issue of Notice of Requirements (NOR) with their requirements for sewer layout, sizing and funding matters confirmed
- 9) Detailed design to be progressed based on the NOR and submitted to Sydney Water for approval.

It is expected that the buildings/precincts may need to make separate applications for connection for their respective stage of development.

The point of separation for the CPRP network and the Sydney Water network, and then private reticulation to individual buildings or separate connection points for each building, will be developed during subsequent stages of design.

# 7. Electrical

## 7.1 Background and existing assets

There are two different electrical networks in the existing Central Precinct. The station areas including platforms, existing terminal building and retail tenancies on Eddy Avenue are supplied from the Sydney Trains network. The surrounding areas and buildings are supplied from the Ausgrid network.

The existing Ausgrid electrical infrastructure in the vicinity of the site has been identified based on Dial Before You Dig (DBYD) information as shown in **Figure 9**. There is a large number of high voltage cables (both Ausgrid and Sydney Trains network) surrounding the site with a high voltage cable crossing the existing Central Precinct along the Devonshire Tunnel.

# Chinatown mpboll Haymarket oldwas Man Itim Recervoir St Contral Station versity of chnology veney antralis eillar Prince Alfred Cleveland St CPRP BOUNDARY Centre S.C.A

#### Figure 9: Ausgrid network

The Central Precinct is situated at the boundary of Ausgrid's Triplex network and Suburban network. Multiple Ausgrid Zone and Transmission substations and HV feeders as shown in **Figure 10** are located in the proximity of Central Precinct.



#### Figure 10: Ausgrid substation locations

### 7.2 Demand assessment

An assessment of the estimated increase in electrical demand generated by the proposed development has been calculated to determine the required supply options, network connections and infrastructure upgrades. Demand forecasting has been based on the number of residential dwellings and Net Lettable Area (NLA) for retail, commercial, community, Education etc for the development as outlined in **Section 1.6**.

Based on this, a "Preliminary Enquiry Application" was submitted to Ausgrid in May 2020. The calculated demand as submitted to Ausgrid was 47MVA (diversified demand).

To reach Ecological Sustainable Development (ESD) initiatives and work towards stronger ESD targets, the Central Precinct Renewal Project (CPRP) has requested the full removal of gas (fossil fuel) and provide full electrification for the proposed buildings. The current gas demands calculations as shown in **Section 8** allow for the complete elimination of gas.

Demand forecasting and profiles were based on AS3000, industry standards and PCA matrix for commercial buildings as shown **Table 8.** 

#### Table 8: AS3000 Industry Standards and PCA Matrix For Commercial Buildings

Type of Building/occupancy	VA/sq.m allowance
Premium Commercial Building	80
Student accommodation	120
Residential units	5A/ph, 3 phase supply per apartment
Electric Cooking for residential units (for electrification option if adopted for ESD)	2.8A single phase/unit as per AS3000, table C1
Education facility	120
Hotel	120
Community	120
Retail Non-food tenancies	100 for tenant light and power 100 for mechanical plant
Retail – Hot-Food tenancies (with gas cooking)	300 for tenant light, power, and equipment 300 for associated mechanical cooling
Retail – Hot food tenancies Additional allowance for electric cooking	Additional 200VA/sq.m

The demand is calculated by applying the above allowances to the NLA. The above allowances (where not specifically mentioned on the above table) include mechanical, lifts etc. for the building.

The impact of Photo Voltaic (PV) cells and other ESD electrical saving initiatives have not been accounted for in this electrical demand estimation as the extent of ESD electrical saving initiatives is not confirmed. Such ESD initiatives have the ability to reduce electrical demand and assist in managing peak demand.

Ongoing engagement with Ausgrid will be carried out to consider the timing of development, staging and impact of the ESD initiatives on the demand.

## 7.3 Forecast demand

Acknowledging that there is an ongoing investigation into ESD electrical saving initiatives, an estimate of both the future diversified and full building electrification cumulative electrical demand of the CPRP has been calculated based on a regular service supply and the development yields discussed in **Section 7.4**.

The "Maximum Demand with Full Building Electrification" allows for complete removal of Gas supply for CPRP.

Refer to Table 9 below which summarises the total cumulative electrical demand for the CPRP.

Block	Max Demand with Gas (kVA)	Max Demand with Full Building
А	13,845	16,552
В	8,340	10,150
С	12,349	13,154
D	2,598	4,713
E	1,611	1,868
F	2,019	4,390
Terminal Building	4,287	5,468
TOTAL	45,051	56,295

#### Table 9: Total cumulative electrical demand

### 7.4 Potential ecological sustainable development initiatives

Investigations into alternative energy sources, building electrification and on-site generation are being considered for the CPRP and are discussed in more detail in the "Central Precinct Renewal Program Environmental Sustainability, Climate Change and Waste Management Report" (TfNSW, 2022).

The ESD initiatives affecting the electrical demand which have currently been investigated and are proposed for implementation for the CPRP include

- The elimination of gas supply to reduce dependence on fossil fuels.
- On-site energy generation (Rooftop solar PV, façade PV, wind turbines)
- Building orientation
- Centralised heat extraction system
- Passive designs such as:
  - o External Sunshades
  - o Efficient Façade/fabric,
  - o Natural ventilation
  - o Natural glazing

The ESD initiative of building electrification involves the removal of fossil fuels for the use of space/water heating, cooking and power generation. The removal of gas has already been requested for CPRP, with the impact on the maximum electrical demand calculated in **Sections 7.2** and **7.3**. Short term increase in the project carbon emissions due to the elimination of gas can be brought down through renewable power purchases and the transformation of the grid.

Other ESD common initiatives such as rooftop solar PV, building orientation and passive designs as mentioned above are to be considered for implementation for CPRP.

As well as the implementation of the above ESD initiatives, the following emerging technologies/techniques are recommended for further investigation for the possible reduction of CPRP electrical demand:

- The use of building integrated photovoltaics for solar power generation from the façade.
- Hydrogen fuel cell energy storage technology to produce electricity and an associated investigation into the use of "Green hydrogen" produced by using solar/wind electricity.
- The use of B5 and B20 biodiesel for standby power generation.

Generally, solar panels are typically either installed on the roof of the buildings or integrated to external pole top fittings for onsite renewable power generation and can be considered for the CPRP. As the façade of tall buildings cover a large portion of the external surface area, an opportunity exists to utilise building integrated PV for solar power generation. Thus, the energy generation from façade can have a much larger impact on the buildings total renewable power generation compared to just the roof.

An emerging energy storage system which could be an opportunity for the CPRP is fuel cells that use hydrogen to produce electricity. Although gas is typically used for the generation of hydrogen, "Green hydrogen" produced by using solar/wind electricity may be a viable alternative for CPRP. Once the technology becomes reliable and commercially available, this may be a potential energy storage system for CPRP in place of conventional batteries.

In the pursuit of reducing or eliminating fossil fuels, biofuel technology is recommended for investigation for the possible replacement of traditional diesel for emergency standby power generation. B5 diesel (containing a maximum 5% biofuel) is commercially available and is subject to the same standard as regular diesel. B20 diesel (containing a maximum 20% biofuel) is not subject to the same standards as regular diesel and requires confirmation from the supplier to check compatibility for specific use.

While there are some carbon savings by utilising B5 and B20, this does not totally eliminate fossil fuels in standby power generation. An ESD consultant will need to carry out a full assessment of carbon savings for B5/B20 diesel and advise whether total or partial elimination of traditional diesel fuel is required in commercial buildings as these are for standby power generation only.

## 7.5 Augmentation and servicing options

As noted previously, a "Preliminary Enquiry Application" based upon a preliminary masterplan and staging plan was submitted to Ausgrid for the review of power supply options and related network requirements to support the CPRP. The load submitted in this application was 47MVA.

Ausgrid subsequently carried out a feasibility study to assess supply options and issued a System Planning Advice Letter in October 2020. The planning advice letter identified and addressed the following options:

- Option 1 33kV supply from Surry Hills STS
- Option 2 11kV Triplex supply from Belmore Park ZS
- Option 3 11kV suburban supply from Campbell St and Surry Hills ZS

Ausgrid discarded Option 1 (i.e. supply the precinct at 33kV).

Option 2 and Option 3 were recommended by Ausgrid for further consideration and selection. Ausgrid Planning Advice letter is attached as **Appendix B**.

Due to the revised masterplan and increase in the calculated electrical maximum demand for the precinct to achieve building electrification (i.e. removal of gas elements), a new Preliminary Enquiry Application will have to be submitted to Ausgrid for them to reassess the supply options as summarised in Ausgrid Planning Advice letter (**Appendix B**).

Reassessment of connection and supply options is required at the subsequent stages of design as the ESD options and their impact on the electrical demand are further developed. Key criteria in the assessment of the options include upfront, and operational costs, maintainability, and functionality.

Bonding/separation of the two systems (Sydney Trains electrical network) and Ausgrid network for the OSD will be implemented as per Central Precincts Earthing and Bonding Strategy.

Once the electrical servicing strategy is developed further, consultation with Ausgrid is required to agree on easements, access, and maintenance for the assets.

Further consultation and coordination are required with Sydney Trains in subsequent stages of design to establish any potential relocation and protective works required for their electrical assets.

### 7.6 Approvals and next steps

As previously discussed, a revised Preliminary Enquiry based on the latest masterplan information is to be submitted to Ausgrid for assessment. Ongoing engagement with Ausgrid including submission of further enquiries will be carried out based upon the confirmed extent of ESD initiatives and the staging of the development.

Key next steps in progressing the delivery of electrical infrastructure through detailed design including the formal Ausgrid approval process consists of the following:

- Undertake site investigations to confirm the layout and extent of existing services (including non-Ausgrid assets and private infrastructure associated with previous landuses)
- 2) Confirm arrangements for supply and ownership of street lighting
- Confirm the extent of existing infrastructure that can be abandoned and/or requires diversion
- 4) Develop duct masterplan and make a submission to set up a case with Ausgrid
- 5) Develop staged designs for delivery of the new infrastructure including required easements and access,
- 6) Liaise with the City of Sydney Council and Sydney Trains to confirm requirements for undergrounding of existing infrastructure
- 7) Ausgrid to provide detailed requirements
- 8) Ausgrid to issue Design Information Pack (DIP), ES9 and Deed; and
- 9) Submit detailed design of individual packages for approval.

It is expected that the buildings/precincts may need to make separate applications for connection for their respective stage of development.

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The point of separation for the CPRP network and the Ausgrid network, and then private reticulation to individual buildings or separate connection points for each building, will be developed during subsequent stages of design.

Once further definition around the requirements and demand of the Tech Central Precinct is developed, including the investigation into a proposed data hub, an update to the electrical demand may be required.

Although not a public utility authority, Sydney Trains have a large array of private assets within the development site that will require protection, relocation, or replacement during the development process.

# 8. Gas

## 8.1 Background and existing assets

Jemena owns and operates the gas network infrastructure in the vicinity of the existing Central Precinct. The existing gas network has been identified based on Dial Before You Dig (DBYD) information as shown in **Figure 11**. There are a number of secondary gas mains and smaller distribution mains within the vicinity of Central Precinct.

### Figure 11: Gas network



Key existing gas infrastructure includes:

- A 110mm Nylon 210kPa distribution main along Regent Street
- A 75mm Nylon 210kPa distribution main along Lee Street
- A 75mm Nylon 7kPa distribution main along Pitt Street and Eddy Avenue
- A 32mm Nylon 210kPa distribution main along Chalmers Street

In order to achieve Ecological Sustainable Development (ESD) initiatives, and work towards zero-carbon, gas supply to CPRP has no longer been considered.

Therefore, there will be no supply of gas for boilers, mechanical plants, water heating, cooking etc. The direct impact of the elimination of gas to CPRP is the increased electrical load as discussed in **Section 7**.

# 9. Data and telecommunications

## 9.1 Background and existing assets

There is substantial data and communications infrastructure present throughout the existing Central Precinct. Data and communications infrastructure are generally present within roads adjacent to the site. Several communication providers have assets running adjacent to and intersecting Central Precinct:

٠	AAPT Power Tel	•	Nextgen	•	Verizon
•	AAR Net	٠	Optus	٠	Vocus

NBN Co
 PIPE Networks

Identified data and telecommunications assets as sourced from DBYD are shown in Figure 12.

#### Figure 12: Communications assets



### 9.1.1 National Broadband Network

Due to the scale of the Central Precinct Renewal Project (CPRP), it is expected that the new telecommunications infrastructure will be provided by the National Broadband Network Company (NBN Co.). NBN Co. have completed upgrades in the area, upgrading the existing fixed line phone and internet network infrastructure.

Furthermore, NBN Co has launched the Business Fibre Initiative, including the creation of nbn<sup>™</sup> Business Fibre Zones across Australia. The CPRP is included in the Sydney CBD Business Fibre Zone, and therefore internet providers can use this infrastructure to provide symmetrical speed and priority data options of close to 1Gbps.

A map showing the current nbn<sup>™</sup> Business Fibre Zone (green highlight) in the area is shown in **Figure 13**.



### Figure 13: Sydney CBD nbn™ Business Fibre Zone

It is expected that NBN connection can be delivered to the Central Precinct with confirmation to be obtained during subsequent consultation with NBN Co./Telstra. It is noted that Telstra provides the majority of the surrounding conduit network for the supply of NBN cables to premises.

### 9.1.2 Telstra

There are existing Telstra tunnels within Central Precinct. The location of the Telstra tunnels has been determined based on DBYD information as shown in **Figure 12**.

The relocation of the Telstra tunnel and the assets inside the tunnels is not recommended with any CPRP works to avoid significant impacts on the telecommunication network. Any relocation or impact to the tunnel will likely incur significant cost, timing, and delivery impacts to CPRP. The Telstra network into the site will require relocation or adjustment as part of the proposal.

To improve data and communication connection coverage, there may be the opportunity to utilise new Telstra 5G technology. **Figure 14** maps out the current 5G coverage for Central Precinct (purple).



### Figure 14: Telstra 5G Coverage

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NBN has confirmed during initial consultation the ability to provide CPRP connection to their telecommunication network.

In discussions moving forward and for NBN to provide further guidance around supply to CPRP, building GFA schedules and project staging information is required. It was highlighted that staging information will be critical to the rollout and supply of telecommunications.

Initial discussions indicate that only a small number of fibre optic cables and conduits will be required to service the CPRP. Each building is expected to have an independent comms room and fibre optic cable.

Once further definition of the requirements and demand of the Tech Central Precinct is developed, a more accurate demand calculation for Telecommunications can be supplied. It is suggested an investigation into the supply of NBN, precinct wide Wifi, and data hubs be conducted in conjunction with the digital framework development for the Central Precinct and Tech Central Precinct.

It is noted that each building and their tenants will require their own NBN connection.

### 9.2 Potential Ecological Sustainable Development initiatives

The ambition for Ecological Sustainable Development (ESD) initiatives and a sustainable digital precinct at CPRP, is to enhance social and environmental performance and disclosure through emerging digital technology and the internet of things.

To enable a digital precinct, a strategy for metering and monitoring energy, water and waste as well as the leasing and contractual framework for data disclosure and privacy is recommended for investigation. The digital precinct will benefit from buildings having a digital strategy that is integrated with the precinct digital platform

Opportunities in the development of a smart grid, with the capacity to integrate demand control, energy storage and on-site generation can be greatly enabled by a strong digital infrastructure approach which will help support ESD outcomes at CPRP.

Further data and telecommunication objectives for delivering sustainability outcomes through the internet of things to be considered, and as discussed in the "Central Precinct Renewal Program Environmental Sustainability, Climate Change and Waste Management Report" (TfNSW, 2022) are:

- Identification of mandatory disclosure of ongoing performance and assurance of key sustainability objectives with a public interest (GHG emissions, waste-to-landfill and operational water consumption at a minimum);
- Identification of key performance data for commercial benefit or operational improvement;
- Development of a single digital platform for data management, monitoring and disclosure of environmental performance;
- Support the effective implementation of the circular economy.
- Build a digital engineering framework for consideration of sustainability improvements over design and tracking of operational data.

The main physical ESD initiatives that have been assessed/explored for telecommunications infrastructure are through energy demand reductions discussed in **Section 7.4**.

### 9.3 Augmentation and servicing options

NBN currently utilise existing Telstra conduit networks in the area, providing a fibre optic network within. It is unlikely that specific upgrades to the infrastructure will be required for the supply of telecommunications to CPRP.

Augmentation works will most likely be the result of physical clashes due to the general construction activities of the CPRP development. If relocation works are required due to CPRP construction activities, NBN may request additional conduits for future-proofing the network. It is recommended to engage Telstra for an understanding of the existing network.

Options for the supply of fibre optic telecommunications have been discussed with NBN Co. NBN Co.'s current preference is to bring the fibre optic network to an accessible point just within the site boundary and distribute an individual optic fibre to each building. It was recognised that due to the nature of the CPRP over station deck, a Building Distributor (BD) room compatible with NBN installation will likely have to be allocated for all the towers and the integrated basement. Commercial towers may require two BD rooms to comply with PCA grade matrix with risers suitable for NBN installation.

Distributed Antennae System (DAS) room will be required in each of the OSD towers with commercial floors and space will be required on the roof level of each tower for further potential communications equipment.

Once the telecommunications servicing strategy is developed further, consultation with NBN Co is required to agree on easements, access, and maintenance for the assets. Refer to **Appendix B** for minutes of NBN consultation.

Further consultation and coordination are required with Sydney Trains in subsequent stages of design to establish any potential relocation and protective works required for their communication assets.

### 9.4 Approvals and next steps

Further consultation with NBN Co in subsequent design stages will be required to confirm and clarify connections to the development and to understand their spatial requirements.

For NBN Co to provide further guidance around supply to CPRP, building GFA schedules and project staging information is required. It was highlighted that staging information will be critical to the rollout and supply of telecommunications.

Following this, an initial application is required, and a formal agreement entered into between NBN Co and the CPRP prior to construction works commencing (this does not prevent designs from being approved).

The formal approval process for NBN Co consists of the following main steps:

- 1) Undertake site investigations to confirm the layout and extent of existing services (including private infrastructure associated with previous land-uses)
- 2) Liaise with Telstra and Optus to confirm the requirement for diversion and/or relocation of their existing infrastructure
- 3) Confirm the proposed infrastructure master plan (including staging) and in principle supply arrangements with NBN Co based on the number and type of connections
- 4) Initial application submitted to NBN Co. for the supply of the site from their network

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- 5) NBN Co. to confirm supply can be provided and provide a draft agreement for both parties to review and sign
- 6) Liaise with Telstra and Optus for quotes for diversions or abandonments including any interim works
- 7) Submit detailed design of individual packages for approval.
- 8) Internet services provider is engaged, and new connections through the NBN Co infrastructure for public and business services are activated.

Communications systems suitable for seamless integration of precinct wide utility with a digital platform will have to be considered at the next stage of design. This can monitor and/or control demand, energy storage on-site (if considered in design), and on-site energy generation.

The internet service providers can offer multiple bandwidth options, and depending on the NBN Co infrastructure available, they can also offer symmetrical connectivity and uncontended connections. The final configuration of the service provided to any given area is subject to detailed information about the service reliability, security, speed, and usage profile (i.e., dedicated business links, data centres, public wireless access) and they need to be defined at the next design stage.

As an example, a connection for a coffee shop will likely require a shared 50MBps with a 4G backup connection for an EFTPOS (Electronic funds transfer at point of sale) device whilst a data centre will require one or more dedicated symmetrical connections of 1Gbps with a continuity up to 99.95% uptime target and end of the next business day SLA (service-level agreement) for fault restoration.

The point of separation for the CPRP network and the NBN.Co network, and then private reticulation to individual buildings or separate connection points for each building, will be developed during subsequent stages of design.

The NSW Government is investing in the creation of Tech Central precinct. Tech Central stretches from Central Precinct south to Ultimo in the west, Surry Hills in the east and Eveleigh in the south, and is planned to be the future focal point of Sydney's innovation and technology community. As such, further discussion, assessment, and coordination are required with data and telecommunication stakeholders to ensure the vision of the future Tech Central is achieved, with the potential need to develop a precinct wide digital framework.

# 10. Coordination with other services

### 10.1 Precinct wide reticulation

The approach for Central Precinct Renewal Project (CPRP) utilities and services reticulation depends on network routes above and below deck being available. These routes are yet to be confirmed due to the preliminary stage of design. Further assessment of site-wide reticulation will be conducted in subsequent design stages in consultation with service providers.

The following reticulation strategies have been proposed for reticulating serviaces from utility infrastructure and an integrated basement(s) to the over station development buildings at deck level:

- Option 1: Services to step up to deck level at the perimeter of the deck and run within services trenches in the build-up between the deck slab and the finished surface
- Option 2: To utilise existing (repurposed) and new tunnels under the station platforms to the OSD building cores.

### 10.2 Coordination with potable and recycled water infrastructure

Coordination of the proposed water infrastructure with other services in the proposed street network would generally be based on the Streets Opening Co-ordination Council (SOCC) standards, these details are attached in **Section 10.7** 

Construction works carried out near Sydney Water assets require a Specialist Engineering Assessment (SEA) to ensure there are no adverse impacts to the Sydney Water assets. This procedure applies to all Sydney Water assets such as pipelines, conduits, channels, culverts, and associated structures.

In addition, Section 5.12.5.2 of the Water Services Association of Australia codes (WSA, Sydney Water Edition) states that the clearance requirements for water mains from other service utility assets shall not be less than the minimum vertical and horizontal clearances as summarised in **Figure 15**.

### 10.3 Coordination with sewer infrastructure

Coordination of the proposed sewer infrastructure with other services in the proposed street network would generally be based on the Streets Opening Co-ordination Council (SOCC) standards, these details are attached in **Section 10.7**.

Construction works carried out near Sydney Water assets require a Specialist Engineering Assessment (SEA) to ensure there are no adverse impacts to the Sydney Water assets. This procedure applies to all Sydney Water assets such as pipelines, conduits, channels, culverts, and associated structures.

In addition, Section 5.12.5.2 of Water Services Association of Australia codes (WSA, Sydney Water Edition) states the clearance requirements for sewers in **Figure 16**.

Utility	Minimum horiz m	ontal clearance m	Minimum vertical clearance <sup>1</sup> mm		
(Existing or proposed service)	New ma	ain size			
	≤DN 200	>DN 200			
Water mains <sup>2</sup> >DN 375	600	600	300		
Water mains ≤DN 375	300 <sup>3</sup>	600	150		
Gas mains	300 <sup>3</sup>	600	150		
Telecommunication conduits and cables	300 <sup>3</sup>	600	150		
Electricity conduits and cables	500	1000	2257		
Stormwater drains	300 <sup>3</sup>	600	1504		
Sewers – gravity	1000 <sup>5</sup> /600	1000 <sup>5</sup> /600	500 <sup>4</sup>		
Sewers – pressure and vacuum	600	600	300		
Kerbs	150	600 <sup>6</sup>	150 (where possible)		

# Figure 15: Water Services Association of Australia Codes Clearance Requirements For Water Main.

NOTES:

- 1 Vertical clearances apply where water mains cross one another and other utility services, except in the case of sewers where a vertical separation shall always be maintained, even when the main and sewer are parallel. The main should always be located above the sewer to minimise the possibility of backflow contamination in the event of a main break.
- 2 Water mains includes mains supplying drinking water and non-drinking water.
- 3 Clearances can be further reduced to 150 mm for distances up to 2 m where mains are to be laid past installations such as concrete bases for poles, pits and small structures, providing the structure will not be destabilised in the process. The clearance from timber poles should be at least 200 mm and preferably 300 mm..
- 4 Water mains should always cross over sewers and stormwater drains. For cases where there is no alternative and the main must cross under the sewer, the design shall nominate an appropriate trenchless construction technique in accordance with Clause 5.5 or other water main construction and protection treatment, effectively joint-free in the vicinity of the sewer. Refer to Standard Drawings WAT-1211-V and WAT-1255-S.
- 5 Where a parallel sewer is at the minimum vertical clearance lower than the water main (500 mm), maintain a minimum horizontal clearance of 1000 mm. This minimum horizontal clearance can be progressively reduced to 600 mm as the vertical clearance is increased to 750 mm.
- 6 Clearance from kerbs shall be measured from the nearest point of the kerb. For water mains ≤DN 375 clearances from kerbs can be progressively reduced until the minimum of 150 mm is reached for mains ≤DN 200.
- 7 An additional clearance from high voltage electrical installations should be maintained above the conduits or cables to allow for a protective barrier and marking to be provided.

#### Figure 16: Water Services Association of Australia Codes Clearance Requirements For Sewers

### TABLE 5.5

#### CLEARANCES BETWEEN WATER MAINS AND UNDERGROUND SERVICES

Utility	Minimum horiz m	ontal clearance m	Minimum vertical clearance <sup>1</sup>		
(Existing or proposed service)	New m	ain size	mm		
· · · · · · [	≤DN 200	>DN 200			
Water mains <sup>2</sup> >DN 375	600	600	300		
Water mains ≤DN 375	300 <sup>3</sup>	600	150		
Gas mains	300 <sup>3</sup>	600	150		
Telecommunication conduits and cables	300 <sup>3</sup>	600	150		
Electricity conduits and cables	500	1000	225 <sup>7</sup>		
Stormwater drains	300 <sup>3</sup>	600	150 <sup>4</sup>		
Sewers – gravity	1000 <sup>5</sup> /600	1000 <sup>5</sup> /600	500 <sup>4</sup>		
Sewers – pressure and vacuum	600	600	300		
Kerbs	150	600 <sup>6</sup>	150 (where possible)		
NOTES - see over			·		

NOTES:

- 1 Vertical clearances apply where water mains cross one another and other utility services, except in the case of sewers where a vertical separation shall always be maintained, even when the main and sewer are parallel. The main should always be located above the sewer to minimise the possibility of backflow contamination in the event of a main break.
- 2 Water mains includes mains supplying drinking water and non-drinking water.
- 3 Clearances can be further reduced to 150 mm for distances up to 2 m where mains are to be laid past installations such as concrete bases for poles, pits and small structures, providing the structure will not be destabilised in the process. The clearance from timber poles should be at least 200 mm and preferably 300 mm..
- 4 Water mains should always cross over sewers and stormwater drains. For cases where there is no alternative and the main must cross under the sewer, the design shall nominate an appropriate trenchless construction technique in accordance with Clause 5.5 or other water main construction and protection treatment, effectively joint-free in the vicinity of the sewer. Refer to Standard Drawings WAT-1211-V and WAT-1255-S.
- 5 Where a parallel sewer is at the minimum vertical clearance lower than the water main (500 mm), maintain a minimum horizontal clearance of 1000 mm. This minimum horizontal clearance can be progressively reduced to 600 mm as the vertical clearance is increased to 750 mm.
- 6 Clearance from kerbs shall be measured from the nearest point of the kerb. For water mains ≤DN 375 clearances from kerbs can be progressively reduced until the minimum of 150 mm is reached for mains ≤DN 200.
- 7 An additional clearance from high voltage electrical installations should be maintained above the conduits or cables to allow for a protective barrier and marking to be provided.

### 10.4 Coordination with electrical infrastructure

Coordination of the proposed electrical infrastructure with other services in the proposed street network would generally be based on the SOCC Standards, these details are referenced in **Section 10.7.** 

Ausgrid's specification "NS130: Specification for Laying of Underground Cables up to 22kV" does not provide specific information on clearances from other services. If the electrical services are installed within the standard allocation, the separations given by the other services provider should apply for all crossings. Where a reduced allocation is proposed, separations should be determined in consultation with Ausgrid

In addition to the above, all works are to comply with Ausgrid Network Standards NS 156 "Working Near or Around Underground Cables"

## 10.5 Coordination with gas infrastructure

Coordination of the existing gas infrastructure with other services in the proposed street network would generally be based on the SOCC Standards, these details are attached in **Section 10.7** 

Jemena provide guidance on horizontal and vertical clearances, the minimum separations between electrical and natural gas mains are provided in Table 1.0 of "Natural Gas Requirements for Developer Provided Trench" as summarised in extracted **Figure 17**.

Nylon or Polyethylene Gas Mains	Telecommunication cables and/or conduits	Protected (2) Low Voltage electricity cables	Protected (2) High Voltage electricity cables
Gas Mains up to 75mm diameter	150mm	150mm	300mm
Gas Mains of 110mm diameter or larger	300mm	300mm	300mm

### Figure 17: Jemena Minimum Separation Between Utilities

The above Table 1.0 refers to the minimum separation requirements between services as per AUS-SPEC #2 Specification 303 – Service Conduits.

### Note:

- Separations relate to distances between conduits/cables peripheries.
- "Protected" refers to mechanical protection over the cables, which usually takes the form of either polymeric strips (at least 3mm thick) or clay brick.
- The above tables are considered to provide desirable minimum separations. Consideration should also be given for the need to access for future maintenance of Services when determining the required separations.

# 10.6 Coordination with data and telecommunications infrastructure

Coordination of the proposed telecommunication infrastructure with other services in the proposed street network would generally be based on the SOCC Standards, these details are attached in **Section 10.7**.

The clearances for NBN services from other utilities are given in Section 5.2.13 of "New Development Deployment of the NBN Co Conduit and Pit Network – Guidelines for Developers", these requirements are presented in **Figure 18**.

Servic	e Item	Minimum Radial Clearances*1		
Cas Dias	Over 110 mm	300 mm		
Gas Pipe	110 mm or Less	150 mm		
Damas	High Voltage	300 mm		
Power	Low Voltage	100 mm* <sup>2</sup>		
W	High Pressure/Capacity	300 mm		
water mains	Local Reticulation	150 mm		
C	Main	300 mm		
Sewer	Connection Pipe	150 mm		
Other Telecommunications	100 mm*1			

#### Figure 18: NBN Clearances from Other Carriers and Underground Services

\* 1 - Reduced separation is possible where all parties (including NBN Co) are consulted and agreement is reached.

\* 2 - Only where protection barriers are used, for example, conduit, bedding, marker tape and cover batten.

## 10.7 NSW Streets Opening Coordination Council Standards

The NSW Streets Opening Coordination Council (SOCC) "Guide to Codes and Practices for Street Opening" 2018, provides guidelines for service allocations within the footpath. The SOCC Guide mainly relates to services within the footpath and road corridor.

As the majority of new utility infrastructure for the CPRP will be within the development footprint, the SOCC Guide will serve as a sufficient guide for where other utilities design standards are not applicable. Such events should be still coordinated and agreed with the relevant service provider. Refer to the extracts below for further information (Figure 19, Figure 20, Figure 21, Figure 22, Figure 23).

# Figure 19: NSW Streets Opening Coordination Council (SOCC) "Guide to Codes and- Practices for Street Opening" Standard Utility Service Extract



# Figure 20: NSW Streets Opening Coordination Council (SOCC) "Guide to Codes and Practices for Street Opening" Standard Utility Service Extract (cont.)



# Figure 21: NSW Streets Opening Coordination Council (SOCC) "Guide to Codes and Practices for Street Opening" Minimum Separation Between Services

#### **Desirable Minimum Separations Between Utility Services**

Desirable Minimum Separations Ho	rizontal mm
----------------------------------	-------------

	Gas mains up to 75mm diameter	Gas mains greater than 75 mm diameter and up to 200mm diameter	Gas mains greater than 200mm d'amétar	Telecommunication cables and/or conduits	Protected <sup>CD</sup> Low voitage electricity cables	Protected <sup>CD</sup> trigh voltage destricity cables	High voltage electricity cables	Water Mains	Sewer Mains	Drainage
Gas mains up to 76mm diameter	150	380	508	150	150	300	600	150	200	300
Gas mains greater than 75 mm diameter and up to 200mm diameter	390	300	500	300	308	300	4000	150	200	300
Oas mans greater than 200mm diameter	580	500	500	500	500	500	4000	150	300	300
Telecommunication cables and/or coduits	150	300	500	100	100	300	1000	150	300	300
Protected <sup>(22</sup> ) Low voltage electricity cables	150	300	508	100	TEN	TBN	1000	1000	100	100
Protected <sup>(2)</sup> high voltage electricity cables	380	200	500	200	TEN	TEN	TEN	TEN	300	300
High voltage electricity cables	500	4800	4005	1000	1000	TBN	TEN	2000	1000	1008
Water Mains	150	150	160	150	300	300	2000	300	500	500
Sewer Mains	200	300	308	200	300	300	1800	500	300	300
Drainage	300	300	308	300	300	300	1000	500	380	300

#### Desirable Minimum Seperations Vertical mm

	Gas mains up to 25mm diameter	Gas mains greater than 75 mm diameter and up to 200mm diameter	Gas mains greater than 200mm diameter	Telecommunication cables and/or conduits	Protected <sup>GD</sup> low voltage electricity cables	Protected <sup>(3)</sup> high valage electricity cables	High voltage electricity cables	Water Mains	Sewer Mains	Drainage
Gas mains up to 75mm diameter	150	380	500	150	150	300	600	150	200	300
Gas mains greater than 75 mm diameter and up to 200mm diameter	300	300	500	300	300	300	4000	150	300	300
Gas mains greater than 200mm diameter	500	500	500	500	608	500	4000	150	300	300
Talacommunication cables and/or codults	150	390	500	100	100	300	600	150	300	300
Protected <sup>00</sup> 1cw voltage electricity cables	150	300	500	100	TEN	TBN	600	225	50	160
Protected <sup>60</sup> high voltage alactricity cables	200	300	600	200	TEN	TEN	TEIN	TEN	200	300
High voltage electricity cables	500	1800	4000	1000	1000	TBN	TEN	2000	1008	600
Water Mains	150	150	150	150	300	300	1000	300	600	500
Sever Mains	380	300	308	300	350	300	500	500	300	300
Orainage	300	300	300	300	300	300	600	500	300	300

#### Notes:

- 1. Separations relate to distances between conduit/cable peripheries.
- "Protected" refers to mechanical protection over the cables, which usually takes the form of either, polymeric strips (at least 3 mm thick) or clay bricks.
- 3. The above tables are considered to provide desirable minimum separations. Consideration should also be given to the need for access for future maintenance of Services when determining the required separations.
- 4. TBN To be Negotiated.
- 5. If it is proposed to lay a new service above an existing asset, need to consider clearances nominated in Section 5.
- In addition to these separations, the service owner may require specific backfill requirements (e.g. thermally stable backfill). These requirements shall be confirmed with the service owner.
- 7. Electricity Cables: Low Voltage 415V phase-to-phase, High Voltage 11kV to 500kV phase-to-phase.

If the minimum clearances between existing and new assets to be installed cannot be achieved, negotiations between the utilities must commence.

This may include:

- Suitable alternative location and depth of the new asset; or
- Protection measures for either the existing or new asset like concrete encasement.

# Figure 22: NSW Streets Opening Coordination Council (SOCC) "Guide to Codes and Practices for Street Opening" Nominal Depth of Cover of Utility Services In Pathways Extract

			Footwa	/			
		Electricity		Gas	Telecommunications	Water	Carriageway
	Ausgrid	Endeavour	Essential				
300 —							
400 —	Communication cables in electricity trench	communication cables in electricity trench	Communication cables in electricity trench				
500-				<400kPa	Local Network cables and conduits	62mm diameter	
600	LV cables				(Phone/Pay TV)	osmin diameter	
000	11kV cables	LV cables	LV cables		Other Network cables and conduits		
700 —							
800 —	HV cables 33kV and above 750-900mm	HV cables to 22kV	HV cables	>1000kPa		750mm diameter	
900 —	classification						
1000—		HV cables 33kV and above.					
1100—							
1200-							
				>3500kPa			

#### Notes:

1. Minimum depth of cover requirements

- 2. Contact utility/asset owner for specific project requirements.
- 3. All depths are to the top of asset or any asset attachments.
- 4. Water mains larger than 750mm in diameter are laid at depth of cover to suit project requirements.
- 5. Sewer pressure mains to be laid in water allocation deeper than water mains.
- 6. Vacuum sewers typically laid in property but could also be in water allocation.

7. For structures to be erected over the electrical distributors footpath allocation for underground mains the electrical distributor must be consulted in accordance with Clause 5.3 Customer's Structure - Service and Installation Rules of New South Wales November 2016.

#### WARNING: FOR GENERAL INFORMATION ONLY

This diagram, showing the depth of underground services, indicates only the depths at which the various utility/service providers are nominally laying services. It has been prepared for information purposes only. Existing and future services may be located at different depths from those indicated. It is therefore important that persons intending to excavate or bore should check with the utility/service providers concerned before commencing work. They must exercise care in areas where services are indicated by the utility/service providers and all services should be located by hand excavation or non –destructive techniques before any mechanical equipment is used.

		Carriageway				
	Electricity			Gas	Telecommunications	Water
	Ausgrid	Endeavour	Essential			
300 —						
400 —						
500 —					Local Network cables and conduits (Phone/Pay TV)	
600 —				<400kPa	Other Network cables	63mm diameter
700 —			LV cables	SHOUKPa	and conduits	
800 —	LV, 11kV and above cables 750-1200mm depending on road classification	SL and LV cables	HV cables			750mm diameter
900 —		11kV and above cables. 33kV and above are installed in a separate trench		>1000kPa		
1000—						
1100—						
1200—						
				>3500kPa		

# Figure 23: NSW Streets Opening Coordination Council (SOCC) "Guide to Codes and Practices for Street Opening" Nominal Depth of Cover of Utility Services In carriageways Extract

#### Notes:

1. Minimum depth of cover requirements

- 2. Contact utility/asset owner for specific project requirements.
- 3. There are no utility/service provider allocations in carriageways.
- 4. All depths are nominal to top of service pipe, conduit or cable or any asset attachments from gutter invert.
- 5. Water mains larger than 750mm in diameter are laid at depth of cover to suit project requirements.
- 6. Sewer pressure mains to be laid in water allocation deeper than water mains.
- 7. Vacuum sewers typically laid in property but could also be in water allocation.
- TransGrid (Extra High Voltage electricity transmission) services are typically buried at 900 mm cover (650mm cover to the top of the cover slabs).

 For structures to be erected over the electrical distributors footpath allocation for underground mains the electrical distributor must be consulted in accordance with Clause 5.3 Customer's Structure - Service and Installation Rules of New South Wales November 2016.

#### WARNING: FOR GENERAL INFORMATION ONLY

This diagram, showing the depth of underground services, indicates only the depths at which the various utility/service providers are nominally laying services. It has been prepared for information purposes only. Existing and future services may be located at different depths from those indicated. It is therefore important that persons intending to excavate or bore should check with the utility/service providers concerned before commencing work. They must exercise care in areas where services are indicated by the utility/service providers and all services should be located by hand excavation before any mechanical equipment is used.

# 11. Consultation

As part of the preliminary Central Precinct Renewal Project (CPRP) works, key stakeholders have been engaged to share information, understand needs and aspirations, and seek feedback for the project.

The stakeholder engagement methodology generally undertaken is summarised below:

- Contact with relevant authorities to ascertain their current capacity, planned upgrades and potential supply constraints, based on a base estimation of the demand generated by the proposed increase in density
- Consultation with strategic planners within each of these organisations, responsible for the overall planning of infrastructure delivery to this area being conscious of the overall extent of development planned within the catchment
- Submission of feasibility applications/requests to each utility service provider
- Updates to the high-level servicing strategy based on feasibility investigations and presentations to key stakeholders to engage in discussion and reach an agreement prior to detailed planning/feasibility of individual projects.

The following key stakeholders were consulted with records provided in Appendix B.

### 11.1 Sydney Water

Sydney Water has been engaged for the supply of potable water and sewer connections for the CPRP. An initial feasibility request has been processed with Sydney Water with their letter response in **Appendix B**.

Within the feasibility response, Sydney Water requested modelling of the surrounding Sydney Water network for firefighting pressures and further application submission for potable water through their Tap in<sup>TM</sup> service.

Modelling of the network and addressing other items in the feasibility letter is to be conducted in subsequent stages of design to address local network issues. Additional consultation is required to coordinate the physical connection to the CPRP, and the necessary augmentations works required for the increased demand.

Consultation with Sydney Water has been collaborative and has informed the scale of augmentation works required and identified ESD opportunities such as connection to the CoS recycled water main.

## 11.2 Ausgrid

Ausgrid has been engaged regarding the electrical supply for the CPRP. A "Preliminary Enquiry Application" based upon a preliminary masterplan and staging plan was submitted to Ausgrid for the review of power supply options and related network requirements to support the CPRP.

Ausgrid subsequently carried out a feasibility study to assess supply options and issued a System Planning Advice Letter in October 2020. The planning advice letter identified and addressed three options, two of which were recommended by Ausgrid for further consideration and selection. Ausgrid Planning Advice letter is attached as **Appendix B**.

Ongoing engagement with Ausgrid will be carried out to consider the timing of development, staging and impact of the ESD initiatives on the demand.

Consultation with Ausgrid has been collaborative and has informed the scale of augmentation works required to provide CPRP with the electrical supply.

### 11.3 Jemena

Initial consultation for the connection of Gas to the CPRP with Jemena has been undertaken. Due to the Ecological Sustainable Development (ESD) initiatives, and work towards Zero Carbon, gas supply to CPRP has no longer been considered.

## 11.4 City of Sydney Council

City of Sydney (CoS) Council has been engaged primarily for the civil and stormwater works relating to the CPRP, with consultation being collaborative and informative. CoS has confirmed the construction of a recycled watermain which may be an opportunity for CPRP ESD initiatives in the future.

Due to the early stages of the recycled watermain implementation, consultation with CoS is recommended at later stages of CPRP design and when CoS has completed the implementation of the recycled watermain. Arcadis to follow up with. Refer to **Appendix B** for the minutes of the CoS meeting.

### 11.5 NBN Co

NBN has been engaged regarding the supply of telecommunication connections to the CPRP. Initial consultations have confirmed the ability to provide a CPRP connection to their telecommunication network.

In discussions moving forward and for NBN to provide further guidance around supply to CPRP, building GFA schedules and project staging information is required. It was highlighted that staging information will be critical to the rollout and supply of telecommunications.

Once further definition of the requirements and demand of the Tech Central Precinct is developed, a more accurate demand calculation for Telecommunications can be supplied. Refer to **Appendix B** for the minutes of the NBN meeting.

# 12. Recommendations

The following recommendations are provided to support the advancement of the Central Precinct Renewal Project (CPRP). Recommendations are provided for the ongoing master plan and design development of the CPRP and the development of planning controls. In addition to these recommendations, a line of sight table has also been provided as **Appendix A** 

The recommendations were determined through consultation with service providers and suitably qualified professionals to achieve CPRP design outcomes and further address "The Study Requirements". Recommendations are derived by a detailed assessment of the CPRP service demands, the augmentation works required and the impact to surrounding infrastructure this shall have.

## 12.1 Design and masterplan recommendations

Future work and recommendations for the CPRP design development include:

- Continuing engagement with stakeholders is strongly recommended for efficiency in the design process, ensuring adequate supply is available, and achieving quality outcomes. It is recommended that the CPRP seek support from the City of Sydney Council, Sydney Water Corporation, Ausgrid and NBN on all relevant precinct wide strategies and plans;
- The continued refinement and assessment of current Ecologically Sustainable Development (ESD) initiatives and their impact on the utility supply options, and the associated costs, timing, delivery, and operation;
- The further development of ESD initiatives regarding the electrical demand and use such as:
  - Discussions and workshops with the façade team for utilising building integrated photovoltaics for solar power generation from the façade.
  - $\circ$  Investigation into the use of B5 and B20 biodiesel for standby power generation.
  - Investigation into hydrogen fuel cell energy storage technology to produce electricity and an associated investigation into the use of "Green hydrogen" produced by using solar/wind electricity.
- Recommended to establish design guidelines for high performance buildings, potentially including electrification, on/off-site renewable energy, load control, passive design, embodied, biophilia and battery storage;
- Further investigation into the requirements to support a sustainable digital precinct as discussed in **Section 9.2**;
- The development of an integrated water cycle management strategy outlining sustainable water management across CPRP with a view to minimising potable water demand;
- Modelling of Sydney Water sewer and potable water networks as stipulated in their feasibility letter to confirm any upgrades required to satisfy demand as each portion of the development is commissioned to address the requirements of Sydney Water;
- Detailed consultation and coordination with utility authorities to:
  - $\circ \quad \text{Confirm lead-in infrastructure requirements and route}$
  - o Provide the services demand based upon the Reference Master Plan

- Reach an agreement upon a point of separation for the CPRP network and private reticulation; and
- Continued consultation and co-ordination with Sydney Trains to establish any potential relocation and protective works required for their various assets;
- Coordination with the Urban Design team and Masterplan to understand development scenarios and limit the impact on the existing authority services and allow sufficient space for service infrastructure;
- Ongoing and continuous assessment of utility demands during project development in general to ensure required demands are accounted for;
- Recommend considering the staging of works in the design development process
  when assessing impacts and design performance. Whilst the ultimate stage of
  development needs to be considered, interim stages and individual developments
  need to equally deliver on outcomes. Reliance on other developments, stages or subprecinct is to be avoided. Such interdependencies increase complexity and tend to
  erode performance outcomes at a precinct scale as the design develops.
  Developments need to be assessed to confirm they perform at both the stage of their
  construction and the ultimate state of the CPRP;
- The development of a holistic Utilities and Services Management Strategy (The Strategy) prior to the detailed design phase. The strategy is recommended to coordinate construction efforts for the precinct as a whole and reduce the size and duration of construction impacts to the surrounding areas and infrastructure;
- In the development of The Strategy, consultation with the services providers is recommended to determine any implications on land use to facilitate easements, access, and maintenance for the assets. Spatial provisions are then to be identified and incorporated into the overall masterplan and strategy;
- It is recommended that The Strategy address deficiencies in available survey information, and produce high-level 3D modelling for identified high risk items, Congestion areas and potential clashes to help inform subsequent detail design;
- It is recommended that The Strategy refers to the climate change impact risks outlined in the "Central Precinct Renewal Program Environmental Sustainability, Climate Change and Waste Management Report" (TfNSW, 2022). The Strategy is to support the proposed aims and adaptation measures to reduce climate change impacts. This aims to maximise the potential for CPRP to achieve a sustainable and resilient outcome;
- It is recommended that The Strategy and design support the aims and ambitions of the "Central Precinct Renewal Program Environmental Sustainability, Climate Change and Waste Management Report" (TfNSW, 2022) and "Central Precinct Renewal Program Green Infrastructure Study" (TfNSW, 2022). This aims to maximise the potential for CPRP to achieve a sustainable and resilient outcome. This may be achieved by ensuring regular formal high-level design reviews are undertaken for this purpose.

### 12.2 Planning framework recommendations

In addition to the above, further recommendations for the support and development of planning controls, DCP's or guidelines for the CPRP include:

- Additional studies/assessments which could help inform The Strategy and achieve CPRP outcomes include Circular Economy, Net-Zero and Lifecycle assessments;
- Sustainability benchmarks and Ecological Sustainable Development (ESD) initiatives are recommended to be established prior to the detailed design phase to ensure overall precinct outcomes are achieved and not compromised;
- A precinct wide telecommunications strategy is recommended to be developed. The strategy requires detailed assessment and co-ordination with data and telecommunication stakeholders to ensure the vision of the future Tech Central is achieved;
- The project must be informed by consultation, including with relevant government agencies, infrastructure and service providers, special interest groups, affected landowners, businesses, and the community. The consultation process must be undertaken in accordance with the current government guidelines;
- Assessment of options for supply and ownership of assets as either standard authority owned assets to each portion of the development or a precinct wide privately owned assets within the CPRP boundary;
- The CPRP is to aim to be consistent with the goals and objectives of NSW's strategic planning and transport infrastructure policies. These strategic plans and policies provide goals and objectives for land use planning within the Sydney metropolitan area, particularly regarding accommodating future population growth and investing in transport infrastructure.

In conclusion, the proposed masterplan has been reviewed and assessed by suitably qualified professionals and consider that the proposed outcomes satisfy the above recommendations

# 13. Conclusion

The purpose of this Utilities and Infrastructure Servicing Report is to address the study requirements issued by the NSW Department of Planning, Infrastructure and Environment (the Department) to guide preparation of the Central State Significant Precinct.

This report identifies and assesses the utility services in the existing Central Precinct and their constraints, opportunities, issues, and network capacity.

A preliminary calculation based on the latest masterplan has been undertaken to determine a "baseline" services demand and identifies any required augmentation to existing infrastructure.

Estimated demand calculations based on the current masterplan information indicate that local amplifications to potable water, wastewater, and electrical delivery systems may be required to service increased demand from the proposed redevelopment. Confirmation is required from NBN regarding the supply of sufficient supply of data and telecommunications to service the future "Tech Central" precinct

Due to the location and age of the existing Central Precinct, there are a number of existing high risk and heritage elements that will require further coordination, stakeholder consultation, protection, and potential modification.

Ecological Sustainable Development (ESD) initiatives have the potential to improve the energy and resource efficiencies for the Central Precinct Renewal Project (CPRP). The following are key ESD Initiatives recommended for further investigation and assessment:

- Rainwater harvesting
- Water recycling (grey or black water treatment plant)
- Connection to City of Sydney (CoS) Council Recycled Water Network
- Elimination of fossil fuels and Investigation into alternatives
- Energy storage and on-site generation (solar PV, wind turbines)
- Centralised heat extraction system
- Passive designs such as:
  - o External sunshades
  - o Efficient façade/fabric
  - o Natural ventilation
  - Natural glazing.

Gas connection for the CPRP is no longer considered in an effort to achieve net-zero carbon emissions by eliminating or replacing fossil fuels.
Utility constraints that may affect the CPRP include:

- Co-ordination and protection of existing high-risk utility services such as
  - Heritage listed Bondi Ocean Outfall Sewer (BOOS)
  - o Telstra Communication Tunnel
  - The augmentation of Sydney Water and Ausgrid assets to service CPRP.

Demand calculations provide the following estimates based on the Reference Master Plan:

- Potable Water Demand = 3,294 kL MDD, 1,697 kL ADD
- Sewer Loading = 28.28 L/s ADF, 136 L/s PDWF
- Electrical Demand = 45,051 kVA (with Gas), 56,295 kVA (Full Electrification)

# Appendix A – Line of sight table

Issue	Aspirations	Solutions
Existing utilities supply/infrastructure inadequate to service the future Central Precinct.	All utilities to have sufficient capacity to provide for demand throughout the stages of the development	Early confirmation of utilities strategy as privately owned within precinct or public utility assets Continuing engagement with utility providers throughout the life of the development Timely response to utility provider's issues. E.g. preferred electrical supply strategy (Ausgrid), modelling of sewer and water asse networks in the vicinity of the development ( Sydney Water) Confirmation of ESD elements to be incorporated and impacts on estimated demands
Abortive construction works	Minimise abortive or temporary utilities construction. Avoiding adverse impacts to costs, timing and delivery of the CPRP	Thorough planning of utility networks, within and outside the development boundary, to allow consideration of staging. Collaborative coordination between CPRP and external Stakeholders, and between CPRP design and construction teams.
Restriction on site usage	Minimise constraints on development due to maintenance requirements and easements	Early confirmation of requirements to allow planning and coordination
Ongoing and unforeseen engagement with stakeholders for the development and approval of service infrastructure. Impact to Central Precinct service strategy feasibility and established approval timeframes.	<ul> <li>Service strategies are developed efficiently and in a timely fashion.</li> <li>No delay to the approval of service strategies.</li> <li>Collaboration with service authorities while maintaining and building healthy stakeholder relationships.</li> </ul>	<ul> <li>The early establishment of key design parameters:</li> <li>Staging of precinct works and activation</li> <li>Adoption and ESD initiatives</li> <li>Detailed survey information.</li> <li>Early and collaborative stakeholder engagement shall also contribute to a well informed and efficient design outcome and approval.</li> <li>Stakeholder management plan/strategy</li> </ul>

Issue	Aspirations	Solutions
Slow development/delivery of staging strategy or ESD initiatives. Adversely impacting: • co-ordination with stakeholders • optioneering designs • work agreements • design approvals	<ul> <li>The delivery of CPRP:</li> <li>Without excessive re-coordination efforts\Without altering agreed option developments with service authorities and</li> <li>By receiving stakeholder endorsement/ approvals without delaying design/ construction works.</li> </ul>	Holistic Central Precinct Strategy to be developed which includes staging strategies and commitment to ESD initiatives prior to detailed optioneering analysis and consultation with service authorities.
Risk of inadequate coordination between internal parties resulting inefficient designs, construction rework, design clashes, extended construction timeframes and disruption to the surrounding community. (i.e. multiple service connections where one may suffice).	<ul> <li>The delivery of the CPRP services while:</li> <li>Avoiding unnecessary construction rework</li> <li>The use of consolidated, efficient services routes for the whole precinct</li> <li>Maintaining the overall Central Precinct vision and project requirements.</li> </ul>	The development and production of a holistic utilities servicing strategy for CPRP to guide and coordinate the subsequent design and construction. The creation of a "single source of truth" for the existing and proposed utilities information that is easily accessible and contributed to by all CPRP designers/constructors.
<ul> <li>Design and/or construction of Central Precinct works that adversely affect key stakeholder assets leading to undesirable project outcomes including:</li> <li>Relocation of high-risk assets</li> <li>Delay to the construction program</li> <li>Redesign of Central Precinct elements</li> <li>Service Disruptions</li> <li>High-risk external stakeholder assets include:</li> <li>Telstra Tunnel</li> <li>Sydney Light Rail</li> <li>Sydney Water BOOS</li> </ul>	The delivery of Central Precinct without creating adverse impacts to the existing high-risk external stakeholder assets while achieving the overall Central Precinct vision and requirements. (Minimal disturbance of existing utility networks)	Ensure existing high-risk stakeholder items are retained and protected during the development of the Central Precinct. The provision of detailed survey information of high-risk items and collaborative stakeholder engagement for works near the assets. Central Precinct design elements adhere to stakeholder requirements throughout the design development. High-risk stakeholder assets to be assessed through a risk assessment.

Issue	Aspirations	Solutions
Relying on specific elements/areas to achieve Sustainability (ESD) targets. (i.e. the reliance on standard outcomes (WSUD or specific material) to achieve final efficiency ratings and not considering alternative potential opportunities elsewhere)	The design, construction and operation of the Central Precinct where all sustainability (ESD) targets are obtained.	The investigation into, and commitment to a wider range and/or non-standard ESD initiatives to achieve a broader path to achieve sustainability targets. Contngency of ESD initiatives and/or a holistic precinct wide approach to ensure sustainability targets are achieved/exceeded.

Appendix B – Evidence of consultation



# **Minutes and actions**

Project Name Central Precinct	Subject: Meeting on servicing options & Recycled Water opportunity with City Of Sydney
Chair:	Chris Gantt (Meeting date 10/08/21)
Attendees:	Ira Williams. Sydney Water Grant Macdonnell. Sydney Water Chris Gantt. Sydney Water Hugh Thornton. TfNSW Melanie Gostelow. Arcadis Gregory Ives. Arcadis David Andersen. City of Sydney
Apologies/absent:	N/A
Distribution date:	19/8/21
Distribution list:	All attendees
Next meeting date:	ТВС

### Minutes (if required):

- Transport for NSW (TfNSW) is halfway through the SSP study for the site in question
- TfNSW Aspiration for the development is to not be dependent on Fossil Fuels. Recycled Water (RW) forms part of this aspiration through a circular water economy
- City of Sydney (COS) will take RW from the George Street Pipeline to the parks within their portfolio first
- At this current stage the RW pipeline in George Street is not operational and is yet to be commissioned
- No current facility asset has been identified to supply the RW pipeline in George Street
- COS & Sydney Water are currently investigating options to supply RW to the George Street pipeline in line with the collaboration commitment under the signed MOU
- Sydney Water cannot forward fund Infrastructure and cannot take development risk.
- TfNSW may investigate supply of RW via a plant within their proposed development. This will dependent on the size allocation in the subsequent development



- At this current stage TfNSW is not in a position to negotiate commercial terms around RW
- TfNSW may state that they do not wish to supply RW water. COS & Sydney Water will investigate alternative supply options in this instance
- Confidentiality deeds may be required moving forward

## **Action items:**

No	Action item(s)	Responsibility	Due date
1	TfNSW to continue engagement with Sydney Water over availability of space for a RW distribution unit within proposed development	TfNSW/Sydney Water	ТВС
2	COS & Sydney Water to further investigate the supply of RW to the George Street Pipeline	COS/Sydney Water	TBC
3	Confidentiality deeds may be required as the collaboration increases	Sydney Water/TfNSW	ТВС



Case Number: 181844

19 December 2019

ARCADIS c/- MGP BUILDING & INFRASTRUCTURE SERVICE PL

#### FEASIBILITY LETTER

Developer:	ARCADIS
Your reference:	2019-0422
Development:	Lot 2 DP819366 RAILWAY SQ, Haymarket
Development Description:	Potential retail/commercial development over the existing Central Station rail lines from Cleveland Street north to Eddy Ave
Your application date:	5 November 2019

Note: Level 2 water restrictions are in place from December 10, which limits how and when water can be used outdoors. This can impact you and your contractors in the activities they need to undertake for this proposal.

Using water to suppress dust is only permitted via a permit when no other water source is available.

You/your contractors will need to apply for an exemption permit to use water for most outdoor uses including:

- Cleaning equipment and the exterior of **new** buildings
- Drilling and boring, and
- Batching concrete on-site

Fines for deliberate breaches of restriction rules are in place.

For more information on the restrictions and for applying for an exemption, visit our web site at https://www.sydneywater.com.au/SW/water-the-environment/what-we-re-doing/ water-restrictions/level-2-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 and check our web site for up to date restriction information.

#### **Dear Applicant**

This Feasibility Letter (Letter) is a guide only. It provides general information about what Sydney Water's requirements could be if you applied to us for a Section 73 Certificate (Certificate) for your proposed development. **The information is accurate at today's date only.** 

If you obtain development consent for that development from your consent authority (this is usually your local Council) they will require you to apply to us for a Section 73 Certificate. You will need to submit a new application (and pay another application fee) to us for that Certificate by using your current or another Water Servicing Coordinator (Coordinator).

Sydney Water will then send you either a:

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

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

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

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

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

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

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

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

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

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

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

#### 3. Developer Works Deed

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

#### 4. Water and Sewer Works

#### 4.1 Water

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

Sydney Water has assessed your application and found that:

The proposed development is within the Centennial Park Water Supply Zone and represents a significant increase in demand within the system. The developer must engage a hydraulic engineer and conduct a detailed planning study to determine required augmentations and proposed connection points. This needs to be provided to Sydney Water for review. Service location and potholing of existing water mains to be undertaken accurately identify the location of existing assets.

#### 4.2 **Sewer**

Your development must have a sewer main that is the right size and can be used for connection. That sewer must also have a connection point within your development's boundaries.

Sydney Water has assessed your application and found that:

The proposed development is within the Sydney West SCAMP which is a part of the Bondi Wastewater System and represents a significant increase in demand within the system. The proposed development sits above three trunk sewer mains, DN450 gravity main, a DN400 gravity main and a 1371x1676 gravity main. Sydney Water does not support connections to trunk mains.

The developer must engage a hydraulic engineer and conduct a detailed planning study (including a wastewater catchment plan and flow schedule) to determine required augmentations and proposed connection points. This will need to be submitted to Sydney Water for review.

Service location and potholing of existing sewer mains to be undertaken accurately identify the location of existing assets.

#### 4.3 Stormwater

#### Building over or adjacent to stormwater assets

The proposed development has impact on Sydney Water's major stormwater pipe/ channels which are draining through the proposed development site.

Without precisely knowing the exact position of the Sydney Water's stormwater pipe/ channel and its relation to the proposed building and permanent structures, Sydney Water is not in a position to provide firm requirements for the proposed development. However, the following can be used as general Sydney Water's requirements for building over and adjacent to Sydney Water's stormwater assets:

No building or permanent structure is to be proposed over the stormwater channel / pipe or within **1m** from the outside wall of the stormwater asset or within Sydney Water easement whichever is larger. Permanent structures include (but are not limited to) basement car park, hanging balcony, roof eves, hanging stairs, stormwater pits, stormwater pipes, elevated driveway, basement access or similar structures. This clearance requirements would apply for unlimited depth and height.

The applicant is required to submit the elevation drawings with the stormwater channel/ pipe, to ensure that the proposed buildings and permanent structures are 1m away from the outside face of the stormwater channel and away from the Sydney Water easement.

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#### Locating the Exact Position of the Stormwater Channel

Exact position of the stormwater pipe/ channel is to be identified using the pot holes or any other acceptable survey method. Location of the easement position should not be used as location of the stormwater channel.

#### **Dilapidation Survey Report**

The proponent is required to undertake a dilapidation survey report / CCTV report of the Sydney Water's stormwater channel/ pipe prior to commencement of any work on the site. This report should extent at least 10m upstream and downstream from the property boundary. A copy of this dilapidation report is to be provided to Sydney Water.

This dilapidation survey report/ CCTV Report is to be carried out again upon completion of the all construction work and need to provide an assessment report, confirming that no damage has occurred to Sydney Water's stormwater assets during construction.

#### Stormwater connections to Sydney Water's Stormwater Channel

Design of the stormwater work on Sydney Water's stormwater assets are to be carried out by Sydney Water accredited providers for stormwater design. Construction of the stormwater work is to be carried out by Sydney Water accredited providers for construction for sewer and water and based on their capability { S1 (up to 300mm connection), W1 (up to 375mm connection), S2, W2 & W3 for any size of connection}.

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

- For pipes with a diameter 300mm or more the connection angle is to be no greater than 30 degrees in the direction of the channel flow.
- Proposed connections that are 300mm or more in diameter require a qualified structural engineer to design the connection. A structural engineer's certificate is to be attached with the design drawings.
- Proposed connections that are less than 300mm in diameter can use Sydney Water's standard drawings to design the connection drawings.

It is your stormwater designer's responsibility to determine the location of the connection point. Sydney Water will not nominate any preferred point of connection.

#### Flood impact assessment (FIA)

The applicant is required to submit a Flood Impact Assessment report based on a current flood model for the proposed development and identify flood hazards. The FIA must:

• demonstrate that there are no potential adverse flood impacts offsite due to the

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development; and

• evaluate the impacts of flooding on the proposed development.

#### **On-site Stormwater Detention (OSD)**

On Site Detention is not required for any catchment which drains to Sydney Water's stormwater pipe which is located under the Devonshire Street Pedestrian Subway.

On Site Detention is required for all other areas, except the area which drains to Sydney Water's stormwater pipe under Devonshire Street Pedestrian Subway. To determine the required On Site Detention and Permissible Site Discharge (PSD), the following site specific information is required to be submitted:

- Total site area (m<sup>2</sup>)
- Existing pre-development impervious area (m<sup>2</sup>)
- Proposed post-development impervious area (m<sup>2</sup>)

If a percentage of the site area does not drain into the OSD system, the rate of discharge from the OSD storage must be restricted so that the total flow from the site (from the OSD storage and free runoff) does not exceed the specified PSD.

On Site Detention is to be designed according to the Sydney Water's values and the details of the On Site Detention are to be submitted to Sydney Water for review and approval.

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

#### Positive Covenant for On-site Stormwater detention

You are required to create a Positive Covenant over the On-site Stormwater Detention. The Positive Covenant must follow the rules laid out in Sydney Water's Policy and Guidelines on the "Documentation Standards for On-site stormwater detention guide".

You should contact Sydney Water's Group Property to get the specific details via email acquisitions@sydneywater.com.au or Ph: 02 8849 6223 or 02 8849 4532

#### **Discharged Stormwater Quality Targets**

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

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

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

#### https://stormwater.flowmatters.com.au/\_/#/

#### **Flood Study**

City of Sydney has carried out flood studies for these area and copies of these flood studies are available on their website.

#### Sydney Water's Stormwater and Sewer

All stormwater and sewer mains owned by Sydney Water are not interconnected at the vicinity of this area. They are dedicated stormwater line and dedicated sewer line.

Service location and potholing of existing storm water and sewer mains to be undertaken accurately identify the location of existing assets.

#### Work As Constructed Drawings

You need to make a formal application through "Sydney Water Tap-In" in order to obtain Work As Constructed drawings for Sydney Water assets. If these drawings are available, you will be advised accordingly and the required fees that need to be paid prior to issue the Work As Constructed drawings.

#### 5. Ancillary Matters

#### 5.1 Asset adjustments

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

#### 5.2 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use Sydney Water's **Permission to Enter** 

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form(s) for this. You can get copies of these forms from your Coordinator or the Sydney Water website. Your Coordinator can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

#### 6. Approval of your Building Plans

You must have your building plans approved before the Certificate can be issued. Building construction work MUST NOT commence until Sydney Water has granted approval. Approval is needed because construction/building works may affect Sydney Water's assets (e.g. water and sewer mains).

Your Coordinator can tell you about the approval process including:

- Your provision, if required, of a "Services Protection Report" (also known as a "pegout"). This is needed to check whether the building and engineering plans show accurately where Sydney Water's assets are located in relation to your proposed building work. Your Coordinator will then either approve the plans or make requirements to protect those assets before approving the plans;
- Possible requirements;
- Costs; and
- Timeframes.

You can also find information about this process (including technical specifications) if you either:

- visit www.sydneywater.com.au > Plumbing, building & developing > Building > Building over or next to assets. Here you can find Sydney Water's *Technical guidelines - Building* over and adjacent to pipe assets; or
- call 13 20 92.

#### Notes:

- The Certificate will not be issued until the plans have been approved and, if required, Sydney Water's assets are altered or deviated;
- You can only remove, deviate or replace any of Sydney Water's pipes using temporary pipework if you have written approval from Sydney Water's Urban Growth Business. You must engage your Coordinator to arrange this approval; and
- You must obtain our written approval before you do any work on Sydney Water's systems. Sydney Water will take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the *Sydney Water Act 1994*.
- Separate out of scope applications are to be submit for water, waste water and stormwater assets.

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#### 7. Special Requirements

#### OTHER THINGS YOU MAY NEED TO DO

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

#### **Disused Sewerage Service Sealing**

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

#### **Soffit Requirements**

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

# Requirements for Business Customers for Commercial and Industrial Property Developments

If this property is to be developed for Industrial or Commercial operations, it may need to meet the following requirements:

#### **Trade Wastewater Requirements**

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

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

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

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

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

#### **Backflow Prevention Requirements**

Backflow is when there is unintentional flow of water in the wrong direction from a potentially

polluted source into the drinking water supply.

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

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

Before you install a backflow prevention device:

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

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

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

#### Water Efficiency Recommendations

Water is our most precious resource and every customer can play a role in its conservation. By working together with Sydney Water, business customers are able to reduce their water consumption. This will help your business save money, improve productivity and protect the environment.

Some water efficiency measures that can be easily implemented in your business are:

- Install water efficiency fixtures to help increase your water efficiency, refer to WELS (Water Efficiency Labelling and Standards (WELS) Scheme, http:// www.waterrating.gov.au/
- Consider installing rainwater tanks to capture rainwater runoff, and reusing it, where cost effective. Refer to http://www.sydneywater.com.au/Water4Life/InYourBusiness/ RWTCalculator.cfm
- Install water-monitoring devices on your meter to identify water usage patterns and leaks.
- Develop a water efficiency plan for your business.

It is cheaper to install water efficiency appliances while you are developing than retrofitting them later.

#### **Contingency Plan Recommendations**

Under Sydney Water's customer contract Sydney Water aims to provide Business Customers with a continuous supply of clean water at a minimum pressure of 15meters head at the main tap. This is equivalent to 146.8kpa or 21.29psi to meet reasonable business usage needs.

Sometimes Sydney Water may need to interrupt, postpone or limit the supply of water services to your property for maintenance or other reasons. These interruptions can be planned or unplanned.

Water supply is critical to some businesses and Sydney Water will treat vulnerable customers, such as hospitals, as a high priority.

Have you thought about a **contingency plan** for your business? Your Business Customer Representative will help you to develop a plan that is tailored to your business and minimises productivity losses in the event of a water service disruption.

For further information please visit the Sydney Water website at: http:// www.sydneywater.com.au/OurSystemsandOperations/TradeWaste/ or contact Business Customer Services on **1300 985 227** or businesscustomers@sydneywater.com.au

#### **Fire Fighting**

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

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

#### Large Water Service Connection

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

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

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

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You will have to pay an application fee.

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

#### **Disused Water Service Sealing**

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

#### Other fees and requirements

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

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

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

END



# **Minutes and actions**

Project Name Central Precinct	Subject: Meeting on servicing & RW opportunity
Chair:	Grant Macdonnell (meeting 5/8/21)
Attendees:	Cassie Perente. Sydney Water
	Grant Macdonnell. Sydney Water
	Raju Mangalam. Sydney Water
	Subha Balasubramanian. Sydney Water (Planning Partner)
	Lisa Curry. Sydney Water (Planning Partner)
	Ray Parcel. Sydney Water
	Hugh Thornton. TFNSW
	Michael Bigen. TFNSW
	Bryce McCarthy. TFNSW
	Melanie Gostelow. Arcadis
	Gregory Ives. Arcadis
	Paul Stroller. Atelienten
Apologies/absent:	Ira Williams
Distribution date:	16/8/21
Distribution list:	All attendees
Next meeting date:	ТВС

## Minutes (if required):

- Loading calculations in Arcadis reports to be reviewed again as job progresses
- The demands in the feasibility calculations after review remain the same at this current stage



- Flooding reports completed after review of Councils hydraulic flood models
- Arcadis requested how would mitigation tactics as part of the development be adopted to mitigate flooding impacts
- Keen to get a capacity check on the existing Storm Water Infrastructure
- Early indication of the Storm Water requiring upsizing to cater for current known demand
- TFNSW provided clarity around scope of development. Development currently under consideration in discussion will cantilever over country rail link via a slab and build vertically from this point.
- The proposed development over the station is an un-solicited proposal by TfNSW. TfNSW is currently
  preparing an SSD application to DPIE requesting to alter the current planning instruments to progress
  the development.
- Block C currently being rezoned by TFNSW and is not a part of this conversation
- Discussion around if RW plant possible at Central Station
- Discussion around the space allowance in development to enable RW distribution centre
- Oviform Trunk sewer reports to be supplied if available
- Question raised to adjust 1371 trunk asset. This would not be considered.

### **Action items:**

No	Action item(s)	Responsibility	Due date
1	TFNSW to consider commercial agreements with Sydney Water to provide service checks, system capacity's, and further collaboration commitments. SW to provide more information on this	Sydney Water	TBC
2	SW to investigate servicing options for the Central precinct development with particular consideration to current servicing capacity in the context of adjacent developments in the sub region, i.e Block A, B & C, Pyrmont and the Bays.	Sydney Water	TBC
4	Supply conditions assessment reports around current Oviform 1371mm trunk asset if available	Sydney Water	TBC
5	TFNSW to provide details around suitable space for RW distribution centre	TFNSW	ТВС
6	TfNSW to confirm utility loads, considering recycled water and stormwater harvesting	TFNSW	TBC



## MEMO

Date	16/07/2021
То	Hugh Thornton (TfNSW)
From	Melanie Gostelow (Arcadis)
Copy to	Greg Ives (Arcadis), Max Hough (Arcadis)
Subject	Sydney Water - Preliminary Utility Loads

The attached information provides the preliminary estimates of the water and sewer demand associated with the Central Precinct Renewal Project.

These estimates were calculated in 2019 and have been based on a gross floor area (GFA) and building use breakdown provided by the architects Architectus at the time. These demands are high-level estimates and subject to change as the design develops.

These estimates are suitable for issue to Sydney Water to assist in their strategic planning of the Redfern Waterloo transport catchment. These estimates are for the proposed Central Precinct building footprints outlined in yellow (labelled A1 to C3) which are located above the rail corridor, along Prince Alfred Park to the east and Regent Street to the west.

These estimates do not include any proposed redevelopments within the Western Gateway sub-precinct located on Lee St (Dexus Fraser, Atlassian and Toga). However, it is expected that the proposed Western Gateway redevelopments have independently engaged with Sydney Water for consultation.

We anticipate reissuing revised demand estimates to Sydney Water in late 2021 to align with the State Significant Precinct master plan development.

Note also that these demand estimates have been issued previously to TfNSW in the 2019 Public Utilities TAN (CPRP-ADAP-CEN-CV-NTS-000005 Public Utilities), and to Sydney Water in the 2019 Feasibility Application (Case Number: 181844).







## **MINUTES**

Issue date	Tuesday, 29 October 2019
Issue to	Alex Raeside (Jemena), Neale Hilton (Jemena)
Issued by	Jeremy Hopson
Subject	Jemena Initial Consultation
Reference	CPRP-ADAP-CEN-CV-MIN-0000002
Client	TfNSW
Meeting date	Tuesday, 29 October 2019
Time	11A.M. – 12P.M.
Location	99 Walker Street, North Sydney, NSW 2060
Present	Alex Raeside (Jemena), Neale Hilton (Jemena), Greg Ives (Arcadis), Jeremy Hopson (Arcadis), Max Hough (Arcadis)
Copy to	John Merrick + Attendees

ITEM	COMMENTS	ACTION
1	Opening & IntroductionsAR – mainly involved with major connectionsGI – ran through project extents and status (the concept of developing above the rail lines and extents the station).	Note
2	Load Demands GI – tabled the total demands for Gas NH – Jemena do not want any assets in TfNSW land. Jemena would also want an above ground room for HP, so not in the basement.	Note
3	Supply Options \$6,000 per metre for HP gas \$400,000 for a regulator pit Equipment in regulator pit will need to be replaced every couple of years, so access is required, small streets work best.	Note
4	Option 1 Feed off 110mm Nylon from Harris Street to Regent Street, NH to assess regulator capacity at Regent Street. NH to assess regulator capacity at Regent Street. 22 500 MJ/hr is maximum. NH to confirm sizing of boundary regulator station.	NH
5	Option 2A Extend existing HP 1050 kPa gas main from O'Connor to Outram Street and to the site of Lee Street sidings.	Note
6	Option 2B	Note





## **MINUTES**

Issue date	Monday, 25 May 2020
Issue to	Lindsay Baker (TfNSW), Jonothan Clarke (Ausgrid), Melinda Rodriguez (Ausgrid)
Issued by	Melanie Gostelow (Arcadis)
Subject	Ausgrid Consultation – Formal Enquiry
Reference	CPRP-ADAP-CEN-CV-MIN-000004
Client	TfNSW
Meeting date	Wednesday, 13 May 2020
Time	11:00 AM
Location	Online Skype Meeting
Present	Lindsay Baker (TfNSW), Jonothan Clarke (Ausgrid), Melinda Rodriguez (Ausgrid), Greg Ives (Arcadis), Kakoli Das (Arcadis), Melanie Gostelow (Arcadis)
Copy to	John Merrick (Arcadis) + Attendees

	ITEM	COMMENTS	ACTION			
	1	<b>Open &amp; Introductions</b> JC – Purpose of the meeting is to get an overview of the development, potential staging of works, talk through the application and any scenarios that may want to be looked at. It is a significant step change in load for the area and will need to be discussed internally to see how it fits into Ausgrid network/development plans.	Note			
t	2	<ul> <li>Project Overview</li> <li>GI – Late 2019 when initially approaching Ausgrid Arcadis provided early planning information and total demand calcs.</li> <li>JC – Confirmed the 2019 information has been passed on and understands this was from discussion with Anthony Sindermann (Ausgrid).</li> <li>GI – Overall scale of the project is still similar to what was presented in 2019. The staging has further developed from late 2019.</li> <li>LB – Staging information shown during this meeting is <u>highly confidential</u>. This staging is still subject to the final business case and its early days in its development.</li> <li>JC – Mention of considering low, medium and high scenario to capture the variance that may occur as the planning and design progresses.</li> <li>LB – The project is going through a state significant planning process. The GFA will be locked in as it progresses giving more certainty around the load estimates.</li> </ul>	Note			
	3	Western Gateway LB – Atlassian and Dexus Fraser are approaching Ausgrid separately for their proposed developments located immediately west of the CPRP. These developments are part of the overall central precinct, but they are being	Note			
		their proposed developments located immediately west of the CPRP. These developments are part of the overall central precinct, but they are being				

	<ul> <li>delivered by separate private entities. Mid 2024 they are looking at coming online, which is earlier than the CPRP. CPRP is looking at commencing construction around 2025.</li> <li>KD – The maximum demand estimate CPRP have provided to Ausgrid previously (and moving forward) does <u>not</u> include the Atlassian or Dexus Fraser sites.</li> </ul>		
4       Ausgrid Enquiry – Required Information         JC – Ausgrid require the load estimate and a course overview of when the load will come online.         GI – CPRP can provide a maximum demand calculation for stages with an approximate timeframe for the loading in a spreadsheet.         LB – TfNSW to provide publicly available material from the strategic framework.			
5	<ul> <li>Ausgrid Enquiry – Progressing</li> <li>JC – Ausgrid will compile the information into a formal document for discussion with Ausgrid planners. Ausgrid will undertake planning studies to see how the development integrates with the area and look at options for servicing the load. Ausgrid will package and present the outcome as system planning advice. This document can then be refined and further validated as the planning and design progresses. By undertaking this work, the development will be within the Ausgrid planning system to be considered in the planning of works in the area.</li> <li>GI – Suggestion that it may be worthwhile meeting again prior to Ausgrid providing the formal response.</li> <li>JC – Ausgrid will inform if this is required. Typically the enquiry has a formal indicated timeframe of 12 weeks from when payment is made. Ausgrid will advise if this changes.</li> <li>LB – 12 week timeframe isn't a problem as we are early in the process.</li> <li>GI – CPRP have formally accepted the Ausgrid offer for the design related services. Waiting to receive the invoice for payment. Requested confirmation that the invoice been raised.</li> <li>JC – The invoices are mailed out, typically received around 10 days from when the offer has been accepted. Ausgrid start internally once the offer has been accepted. Ausgrid will follow up internally to confirm the invoice has been sent.</li> </ul>	JC	
6	Conclusion GI – CPRP will provide an updated load estimate over time considering the construction staging within 2 weeks of today. Information will be provided to MR. Arcadis may check in periodically to ensure it is progressing and answer any questions. JC – MR is commencing work on the response and Ausgrid will notify of any issues.	GI JC	

ITEM	COMMENTS	ACTION
	Provide new 160mm PE medium pressure to the site O'Connor to Outram Street to the site of Lee Street sidings.	
7	<b>Option 3</b> Junction of George and Pitt Street – Bring HP gas from Thomas Street through Quay Street and regulator pit and medium pressure to the site.	Note
8	<b>Next Steps</b> Once actions are closed out, project will progress to define the preferred connection option of the 3 options listed above.	Note



Address all relevant correspondence to: Major Customer Connections PO Box 4009 Sydney NSW 2001

E: majorconnections@ausgrid.com.au

14 October 2020

Ausgrid – Project Number: AN-20712

Mr Greg Ives Senior Technical Director

Arcadis Australia Pacific Pty Ltd Level 7, 199 Grey Street South Brisbane, QLD 4101

Email: greg.ives@arcadis.com

Dear Greg,

# Central Precinct Renewal Project – Central Rail Station, Haymarket – Power Supply of up to 47MVA - System Planning Advice

Further to your connection application dated 01 November 2019 and subsequent additional information, Ausgrid's has now completed a review of connection options and related network requirements to support the proposed development.

The key considerations and outcomes from this review are described below and will provide important information to assist with finalising electrical requirements for the site and the preparation of a detailed Design Information Package for any associated contestable works.

Ausgrid has investigated options for 'N-1' supply up to 47MVA at 33kV and 11kV supply voltage for the proposed Central Precinct Renewal Development, which is located near Central Rail Station.

A range of connection options have been considered and compared based on overall cost as well as general technical suitability and integration within our own network development plans for the area. Through this process, the alternative arrangements have been narrowed down to the following options:

Option 1 - 33kV supply from Surry Hills STS (not for further consideration) Option 2 - 11kV Triplex supply from Belmore Park ZS Option 3 - 11kV suburban supply from Campbell St and Surry Hills ZS

Ausgrid will enter the next phase upon the receipt of a formal selection of a supply option for your development. Selection of a suitable supply option for your facility will allow Ausgrid to commence

<sup>1</sup> ZS = Zone Substation

<sup>2</sup> STS = Subtransmission Substation

design level scoping of your supply requirements and further confirmations of supply option feasibility. This phase will result in the creation of a Design Information Package (DIP) for your proposed development.

Ausgrid's connection processes and related documents are available on the Ausgrid website www.ausgrid.com.au under "Connections".

The table below provides a preliminary program showing typical milestones and activities for establishing a connection upon receipt of the System Planning Advice.

Milestone or Activity	Coordinated By	Date / Duration
System Planning Advice	Ausgrid	12 weeks
Select preferred Connection Option	Customer	
Prepare Contestable Design Information	Ausgrid	16 weeks
Develop Contestable Design Package	Customer / ASP3	
Review and Certify Design Package (allow minimum 6 weeks per submission and at least 2 submissions)	Ausgrid / Customer	Subject to complexity
Prepare Negotiated Connection Offer and Construction / Commissioning Fee Estimates	Ausgrid / Customer	Up to 13 weeks
Construction, Audit & Compliance	Customer / ASP1 / Ausgrid	6 - 18 months
Testing and Commissioning	Ausgrid / Customer	12 weeks

#### Background

The areas surrounding the proposed development at Central Station, Haymarket are on the boundary between the Sydney CBD triplex and urban 11kV networks. As such, although the closest supply is from Belmore Park 132/11kV zone substation (ZS) or City South 132/11kV ZS, the existing supply is from Campbell Street 132/11kV ZS and Surry Hills 33/11kV ZS.

Figure 1 below depicts the location of the proposed development site.



Figure 1 –Site Location of the proposed Development

Figure 2 below depicts the location of the proposed development site in relation to existing Ausgrid substations.



Figure 2 - Indicative location of Central Precinct development site and Ausgrid assets

Ausgrid's Surry Hills 132/33kV STS is located approximately 1km away from the proposed development site. It should be able to provide 33kV supply to meet the permanent load requirements of 47MVA.

There are three potential 11kV supply points near the proposed connection: Belmore Park ZS, Campbell Street ZS and Surry Hills ZS. The City South ZS is not a potential option because does not have enough spare capacity or panels to supply the permanent load of 47MVA.

Belmore Park ZS is located less than 1km away. There are currently works under construction to transfer load. Once these works are completed, there will be adequate spare capacity available at Belmore Park ZS as well as available 11kV feeder panels.

Campbell Street ZS is located approximately 1.5km away. There are currently works under construction to transfer load. Once these works are completed, there will still be some spare capacity available at Campbell Street ZS but no spare panels. Potentially, network consolidation and minor augmentation can be carried out to make use of existing 11kV circuit breakers that are designed to be double-banked panels. Campbell Street ZS has provision for an additional transformer and 11kV switchgear which can be installed once there is no more spare capacity.

Surry Hills ZS is located approximately 1km away but on the opposite side of the railway to the majority of the proposed Central Precinct development. As such, any supply from Surry Hills ZS will require an under bore under the railway corridor which is likely to cost over \$1 million. There are currently works underway to replace the 11kV switchgear at Surry Hills ZS. Once these works are completed, there will be some spare capacity and panels. Potentially, network consolidation and minor augmentation can be carried out to make use of existing 11kV circuit breakers that are designed to be double-banked panels.

#### **Option 1 - 33kV Supply from Surry Hills STS for an Embedded Network**

The 33kV supply option as described below involves 33kV connections to Surry Hills 132/33kV STS to accommodate the initial loading requirements of at least 0.5MVA from 2025 as well as the ultimate proposed load of 47MVA by 2039.

This option considered a permanent 33kV option from Surry Hills STS to supply the proposed load of 47MVA with an N-1 supply security standard. This involves the installation of three new 33kV cables (subject to a rating assessment) between Surry Hills STS and the proposed Central Precinct site.

Surry Hills STS is located approximately 1.9km away from the proposed development site. It consists of four 33kV busbar sections. This option includes the establishment of three new 33kV feeder bays on different 33kV busbar sections to allow for the anticipated three 33kV feeder connections.

Based on a request for an embedded network it was considered that the new 33kV feeders will be connected and/or terminated to a privately owned 33kV customer substation located within the Central Precinct site. Figure 3 below depicts a high-level single line diagram which describes the connectivity between Surry Hills STS and the proposed Central Precinct development.



#### Surry Hills STS

Figure 3 – Indicative single line diagram between Surry Hills STS and Central Precinct development

The establishment of new 33kV feeders between Surry Hills STS and the proposed privatelyowned Central Precinct network would be delivered as contestable works.

Surry Hills STS and the Central Precinct site are on opposite sides of the Light Rail. As such, the establishment of new 33kV feeders between these two sites will require crossing the Light Rail.

All supplies to the proposed Central Precinct site were expected to operate normally closed at Surry Hills STS. It is Ausgrid's preference that the 33kV feeders should not be paralleled at the customer's end as it imposes limitations on Ausgrid to operate upstream network.

This option was included as it was requested by the customer, however Ausgrid makes the determination regarding the appropriate connection arrangement for developments within its network area and at this stage, this option is not suitable to proceed from Ausgrid's perspective.

#### **Option 2 – 11kV Triplex Supply from Belmore Park Zone Substation**

This option involves the installation of a 16-way conduit duct bank carrying 4 circuits from Belmore Park zone substation through Hay Street, Pitt Street and Ambulance Street to enter the site on its western frontage. Belmore Park zone substation is located approximately 300m north from the proposed development site.

This option will facilitate a 3 x 11kV feeders for an N-2 redundant supply (known as the Ausgrid City or Triplex network) throughout the Central Precinct site and aims to utilise a recently installed 20-Way duct bank under a light rail crossing at the intersection of Pitt St and Eddy Ave. Note there will be a second Light Rail crossing at the intersection Pitt and Hay St that may require an under bore, the cost of such an under bore could exceed \$1,000,000.

#### **Option 2 Planning Estimate**

Planning estimates are based on approximate Ausgrid standard costs (in FY21 dollars) for an assumed final arrangement and required works as given below.

The planning estimates below are only preliminary planning estimates and do not include any costs for easements or property acquisitions or privately-owned substation related costs.

The planning estimates have assumed that the most direct feeder routes are obtained, and where it is not possible these planning estimates may not be valid.

The installation of a CBD pit is typically around \$500,000 each. This estimate also contains non-contestable components for works within the zone substation.

OPTION 2 – 11kV Triplex supply from Belmore Park Zone Substation			
Dedicated Connection Assets	Need Date	Estimated Cost Range Real 20/21 (\$)	
Install 11kV feeders from Belmore Park Zone Substation	2025	\$6.57m – 7.07m	
Non-Contestable			
Terminate 11kV feeders at Belmore Park Zone Substation (includes protection and circuit breaker modification works)	2025	\$0.09m – 0.17m	
TOTAL		\$6.66m – 7.24m	

#### **Option 3 – 11kV Urban Supply from Campbell St ZS & Surry Hills ZS Substations**

This option offers a permanent 11kV supply with urban N-1 security standard. The option involves the installation of a 6-Way Duct bank carrying 5x300mm<sup>2</sup> Cu Triplex cables from Campbell St zone and a second 6-way Duct bank from Surry Hills zone carrying another 5x300mm<sup>2</sup> Cu Triplex cables.

The installation from Campbell St zone substation proposes to a cable route through Samuel St, Reservoir St, Mary St, Foveaux St, Elizabeth St and Randle St however it should be noted that this route is indicative only and is approximately 1050m in length. Note there is a possible Light Rail crossing at the intersection Randle and Devonshire St that may require an under bore, the cost of such an under bore could exceed \$1,000,000.

The installation from Surry Hills zone substation proposes a cable route through Belvoir St, Buckingham St and Rutland St. As previously stated, the proposed feeder route is indicative only and is approximate 830m in length.

The separate supplies ensure both Campbell St and Surry Hills zone substations can supply the Central Precinct site under firm in 'N' operating conditions and within emergency ratings under 'N-1' emergency contingency conditions.

#### **Option 3 Planning Estimate**

Planning estimates are based on approximate Ausgrid standard costs (in Real 2020/21 dollars) for an assumed final arrangement and required works as given below.

The planning estimates below are only preliminary planning estimates and do not include any costs for easements or property acquisitions or privately-owned substation related costs.

The planning estimates have assumed that the most direct feeder routes are obtained, and where it is not possible these planning estimates may not be valid.

OPTION 3 – 11kV urban supply from Campbell ZS & Surry Hills ZS Substations			
Dedicated Connection Assets	Need Date	Estimated Cost Range Real 20/21 (\$)	
Install 11kV feeders from Campbell St & Surry Hills ZS	2025	\$6.26m – 6.76m	
Non-Contestable			
Terminate 11kV feeders at Campbell St & Surry Hills Zone Substations (includes protection and circuit breaker modification works)	2025	\$0.09m – 0.17m	
TOTAL		\$6.35m – 6.93m	

#### 2.0 Funding Arrangements

Under Ausgrid's current connections policy, the connection applicant is required to fund all dedicated connection and customer premises works. Ausgrid will undertake all non-contestable network asset works and fund most of the non-contestable works, provided appropriate tariff and revenue security arrangements are in place to ensure that a reasonable return is earned on this investment. The connection applicant will be required to fund the works undertaken by Ausgrid to terminate 11kV cables at the zone substation.

#### 3.0 Responsibility for Costs and Contestability - General

Under current legislative arrangements in NSW, connection applicants are required to contribute to the cost of developing and establishing a connection. This may include costs for Ausgrid design related services and costs for Ausgrid connection related ancillary services, as well as responsibility for arranging and funding dedicated contestable connection works. For large load connections, this may also include costs for augmentation of upstream shared network assets.

Design and construction of dedicated extensions to the distribution network, or alterations to an existing connection are arranged and funded by connection applicants who are also permitted their choice of Accredited Service Providers (ASPs) following the normal contestability processes.

The fees to assess a Connection Application will be dependent on the chosen connection option and may vary based on the timing. The fees are required to cover the reasonable costs of developing a Connection Offer. The connection fees are estimated in accordance with Ausgrid's Connection Policy in accordance with the Australian Energy Regulator (AER) determined rates.

Further background and detailed information in relation to network connections, contestability and related topics as well as details of our Deemed Standard Connection Contract can be found on the Ausgrid website http://www.ausgrid.com.au under "Connections".

For any Ausgrid funded works, the proponent may be required to arrange a Guarantee of Minimum Revenue in favour of Ausgrid prior to commencement of any related work. This is to provide security if the facility does not achieve the necessary revenue for underpinning these augmentation works.

#### 4.0 Next Steps

To progress your application further, please select one of the supply options above and formally advise Ausgrid of your selection. On receipt of this advice, Ausgrid will prepare a Design Information Package to allow you to enter the technical review and design phase of the works. Please note that the outcomes described in the options above are highly dependent on the loads advised in your enquiry. Should your loads not be reflective of the actual installation proposed, a review of the above options may be advisable to avoid over investment in the proposed assets.

Major Connections Engineer Melida Rodriguez will be the Ausgrid contact for facilitating these connections and can be contacted directly on (02) 9477 8325.
After reviewing this information, it may be advisable to arrange a meeting with Ausgrid to discuss this response and to help address any immediate concerns. Accordingly, please do not hesitate to contact the undersigned should you wish to discuss any aspect of this information.

Yours sincerely,

K-5Sitl

Kevin Smith Manager – Major Customers Ausgrid

### Appendix

#### Option 1 - 33kV supply from Surry Hills STS - Fault Levels

Estimated and indicative fault levels (voltage factor – 1.1) are as follows:

			Fault Level (kA)			
Substation	Busbar	ЗРН	LLG		IG	
			Phase	Earth	EO	
Surry Hills STS	2211/			4.0	<u>.</u>	
(current configuration)	33kV	25.3	22.7	1.6	3.1	
Central Precinct <sup>1</sup>	0011/	00.0	10.0	4.5		
(current configuration)	33KV	20.2	18.3	1.5	3.0	
Surry Hills STS				4.0	<b>.</b>	
(after retirement of 928/3, 929/1)	33kV 26.4	23.7	1.6	3.1		
Central Precinct <sup>1</sup>						
(after retirement of 928/3, 929/1) 33kV		20.9	18.9	1.5	3.0	

Note: Fault level is calculated based on system **NORMAL** network configuration.

All 33kV equipment installed as part of this project should have a fault duty of at least 31.5kA for 1.0 sec, to align with Ausgrid's current standard contract specification. The earth fault levels at the Customer installation should be designed for future network fault levels to cater for any future developments at the Ausgrid network.

# Option 2 - 11kV Triplex supply from Belmore Park ZS and Option 3 - 11kV suburban supply from Campbell St and Surry Hills ZS - Fault Levels

		Fault Level (kA)			
Substation	Buchar	ЗРН	LLG		
Cubstation	Busbu		Phase	Earth	LG
Belmore Park zone (current configuration)	11kV A-B- C Groups	9.41	8.20	1.42	2.46
Belmore Park zone (current configuration)	11kV D-E- F Groups	9.45	8.27	1.41	2.47
Belmore Park zone (current configuration)	11kV G-H- J Groups	9.29	8.10	1.42	2.46

Estimated and indicative fault levels (voltage factor – 1.1) are as follows:

<sup>&</sup>lt;sup>1</sup> These fault levels assume that the 33kV feeders are NOT operated in parallel at the customer's end. If they are, the fault levels will be much closer to those at Surry Hills STS.

		Fault Level (kA)			
Substation	Busbar	ısbar 3PH	LLG		
			Phase	Earth	LG
Belmore Park zone (current configuration)	11kV K-L- M Groups	9.35	8.10	1.42	2.46
Campbell St zone	11kV Tx1	7.01	6.14	1.75	2.80
Campbell St zone	11kV Tx2	7.00	6.13	1.75	2.80
Surry Hills zone (after switchgear replacement)	11kV Tx1	7.73	7.96	8.55	8.12
Surry Hills zone (after switchgear replacement)	11kV Tx2	7.80	8.02	8.62	8.19
Surry Hills zone (after switchgear replacement)	11kV Tx3	7.47	7.68	8.24	7.83
Surry Hills zone (after switchgear replacement)	11kV Tx4	7.34	7.54	8.07	7.69

Note: Fault level is calculated based on system **NORMAL** network configuration.

All 11kV equipment installed as part of this project should have a fault duty of at least 20kA for 3.0 sec respectively, to align with Ausgrid's current standard contract specification. The earth fault levels at the Customer installation should be designed for future network fault levels to cater for any future developments at the Ausgrid network.



### **MINUTES**

Issue date	Thursday, 24 March 2022
Issue to	Kareena Prado, Jodie Lunn, Kenny D'Cruz
Issued by	Rhys Harvey
Subject	Central Precinct Renewal Project – Initial NBN Consultation
Reference	CPRP-ADAP-CEN-CV-MIN-000007
Client	Transport for NSW
Meeting date	Monday, 21 March 2022
Time	15:30
Location	Online
Present	Kareena Prado (NBN), Jodie Lunn (NBN), Kenny D'Cruz (NBN), Steve Austin (NBN), Greg Ives (Arcadis), Rhys Harvey (Arcadis)
Copy to	Melanie Gostelow (Arcadis), John Merrick (Arcadis), Hugh Thornton (TfNSW) + Attendees

ITEM	COMMENTS	ACTION
1	Introductions Greg Ives (GI) – Conducted introductions for Arcadis and outlined our role with TfNSW.	Note
	<b>Presentation</b> GI – Presented a short overview of the Central Precinct Renewal Project (CPRP) including the latest high level masterplan information and an explanation of the CPRP's "State significant Project's" (SSP) utilities requirements.	
2	GI – Explained the SSP process and the required engagement of stakeholders and utility providers. Key to the engagement is the confirmation of the ability to supply the CPRP and agree to working towards method of supply.	NIDNI
2	NBN confirmed the ability to provide CPRP connection to their telecommunication network. GI requested that NBN provide written confirmation they are aware of the project and are able to provide telecommunication supply to the CPRP for our records.	INDIN
	Agreement between NBN and Arcadis to continue discussions for the method of supply to CPRP in the future as the project develops.	
	GI – Provided an overview of the Masterplan GFA's usage and preliminary Staging.	

1

3	<b>Tech Central</b> Jodie Lunn (JL) – Mentioned that NBN have been in discussions with TfNSW in regard to "Tech Central". Rhys Harvey (RH) – To follow up internally for update and potentially arrange co-ordinated discussions with NBN.	RH
4	<ul> <li>Existing Network</li> <li>Kenny D'Cruz (KD) – Provided context around the existing NBN network.</li> <li>NBN currently utilise existing Telstra conduit networks in the area, providing fibre optic network within. It is unlikely that specific upgrades to the infrastructure will be required, and that augmentation works will most likely be the result of physical clashes of the CPRP development.</li> <li>If relocation works are required, there may be a potential need to provide additional conduits for future proofing the network.</li> <li>It is recommended to engage Telstra for an understanding of the existing network.</li> </ul>	Note
5	<ul> <li>NBN Supply</li> <li>JL – Discussed options for the supply of telecommunications to CPRP. JL highlighted NBN's preference to bring the network to an accessible point just within the site boundary and distribute an individual optic fibre to each building. It was recognised that due to the nature of the CPRP over station deck, a common communications room may be required on the deck in lieu of a location near the boundary.</li> <li>It is not expected that a significant number of fibre optic cables will be required to service the CPRP. Each building is expected to have an independent comms room and fibre optic cable.</li> <li>For NBN to provide further guidance around supply to CPRP, building GFA schedules and project staging information is required. It was highlighted that staging information will be critical to the rollout and supply of telecommunications.</li> <li>KD – Highlighted that an email previously issued to TfNSW may be relevant to Arcadis and CPRP. KD has agreed to forward email to RH/GI</li> </ul>	NBN - KD
0	<b>Conclusion</b> Rhys Harvey (RH) – To provide meeting minutes to all.	RH
•	NBN to highlight further steps, noting the early phase of the CPRP.	NBN



nbn-Confidential: Commercial

4<sup>th</sup> April 2022

Rhys Harvey Arcadis Level 16/580 George Street, Sydney NSW 2000

Dear Rhys,

### **Response to Central Precinct Renewal Project NBN Feasibility Application**

Thank you for the opportunity to prepare a feasibility assessment for the delivery of nbn<sup>™</sup> broadband access network infrastructure at Central Precinct Renewal Project

**nbn** will be able to service Central Precinct Renewal Project with Fibre to the Premises by the indicative development timeframes.

Central Railway is currently within our Fixed Line Network – we anticipate no backhaul costs to service the estimated 2000 mix of residential, commercial space and retail space with the capacity to cater for residential services as well as enterprise grade 1Gbps ethernet services

I can confirm that **nbn** will service this developments via our New Development program, subject to a Master Developer Agreement being in place prior to development commencing

Yours sincerely

Kareena Prado Senior Account Manager (NSW/ACT) – New Developments M +61 428 537 208 | E kareenaprado@nbnco.com.au 100 Mount Street, North Sydney NSW 2060 Cammeraygal Country



## **MINUTES**

Issue date	Tuesday, 19 April 2022
Issue to	Attendees
Issued by	Melanie Gostelow
Subject	Central Precinct SSP – City of Sydney Consultation – Stormwater & Utilities
Reference	CPRP-ADAP-CEN-CV-MIN-000009
Client	TfNSW
Meeting date	Monday, 4 April 2022
Time	02:00 PM
Location	Online
Present	David Andersen (CoS), Steve Audet (CoS), James Dirickx-Jones (CoS), Stuart McTaggart (CoS), Hugh Thornton (TfNSW), Melanie Gostelow (Arcadis), Rhys Harvey (Arcadis), Greg Ives (Arcadis).
Copy to	Colin Sargent (TfNSW), John Merrick (Arcadis) + Attendees

ITEM	COMMENTS	ACTION
1	IntroductionsMG - Meeting to discuss Central Precinct Renewal currently at the StateSignificant Precinct (SSP) Study phase, specifically stormwater, flooding and utilities. Introductions, Melanie Gostelow, Stormwater and Flooding lead and overseeing other Arcadis disciplines.GI – Greg Ives, Senior Technical Director in Urban Development at Arcadis. Civil lead for the project.RH – Principal Civil Engineer assisting Greg and Mel on SSP.	Note
2	Central Precinct Overview MG – Consultation objectives, Arcadis has spoken with Council earlier in 2019 and 2020 in relation to Stormwater and Flooding with Shah Alam (CoS), keen to give an update on where the project is at with the SSP, seek feedback and any updates from Council. Brief overview of the Central Precinct with masterplan images. Scale, large extent from Goulburn to Cleveland Street with several sub-precincts. Masterplan has been developed to show a vision of what is possible. SSP is part of the planning approval process, we are not seeking approval of the masterplan or a specific design. Providing input into the planning framework to ensure future developments meet the aspirations of the precinct. Over-station deck is a key feature of the development. Looking at over-station development with high rises above a portion of the rail corridor as well as parcels of land surrounding the rail corridor.	Note

ITEM	COMMENTS	ACTION
3	<ul> <li>Stormwater</li> <li>MG – Significant amount of flood modelling work has been completed to date, seeking feedback on. Stitched together two Council flood models, refined and updated details to better understanding existing flood behaviour around the site, to avoid future flood impacts.</li> <li>Developed a high-level stormwater management strategy for the precinct. Aims to maintain the integrity of the stormwater design moving forward to ensure the best practice principles are included. Also driving for an aspirational precinct capitalising on opportunities given the scale of the precinct, issues such as water quality treatment to benefit the downstream.</li> <li>Have consulted with Sydney Water. Large trunk stormwater and sewer lines cross the site. Generally stormwater flows east to north-west.</li> <li>Flood modelling report provides technical detail for Council and future flood modellers, including comparisons with Council flood maps. Flood mapping provided, ponding in the rail corridor and overland flow along road ways as expected. As Central Precinct is building above the rail corridor, this flood storage is maintained. Example of refinement, the Goods Line Tunnel draining overland flows wasn't identified in Council flood studies.</li> <li>Flood modelling for the existing conditions but also a representation of the proposed design. Aim for the flood model to continue being refined and used as a tool as the design progresses, not as an end of line assessment. Impact mapping of proposed development, not showing broad scale major impacts, instead looking at worsening of existing flooding. Through the design process further refinements can be made to reduce and mitigate these impacts.</li> <li>Continue working with Council and Sydney Water to ensure assets aren't impacted and any required mitigation measures are identified early in the design process.</li> <li>Gl – Principals of water quality aim to exceed normal practice. Will be looking at passive irrigation and treating prior to discharge. Detentio</li></ul>	Note

ITEM	COMMENTS	ACTION
4	<ul> <li>Utilities</li> <li>GI – Previous Sydney Water discussion with Council (David Andersen) regarding recycled water. The SSP report will recommend continued discussions with Council and Sydney Water on the status and feasibility of the George Street recycled water pipeline. '</li> <li>RH – Project has a strong focus on sustainability and resilience. Consultation with Sydney Water, Ausgrid, NBN and Jemena has occurred. We have confirmed connections to all networks and working through details of demand impacts and strategies for connections. Gas is being eliminated.</li> <li>Investigating all opportunities including the recycled water main. Seek confirmation on the current status of the George St recycled water main.</li> <li>DA – Correct, it is constructed but not active.</li> <li>RH – SSP study requirement in relation to guidance documents. Do any documents exist for the recycled water main?</li> <li>DA – Not currently, work in progress.</li> <li>MG – Any other utility providers that Council is having discussions with in terms of big scale opportunities?</li> <li>DA – In the water space this is under a market process at the moment so we can't comment. Onsite electrical generation being looked at?</li> <li>GI – Total demand calculations have been taken to Ausgrid, who have confirmed they can service the site subject to ongoing negotiations with several options to investigate.</li> <li>RH – Onsite electrical generation, solar generally limited to roof area. For Central Precinct we are looking at new technologies such as on the façade.</li> <li>HT – At this stage covering sustainability objectives with green star commitments rather than more detailed commitments.</li> <li>GI – May struggle to find enough space for solar to provide a significant generation.</li> </ul>	Note
5	<ul> <li>Additional Stormwater Questions</li> <li>SM – Provided information suggested the concept drainage plan was still to come. Is there intent for additional detail to be provided in the final version of the reporting?</li> <li>MG – As the drainage design progresses further, more information will become available. At this stage for the SSP submission it will remain at a high level.</li> <li>HT – Masterplan being included is indicative only. Showing the planning rules being proposed can met certain objectives. Further design work at this stage would be redundant.</li> <li>SM – Intent is to meet and exceed water quality targets. What work has been done to confirm spatially the targets can be met given the constraints of the masterplan. Is green space sufficient?</li> <li>GI – In addition to the green space we would look at proprietary products.</li> <li>MG – Recommending a detailed study is done upfront to identify what constraints and opportunities there are across the different sub-precinct. Some sub-precincts may be able to over deliver, others may struggle to deliver. Report also discusses priorities for stormwater management which vary.</li> </ul>	Note

ITEM	COMMENTS	ACTION
	SM – Understand that is the Integrated Water Cycle Management Plan. How does this fit into the overall planning controls.	
	MG – Working on this with the planners who are working on ensuring the discipline recommendations are adequately reflected in the design guide and planning framework.	
	GI – Flood model, does Council have a process for reviewing the flood model?	
	SM – Reviewed the flood model report and the refinements seem to make sense. At this stage we may not get more involved in check it, may need to engage someone to do this.	
	GI – Sydney Water we expect to also be interested in this.	
	SA – The flood model needs to be adopted and prepared without agenda. Not aiming for a certain outcome.	
	MG – When it comes to reviewing the model in the future, if Council has checklist items they would like provided, more than happy to include those in our work sooner rather than later. Meeting Council expectations, efficiency and consistency. Keen to support Councils review and assessment process.	
	HT – Consultation presentation not available to be shared currently.	
	GI – Appreciate meeting, happy to answer questions and keen to keep the conversation going.	
	HT – Further questions please email Hugh Thornton direct.	





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