

Burwood North Precinct Masterplan

Utilities Study

July 2023

Infrastructure Servicing Strategy

Acknowledgment of Country

We recognise the Wangal People of the Eora Nation as the Traditional Custodians of this land that is being masterplanned. We respect their enduring cultural and spiritual connections to the land and waters, and celebrate their knowledge, kinship and values.

We acknowledge that these connections, to the land and waters, have existed for millennia and will continue into the future. We respect the Elders who have gone before, together with those of today for their guidance on our shared journey.

We recognise that we are, and always will be, on Aboriginal land.

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Executive summary

Mott MacDonald has been engaged by Cox Architecture to develop an infrastructure servicing assessment for the Burwood North Precinct Masterplan. This assessment will support the delivery of this site as it will identify opportunities, constraints, and risks related to civil engineering and services infrastructure. The scope of this report summarises existing utility infrastructure.

The Burwood North Precinct is located west of the Sydney CBD and is within the Municipality of Burwood Local Government Area and City of Canada Bay Local Government Area (LGA).

Services

The site is currently serviced through the following means:

- **Potable Water:** Potable water is provided by Sydney Water from the Potts Hill Water Delivery System;
- **Sewer:** Wastewater facilities are provided by Sydney Water, which is processed through the Malabar Wastewater Treatment Plant;
- **Electrical:** Electrical supply is provided by Ausgrid;
- **Gas:** Gas servicing is provided by Jemena Gas; and
- **Telecommunications:** Multiple telecommunications providers service the site including Broadband, LBNCo, NBN, OptiComm, Optus, Telstra, TPG, Verizon, and Vocus.

Servicing Constraints

The main servicing constraints are:

- **Potable Water:** The site is well serviced from trunk assets on Parramatta Road, but local reticulation services may require amplification as a result of the proposed development uplift;
- **Sewer:** The site is well serviced from trunk assets on Parramatta and Neich Road, but local reticulation services may require amplification as a result of the proposed development uplift, additionally the reticulation network predominately runs under low density residential lots and may need to be relocated to the street network as a part of any change in building form;
- **Electrical:** It is likely that new feeder cables from the Burwood Zone substation will be required when existing LV distribution is at capacity. Additionally existing overhead power may need to be undergrounded;
- **Gas:** While there are existing gas services to a large proportion of the site, consideration should be given to a "zero-gas" precinct to reduce use of non-renewable resources; and
- **Telecommunications:** No servicing constraints based on anticipated land uses however should this change and high use development (e.g., data centre, research, or university) then potential infrastructure upgrades may be required.

Although the outcomes of this assessment are subject to results of feasibility applications, it generally appears that there are mains available to service the site.

Additional Constraints

There are also other utility assets within close proximity to the site that may affect the development of this site. These assets are listed below:

- **Transport for NSW:** There are assets located at the intersection of Parramatta Rd and Broughton St as well as at the intersection of Shaftesbury Rd and Wilga St. There are also assets along Shaftesbury Rd, Wilga St, Burwood Rd, and Park Ave; and
- **Sydney Trains Central:** There are assets located along Rowley St and Wilga St.

1 Introduction

1.1 Background

Burwood Council is preparing an updated masterplan and supporting studies for the Burwood North Precinct, building upon the work already undertaken as part of the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS). The masterplan seeks to capture the opportunity afforded by a new metro station at Burwood North on the Sydney Metro West network.

The masterplan strives to deliver an outcome that is feasible, maximises public benefit and delivers high quality public domain, open spaces, and community infrastructure. The masterplan articulates a cohesive vision for Burwood North that will underpin the growth and development of the precinct as a benchmark for sustainable urban renewal.

The masterplan is the result of a collaborative process that has been undertaken between Burwood Council, a wide range of government, institutional and community stakeholders, and the project's consultant team.

An Implementation Plan will also be prepared that outlines the recommended planning controls, policies, and infrastructure necessary to enable the successful delivery of the masterplan. The recommendations may inform amendments to the Burwood Local Environmental Plan 2012 (LEP) and Burwood Development Control Plan 2012 (DCP).

1.2 Scope of Works

Mott MacDonald has been engaged to identify existing opportunities, constraints, and risks associated with civil engineering and services infrastructure to support the delivery of the masterplan.

To assist in the preparation of the masterplan, Mott MacDonald have undertaken the following tasks:

- Undertaken a comprehensive services search, DBYD, and identified the existing service infrastructure in the vicinity of the site;
- Coordinated with the relevant service providers to determine the infrastructure requirements for the proposed masterplan;
- Assessed the existing capacity and any planned upgrades; and
- Mapped the existing services, identifying key infrastructure.

1.3 Purpose of Report

The purpose of this report is to identify the existing servicing infrastructure and identify requirements to service the Burwood North Precinct Masterplan. These requirements include:

- Identify the existing situation, including the constraints, opportunities, key issues, and existing network capacity;
- Assess the capacity of the relevant service infrastructure networks to service the site;
- Assess the implications of any proposed land use for local infrastructure and service delivery; and
- Inform and support the preparation of the proposed planning framework including any recommended planning controls of DCP / Design Guideline.

To accommodate these requirements, this report will cover the following:

- Existing servicing strategies;
- Key constraints and opportunities; and
- Staging recommendations.

1.4 Site Context

The proposed Burwood North Precinct Masterplan site is primarily located in Burwood, with the north portion of the site being located in Canada Bay. It is bounded by the following roads:

- **North:** Broughton St, Burton St, Loftus St, Parramatta Rd ;
- **East:** Shaftesbury Rd;
- **South:** Wilga St, Burwood Rd, Comer St, Rowley St; and
- **West:** Grantham St.

The extents of the site are shown in the figure below:

Figure 1 Site Extents



The site is 12.9km west of the Sydney CBD and is located within both the Burwood Municipality LGA and the City of Canada Bay LGA.

2 Information Gathering

2.1 Gathering Existing Utility Information

The existing utilities assessment is primarily based on information received as a result of a Before You Dig Australia (BYDA) search. The BYDA request identified multiple services as outlined in the table below. The services information has been consolidated and displayed on numerous plans which can be found throughout the report.

The details shown on the plans should be considered as indicative only as the original BYDA information is not based on detailed survey data.

Table 1 Summary of Existing Services

Authority Name	Phone	Utility Type
Municipality of Burwood	(02) 4951 0899	Council/Shire
City of Canada Bay	(02) 9911 6339	Council/Shire
Ausgrid	(02) 4951 0899	Electricity
Jemena	1300 880 906	Gas
Broadband	(03) 5165 0073	Telecommunications
LBNCo	1300 797 027	Telecommunications
NBN	1800 626 329	Telecommunications
OptiComm	1300 743 462	Telecommunications
Optus	1800 505 777	Telecommunications
Telstra	1800 653 935	Telecommunications
TPG	1800 786 306	Telecommunications
Verizon	(02) 8210 3400	Telecommunications
Vocus	1300 88 99 88	Telecommunications
Sydney Water	13 20 92	Potable Water
Sydney Water	13 20 92	Sewer
Sydney Trains Central		Government Agency
TfNSW		State Government Agency

The plans provided from these BYDA reports were assessed as a component of our capacity review.

3 Potable Water

3.1 Background

Sydney Water supplies potable water to the proposed site from the Potts Hill Water Delivery System, as shown below in Figure 2.

Figure 2 Entire Sydney Water Network, Sydney Water



There are watermains within and along roads adjacent to the site boundary. A plan showing these mains and nearby pump stations are shown at the end of this section.

3.2 Existing On-Site Utility Infrastructure

The existing Sydney Water potable water network within and adjacent to the Burwood North Precinct has been identified based on BYDA records. These records indicate the presence of numerous potable water mains within and adjacent to the development boundary. These records also indicate the presence of multiple disconnected potable water mains. There is potential to repurpose the disconnected infrastructure. However, this will need to be coordinated with Sydney Water.

The key existing potable network infrastructure within and adjacent to the development site is outlined within the table below.

Table 2 Existing Potable Water Infrastructure

Owner	HLFC	Size (DN)	Material	Location
Sydney Water	Water	100	CICL	On east side of Broughton St
Sydney Water	Water	N/A	N/A	Disconnected. On east side of Broughton St, from Burton St.
Sydney Water	Water	100	CICL	On south side of Burton St, ending at Broughton St
Sydney Water	Water	125	PE	On south side of Burton St, from Broughton St to Loftus St
Sydney Water	Water	100	CICL	Across Burton St and continuing through to Lansdowne St
Sydney Water	Water	N/A	N/A	Disconnected. Across intersection of Burton St and Burwood Rd.
Sydney Water	Water	600	CICL	Along Parramatta Rd
Sydney Water	Water	150, 200	CICL	Along north side of Parramatta Rd, ending at Loftus St
Sydney Water	Water	200	CICL, DICL	Along south side of Parramatta Rd, ending at intersection with Shaftesbury Rd
Sydney Water	Water	N/A	N/A	Disconnected. Across intersection of Parramatta Rd and Shaftesbury Rd.
Sydney Water	Water	N/A	N/A	Disconnected. Along Parramatta Rd, at intersection with Shaftesbury Rd.
Sydney Water	Water	N/A	N/A	Disconnected. Along Shaftesbury Rd, at intersection with Parramatta Rd.
Sydney Water	Water	150	oPVC	Along north side of Comer St
Sydney Water	Water	N/A	N/A	Disconnected. Along and across Comer St.
Sydney Water	Water	100	oPVC	Along south side of Milton St
Sydney Water	Water	N/A	N/A	Disconnected. Along south side of Milton St
Sydney Water	Water	150	oPVC	Along north side of New St
Sydney Water	Water	N/A	N/A	Disconnected. Along New St.
Sydney Water	Water	100, 150	oPVC	Along south side of Meryla St
Sydney Water	Water	N/A	N/A	Disconnected. Along south side of Meryla St, between Esher St and Shaftesbury Rd.
Sydney Water	Water	100	DICL	Along north side of Wilga St

Owner	HLFC	Size (DN)	Material	Location
Sydney Water	Water	100, 200	mPVC	Along north side of Wilga St, from 17 Wilga St to Shaftesbury Rd
Sydney Water	Water	180	PE	Along west side of Burwood Rd, from Parramatta Rd
Sydney Water	Water	300	CICL	Across Parramatta Rd, at intersection of Burwood Rd and Parramatta Rd, and continues north along west side of Burwood Rd
Sydney Water	Water	125	PE	Along east side of Burwood Rd
Sydney Water	Water	N/A	N/A	Disconnected. Along Burwood Rd, adjacent to 25 Burwood Rd.
Sydney Water	Water	100	CICL, oPVC	Along west side of Burwood Rd, between Comer St and Parramatta Rd
Sydney Water	Water	150	CICL	Along east side of Burwood Rd, from 10-12 Burwood Rd and continuing south
Sydney Water	Water	200	uPVC	Along east side of Burwood Rd, from intersection with Parramatta Rd to 10-12 Burwood Rd
Sydney Water	Water	N/A	N/A	Disconnected. Starts near intersection with Parramatta Rd and ends at 10-12 Burwood Rd.
Sydney Water	Water	100	CICL	Along west side of Loftus St
Sydney Water	Water	150	CICL	Along west side of Grantham St
Sydney Water	Water	150	CICL	Along south side of Rowley St, ending at Park Rd
Sydney Water	Water	375	CICL	Along south side of Rowley St and continuing onto Park Rd
Sydney Water	Water	150	CICL	Across Parramatta Rd and continuing along west side of Park Rd
Sydney Water	Water	100	oPVC	Along west side of Britannia Ave, between Comer St and Parramatta Rd
Sydney Water	Water	N/A	N/A	Disconnected. Along Britannia Ave, at intersection with Comer St.
Sydney Water	Water	N/A	N/A	Disconnected. Along Britannia Ave, between Comer St and Parramatta Rd.
Sydney Water	Water	N/A	N/A	Disconnected. Along Neich Pde, between Comer St and Nicoll Lane.
Sydney Water	Water	100	CICL	Along east side of Neich Pde
Sydney Water	Water	N/A	N/A	Disconnected. Along Esher St, between Parramatta Rd and ending at Meryla Rd.
Sydney Water	Water	150	oPVC	Along west side of Esher St, from Parramatta Rd to Meryla Rd.
Sydney Water	Water	100	CICL	Along Archer St, from Meryla Rd to Milton St

Owner	HLFC	Size (DN)	Material	Location
Sydney Water	Water	N/A	N/A	Disconnected. Along Archer St, between Milton St and New St.
Sydney Water	Water	219	SCL, Conc Encased	Across Shaftesbury Rd, at intersection with Parramatta Rd
Sydney Water	Water	100	CICL	Along east side of Shaftesbury Rd
Sydney Water	Water	N/A	N/A	Disconnected. Along west side of Shaftesbury Rd, at intersection with Parramatta Rd.
Sydney Water	Water	200	mPVC Conc Encased	Along west side of Shaftesbury Rd, ending at intersection with Wilga St
Sydney Water	Water	100	CICL	Along west side of Shaftesbury Rd

The depths and positions of the existing reticulation mains are unknown. Further consultation with Sydney Water is required to determine the exact existing layout and potential impacts of the design on the existing network.

It is noted that the above discussion only considers Sydney Water infrastructure. There is the potential that private or other authority water infrastructure is present on the site however no records of this infrastructure have been made available for this study and have not been identified on the BYDA plans.

The existing water infrastructure is shown in the plan at the end of this section.

3.3 Demand Assessment

An assessment of the estimated net increase in potable water demand generated from the proposed development has been conducted to determine the required infrastructure upgrades.

Demand forecasting and profiles were developed for the study area, which were based on the proposed net lettable area (NLA) and number of proposed dwellings. An assumed conversion rate of 80% between the GFA and NLA was used.

Demand estimates for potable water have been calculated using the Design Criteria Guidelines Supplement for Single Reticulation System (Sydney Water, 2014) and is based on the maximum daily demand. A BASIX reduction of 40% has been included within these calculations and applied to the residential portion of this development.

A summary of the water demand unit rates adopted is presented in Table 3.

Table 3 Potable Water Demand Unit Rates

Development Type	Block Tag	Assumed Land Use	Design Criteria	Units	Demand/Unit
Residential	A1	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	A2	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	A3	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	A4 (MLC)	NO DWELLINGS PROPOSED			

Development Type	Block Tag	Assumed Land Use	Design Criteria	Units	Demand/Unit
Residential	B1	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	B2	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	B3	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	B4	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	B5 (MLC)	NO DWELLINGS PROPOSED			
Residential	B6 (OS)	NO DWELLINGS PROPOSED			
Residential	C1	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	C2	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	C3	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	C4 (SCC)	NO DWELLINGS PROPOSED			
Residential	C5	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	D1	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	D2	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	D3	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	D4	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	D5	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	D6	NO DWELLINGS PROPOSED			
Residential	D7	NO DWELLINGS PROPOSED			
Residential	D8	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	D9	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	E1 (Metro)	NO DWELLINGS PROPOSED			
Residential	E2	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	E3	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8

Development Type	Block Tag	Assumed Land Use	Design Criteria	Units	Demand/Unit
Residential	E4	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	E5	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	E6	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	E7 (OS)	NO DWELLINGS PROPOSED			
Residential	E8	NO DWELLINGS PROPOSED			
Residential	F1	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	F2	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	F3	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	F4	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	F5	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	F6	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	G1	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	G2	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	G3 (OS)	NO DWELLINGS PROPOSED			
Residential	H1	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	H2	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	I1	Multi-unit (61-100 units/net/ha)	Max Day Demand	kL/unit/day	1.09
Residential	I2	Multi-unit (>140 units/net/ha)	Max Day Demand	kL/unit/day	0.8
Residential	I3 (OS)	NO DWELLINGS PROPOSED			
Residential	I4	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Residential	J1	NO DWELLINGS PROPOSED			
Residential	J2	Multi-unit (101-140 units/net/ha)	Max Day Demand	kL/unit/day	0.88
Residential	J3	Multi-unit (30-60 units/net/ha)	Max Day Demand	kL/unit/day	1.35
Non-residential ¹	All Blocks	Suburban Commercial	Max Day Demand	kL/Nha/day	41

¹ It has been assumed that all non-residential spaces are comprised of only commercial spaces and are of the same type of commercial space.

3.4 Forecast Demand

An estimate of the future potable water demand for the development has been calculated based on the projected development yields.

The cumulative maximum daily demand (MDD) of the development has been calculated as 2894.8kL/Day. These results are provided in the table below.

Table 4 Estimated Potable Water Demand¹

Development Type	Block Tag	Estimated Demand
Residential	A1	72.9
Residential	A2	57.3
Residential	A3	146.6
Residential	A4 (MLC)	0
Residential	B1	76.1
Residential	B2	114.6
Residential	B3	69.8
Residential	B4	70.3
Residential	B5 (MLC)	0
Residential	B6 (OS)	0
Residential	C1	56.2
Residential	C2	68.4
Residential	C3	213.8
Residential	C4 (SCC)	0
Residential	C5	122.8
Residential	D1	114.9
Residential	D2	178.1
Residential	D3	147.2
Residential	D4	93.4
Residential	D5	110.0
Residential	D6	0
Residential	D7	0
Residential	D8	73.3
Residential	D9	61.0
Residential	E1 (Metro)	0
Residential	E2	41.5
Residential	E3	169.2

Development Type	Block Tag	Estimated Demand
Residential	E4	218.8
Residential	E5	184.3
Residential	E6	135.9
Residential	E7 (OS)	0
Residential	E8	0
Residential	F1	118.7
Residential	F2	272.3
Residential	F3	122.0
Residential	F4	92.2
Residential	F5	87.7
Residential	F6	77.4
Residential	G1	198.1
Residential	G2	72.4
Residential	G3 (OS)	0
Residential	H1	359.7
Residential	H2	121.8
Residential	I1	92.4
Residential	I2	187.2
Residential	I3 (OS)	0
Residential	I4	51.3
Residential	J1	0
Residential	J2	118.8
Residential	J3	60.1
Non-Residential	A1	4.9
Non-Residential	A2	0
Non-Residential	A3	0
Non-Residential	A4 (MLC)	0
Non-Residential	B1	5.2
Non-Residential	B2	0.9
Non-Residential	B3	0
Non-Residential	B4	0
Non-Residential	B5 (MLC)	0
Non-Residential	B6 (OS)	0
Non-Residential	C1	3.1
Non-Residential	C2	0.4

Development Type	Block Tag	Estimated Demand
Non-Residential	C3	0
Non-Residential	C4 (SCC)	0
Non-Residential	C5	0
Non-Residential	D1	7.5
Non-Residential	D2	0.7
Non-Residential	D3	0.5
Non-Residential	D4	5.5
Non-Residential	D5	0.4
Non-Residential	D6	0
Non-Residential	D7	0
Non-Residential	D8	2.8
Non-Residential	D9	2.4
Non-Residential	E1 (Metro)	19.1
Non-Residential	E2	1.6
Non-Residential	E3	0.6
Non-Residential	E4	14.2
Non-Residential	E5	0.7
Non-Residential	E6	0.5
Non-Residential	E7 (OS)	0
Non-Residential	E8	7.3
Non-Residential	F1	10.0
Non-Residential	F2	17.7
Non-Residential	F3	10.2
Non-Residential	F4	0.3
Non-Residential	F5	0
Non-Residential	F6	0.2
Non-Residential	G1	0.7
Non-Residential	G2	0
Non-Residential	G3 (OS)	0
Non-Residential	H1	0
Non-Residential	H2	0
Non-Residential	I1	0
Non-Residential	I2	0
Non-Residential	I3 (OS)	0
Non-Residential	I4	0

Development Type	Block Tag	Estimated Demand
Non-Residential	J1	0
Non-Residential	J2	0.4
Non-Residential	J3	0.1
Total (kL / Day: Max Day Demand) - Non-Residential		118.0
Total (kL / Day: Max Day Demand) - Residential		4628.1
Total (kL / Day: Max Day Demand, incl. BASIX)		2894.8
Total (kL / Day: Max Day Demand, incl. BASIX, +15%)		3329.0
Total (kL / Day: Max Day Demand, incl. BASIX, -15%)		2460.6

¹ Since the demand calculations do not include carparks, lifts, or impacts of ESD initiatives, a $\pm 15\%$ range is recommended.

3.5 Coordination with Other Services

Coordination of the proposed potable water infrastructure with other services in the proposed street network would generally be based on the Streets Opening Conference standards.

In addition, Section 5.12.5.2 of the Water Services Association of Australia codes (WSA 03-2011-3.1, Sydney Water Edition – 2012) states 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 3.

**Figure 3: Sydney Water Clearances between Water Mains and Underground Services
(WSA 03-2011-3.1, Sydney Water Edition – 2012)**

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

NOTES:

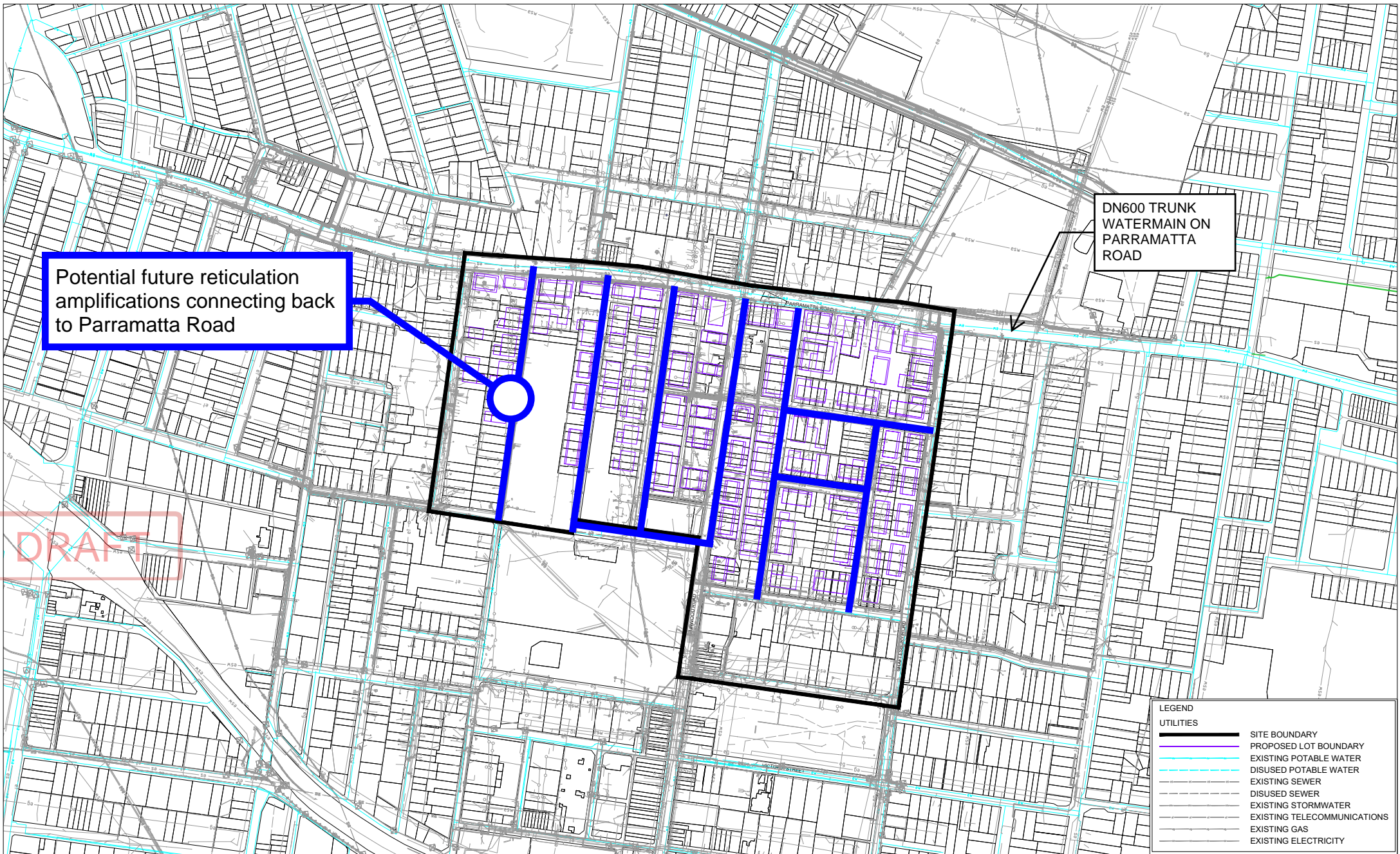
- 1 Vertical clearances apply where water mains cross one another and other utility services, except in the case of sewers where a vertical separation shall always be maintained, even when the main and sewer are parallel. *The main should always be located above the sewer to minimise the possibility 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.

3.6 Approvals and Next Steps

The potable water strategy is to be confirmed through hydraulic modelling, with separate reports outlining the modelling outcomes to be submitted to Sydney Water. Further discussion is also to be undertaken with Sydney Water to confirm lead-in infrastructure requirements and pressures of existing potable water services. 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. Undertake hydraulic modelling to confirm the extent of any lead-in infrastructure upgrades required – Post Rezoning/Development Application;
2. Undertake site investigations to confirm the layout and extent of existing on-site infrastructure (including non-Sydney Water infrastructure) – Post Rezoning/Development Application;
3. Develop an overall water masterplan for the site including staging considerations and agree this with Sydney Water – As a part of Development Applications;
4. Develop diversion strategy (including any interim works to suit staging) and protection/build-over requirements for infrastructure that cannot be diverted - As a part of Development Applications.
5. Establish a Head Deed to be signed by required parties (Sydney Water, Designer, WSC, Developer, Constructor) – As a part of detailed design;
6. Submit application/s for individual detailed design packages to SWC with drawing of proposed works in stages, Section 73– As a part of detailed design;
7. SWC to issue of Notice of Requirements (NOR) with their requirements for water main layout, sizing and funding matters confirmed– As a part of detailed design; and
8. Detailed design to be progressed based on the NOR and submitted to Sydney Water for approval – As a part of detailed design.

It is noted that the above is for delivery of the water network through the street network. Depending on the strata arrangement, individual buildings will still need to make separate applications for each connection.



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	A 25/11/22 DRAFT ISSUE		DF DF		Drawn: J.Laokittichai		Revision: A						
	Rev Date Description		Chk'd App'd		Designed: -		Status:						
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					DRAWING NUMBER					N/A			

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Figure 4 Potable Water Plan

4 Sewer

4.1 Background

Sydney Water wastewater facilities service the Burwood North Precinct. Wastewater from properties located between Grantham St and Burwood Rd gravitate towards the 600 x 900 brick trunk main on Neich Parade. From here, the wastewater is then discharged into the 1143 x 1447 brick trunk main located at the intersection of George St and Elsie St. Wastewater from properties in the other parts of the site gravitate towards Sewage Pump Station 22 (SP0022), which is located at 1C Gipps St. The wastewater from here is then pumped in a DN375 CICL pressure main on Lucas Rd, which then joins up to the 1143 x 1447 brick trunk main on Lucas Rd. The wastewater from the entire site is then discharged to the Western Outfall Main Sewer through the Cooks River Sewage Aqueduct, Wolli Creek Heritage Aqueduct, and Arncliffe Sewerage Aqueduct. It then arrives at the Malabar Wastewater Treatment Plant, which is of a primary treatment level, has a discharge volume limit of 1199 ML/day, and discharges to a deep-water ocean outfall located 3.6 km from the shoreline.

There are sewer mains within and along roads adjacent to the site boundary. A plan showing these mains and nearby pump stations are shown at the end of this section.

4.2 Existing On-Site Utility Infrastructure

The existing Sydney Water wastewater network within and adjacent to the Burwood North Precinct has been identified based on BYDA records. The key existing sewer infrastructure within and adjacent to the development site is outlined within the table below.

Table 5 Existing Sewer Infrastructure

Owner	HLFC	Size (DN)	Material	Location
Sydney Water	Sewer	225, 400	SGW, VC, PVC	Traverses through various properties, from 19 Broughton St, crosses Burwood Rd, and ends across Burton St
Sydney Water	Sewer	150	PVC	At 20-24 Burton St
Sydney Water	Sewer	225	VC	From Burwood Rd, adjacent to 18 Burwood Rd, and ends on Neichs Lane
Sydney Water	Sewer	150	VC	Traverses through various properties, from 20-24 Burton St and ends at Loftus St, adjacent to 1 Loftus St
Sydney Water	Sewer	150	SGW, VC	Traverses through various properties, from 9 Burwood Rd and continues along west side of Loftus St
Sydney Water	Sewer	150	VC, EW	Along west side of Neichs Lane, between 1 and 11 Neichs Lane
Sydney Water	Sewer	150, 225	PVC, SGW	From Parramatta Rd and entering 29-45 Parramatta Rd
Sydney Water	Sewer	225	SGW, VC	From 2 Parramatta Rd and continuing onto north side of Parramatta Rd and ending at intersection with Neichs Lane
Sydney Water	Sewer	400	VC	From Neich Pde, at intersection with Emanuel Lane, and continuing onto Emanuel Lane.

Owner	HLFC	Size (DN)	Material	Location
				Traverses through 1 Parramatta Rd, crosses Parramatta Rd, and continues onto Burwood Rd.
Sydney Water	Sewer	660x990	Brick	Along Parramatta Rd and continues onto Neich Pde
Sydney Water	Sewer	225	PVC Conc Encased, SGW	From 17 Neich Pde and crosses Neich Pde
Sydney Water	Sewer	450	SGW	Along Neich Pde, between 12-22 Neich Pde
Sydney Water	Sewer	150	SGW	From 20 Britannia Ave, through 23 Neich Pde, and ends on Neich Pde, near intersection with Milton Lane
Sydney Water	Sewer	150, 225	SGW	Traverses through properties, from 17 Neich Pde to 6 Britannia Ave
Sydney Water	Sewer	225, 300	VC	From MLC School and continuing north to 8 Grantham St. Crosses Park Rd and traverses east, through various properties. Crosses Britannia Ave, through various properties, and ends at Neich Pde.
Sydney Water	Sewer	225	VC	At 7 Neich Pde
Sydney Water	Sewer	225	SGW	From 3 Neich Pde and ending at 1A Britannia Ave
Sydney Water	Sewer	125	SGW	From 6 Park Rd to 386 Parramatta Rd
Sydney Water	Sewer	225	VC	From 4 Park Rd and ending at 388 Parramatta Rd
Sydney Water	Sewer	150	EW	Along Park Rd, adjacent to 4 Park Rd
Sydney Water	Sewer	225	VC	Traverses through properties on Britannia Rd, from north of Burwood Park to 1A Britannia Ave
Sydney Water	Sewer	150, 225	SGW, VC	Along Riley Lane, from intersection with Nicoll Lane to 348 Parramatta Rd
Sydney Water	Sewer	N/A	N/A	Disconnected. At 25-25A Burwood Rd.
Sydney Water	Sewer	N/A	N/A	Disconnected. At 35 Burwood Rd.
Sydney Water	Sewer	150	VC	Along Nicoll Lane
Sydney Water	Sewer	150	DICL, PVC Conc Encased	At 46A-46B Burwood Rd
Sydney Water	Sewer	150, 225, 300, 400	DICL, VC, SGW, VC	Along Milton Lane and Milton St, from intersection of Riley and Milton Lane. Crosses properties along Shaftesbury Rd and continues northeast.
Sydney Water	Sewer	150	VC, DICL Conc Encased, SGW	Along Esher Lane, from intersection with Burwood Rd, and continuing along Webbs Lane
Sydney Water	Sewer	N/A	N/A	Disconnected. At 322-324 Parramatta Rd.
Sydney Water	Sewer	150	VC, SGW	Traverses through properties along Parramatta Rd. From 322-324 Parramatta Rd and continues east.

Owner	HLFC	Size (DN)	Material	Location
Sydney Water	Sewer	150	VC	Traverses through properties along Shaftesbury Rd, from 298 Parramatta Rd to 5A Shaftesbury Rd.
Sydney Water	Sewer	225	VC, CICL	Along north side of Parramatta Rd and crosses Parramatta Rd. Traverses through 298 Parramatta Rd and ends at 302-312 Parramatta Rd.
Sydney Water	Sewer	150	SGW	At 9 Milton St
Sydney Water	Sewer	150, 225	VC, SGW	Traverses through properties on Esher St and Milton St. Crosses Burwood Rd and ends at 282 Parramatta Rd.
Sydney Water	Sewer	300	SGW	From Milton St and traverses through multiple properties. Ends at 7A Burwood Rd.
Sydney Water	Sewer	225	SGW, VC	From 1 New St and traverses north. Ends at 11 Milton St.
Sydney Water	Sewer	225	VC	From 14 Milton St to 11 New St
Sydney Water	Sewer	150, 225, 300	VC, SGW	From 31 Esher St and crosses Esher St. Continues onto New St and traverses through properties along New St. Ends at 13 Archer St,
Sydney Water	Sewer	225	PVC, VC	Along Wilga St, ending at 11-15 Wilga St
Sydney Water	Sewer	150	VC	Traverses through properties along Wilga St. From 17 to 33-39 Wilga St.
Sydney Water	Sewer	225	VC, SGW	Along Webbs Lane and across Meryla St. Traverses through 35 Meryla St and continues north. Ends at 8 New St.
Sydney Water	Sewer	225	VC	At 33 Archer St
Sydney Water	Sewer	150	VC	From 41 Archer St to 8 New St
Sydney Water	Sewer	400	VC	From 17 New St, continues north, and ends at Milton St, adjacent to 9 Milton St
Sydney Water	Sewer	225	VC	From 12 New St and continues along New St. Traverses along Archer St and onto Milton St. Ends near 1 Milton St.
Sydney Water	Sewer	150, 225	VC, SGW	From Webbs St and continues east along New St. Traverses through properties along New St and ends at 13 Archer St.
Sydney Water	Sewer	300, 225	VC	Along Esher St, adjacent to 33 Esher St. Traverses onto properties along New St and ends at 17 New St.
Sydney Water	Sewer	150	VC, PVC	From 38 Archer St and continues north. Ends at Milton St.
Sydney Water	Sewer	150	VC	At 37 Shaftesbury Rd and 34 Archer St
Sydney Water	Sewer	150	SGW	At 33 Shaftesbury Rd and 30 Archer St
Sydney Water	Sewer	150	VC	At 31 and 31A Shaftesbury Rd and 20 and 24 Archer St

Owner	HLFC	Size (DN)	Material	Location
Sydney Water	Sewer	150	VC	Traverses through properties along Meryla St, from 27 Meryla St. Continues east and crosses Archer St and Shaftesbury Rd. Continues east.
Sydney Water	Sewer	150, 225	VC, PVC	From 3 Wilga St and traverses west through various properties. Then continues north, across Meryla St and onto Esher St. Ends on Esher St, near 31A Meryla St.
Sydney Water	Sewer	150	VC	From Burwood Park and along Comer St
Sydney Water	Sewer	N/A	N/A	Disconnected. Across and along Burton St. Continues through Concord Oval.
Sydney Water	Sewer	225	VC	Along west side of Shaftesbury Rd and continues through properties located on Eureka St
Sydney Water	Sewer	225	VC	Along Rowley St

Similar to the potable water network, the exact depths and positions of the existing reticulation mains are unknown.

The existing wastewater infrastructure is shown in the plan at the end of this section. It is important to note that wastewater is a gravity service. Thus, for the proposed servicing design to work hydraulically, the inverts of the existing and proposed services must be checked to confirm that the falls are achievable. This should be done as part of design development.

Onsite utility investigations and service searches are recommended post rezoning as a part of any future detailed development application, including investigation for any private sewer mains. Further consultation is also required with Sydney Water to consider any lead-in infrastructure requirements.

The existing wastewater infrastructure is shown in the plan at the end of this section.

4.3 Demand Assessment

An assessment of the net increase in sewer loading resulting from the proposed development has been undertaken to assist in determining the required infrastructure upgrades. Servicing forecasting and profiles have been based on the gross floor area (GFA).

The design criteria used to forecast future sewer loading are taken from the Sydney Water Area Planning Design Criteria Guide: WSA 02-2002-3.0 (Sewer Code of Australia) and is expressed as an equivalent population (EP) for a particular land use. These are summarised below.

Table 6 Sewer Design Loading Criteria

Development Type	Block Tag	Assumed Land Use	Design Criteria	Units	Demand/Unit
Residential ¹	All Blocks	Medium density (group housing)	Average Dry Weather Flow	EP/ha (gross)	120
Commercial ²	All Blocks	Local commercial	Average Dry Weather Flow	EP/ha (gross)	75

¹ It has been assumed that all residential spaces are of the same housing type.

² It has been assumed that all non-residential spaces are comprised of only commercial spaces and are of the same type of commercial space.

The average dry weather flow (ADWF) per equivalent population (EP) has been taken as 150 L/day or 0.0017L/s ($ADWF(L/s) = 0.0017 * EP$). A BASIX reduction of 40% has been included in the sewer loading calculations and applied to the residential portion of this development.

4.4 Forecast Demand

An estimate of the wastewater demand for the development has been calculated based on the development yields. The estimated wastewater demand is 6.2L/s. The results are shown in the tables below.

Table 7 Estimated Wastewater Demand¹

Development Type	Block Tag	Estimated Demand
Residential	A1	72.2
Residential	A2	45.8
Residential	A3	197.8
Residential	A4 (MLC)	0
Residential	B1	75.4
Residential	B2	154.6
Residential	B3	69.2
Residential	B4	56.2
Residential	B5 (MLC)	0
Residential	B6 (OS)	0
Residential	C1	45.0
Residential	C2	67.7
Residential	C3	288.6
Residential	C4 (SCC)	0
Residential	C5	150.8
Residential	D1	155.1
Residential	D2	240.4
Residential	D3	198.7
Residential	D4	114.6
Residential	D5	135.0
Residential	D6	0
Residential	D7	0
Residential	D8	58.7
Residential	D9	48.8
Residential	E1 (Metro)	0
Residential	E2	33.2
Residential	E3	228.4

Development Type	Block Tag	Estimated Demand
Residential	E4	295.4
Residential	E5	248.8
Residential	E6	183.4
Residential	E7 (OS)	0
Residential	E8	0
Residential	F1	145.6
Residential	F2	367.6
Residential	F3	149.8
Residential	F4	113.2
Residential	F5	86.9
Residential	F6	76.7
Residential	G1	267.4
Residential	G2	57.9
Residential	G3 (OS)	0
Residential	H1	485.6
Residential	H2	164.4
Residential	I1	91.6
Residential	I2	252.7
Residential	I3 (OS)	0
Residential	I4	41.0
Residential	J1	0
Residential	J2	145.8
Residential	J3	48.1
Non-Residential	A1	11.3
Non-Residential	A2	0
Non-Residential	A3	0
Non-Residential	A4 (MLC)	0
Non-Residential	B1	11.8
Non-Residential	B2	2.0
Non-Residential	B3	0
Non-Residential	B4	0
Non-Residential	B5 (MLC)	0
Non-Residential	B6 (OS)	0
Non-Residential	C1	7.0
Non-Residential	C2	0.8

Development Type	Block Tag	Estimated Demand
Non-Residential	C3	0
Non-Residential	C4 (SCC)	0
Non-Residential	C5	0.0
Non-Residential	D1	17.1
Non-Residential	D2	1.5
Non-Residential	D3	1.3
Non-Residential	D4	12.6
Non-Residential	D5	0.9
Non-Residential	D6	0
Non-Residential	D7	0
Non-Residential	D8	6.5
Non-Residential	D9	5.4
Non-Residential	E1 (Metro)	43.7
Non-Residential	E2	3.7
Non-Residential	E3	1.4
Non-Residential	E4	32.6
Non-Residential	E5	1.6
Non-Residential	E6	1.2
Non-Residential	E7 (OS)	0
Non-Residential	E8	16.6
Non-Residential	F1	22.8
Non-Residential	F2	40.5
Non-Residential	F3	23.4
Non-Residential	F4	0.7
Non-Residential	F5	0
Non-Residential	F6	0.5
Non-Residential	G1	1.7
Non-Residential	G2	0
Non-Residential	G3 (OS)	0
Non-Residential	H1	0
Non-Residential	H2	0
Non-Residential	I1	0
Non-Residential	I2	0
Non-Residential	I3 (OS)	0
Non-Residential	I4	0

Development Type	Block Tag	Estimated Demand
Non-Residential	J1	0
Non-Residential	J2	0.9
Non-Residential	J3	0.3
Total (Equivalent Population) - Non-Residential		269.7
Total (Equivalent Population) - Residential		5658.0
Total (L/s: Average Dry Weather Flow) - Non-Residential		0.5
Total (L/s: Average Dry Weather Flow) - Residential		9.6
Total (L/s: Average Dry Weather Flow) - including BASIX		6.2
Total (L/s: Average Dry Weather Flow) - including BASIX (+15%)		7.2
Total (L/s: Average Dry Weather Flow) - including BASIX (-15%)		5.3

¹ Since the demand calculations do not include carparks, lifts, or impacts of ESD initiatives, a $\pm 15\%$ range is recommended.

4.5 Coordination with Other Services

Coordination of Sewer Infrastructure with other services in the proposed street network would generally be based on the Streets Opening Conference standards.

In addition, Section 4.4.5.2 of Water Services Association of Australia codes (WSA 02-2002-2.2, Sydney Water Edition – Version 3) states the clearance requirements for sewers in Table 4.2, as summarised below in Figure 5.

Figure 5: Sydney Water Clearance between Sewers and Other Underground Services
(WSA 02-2002-2.2, Sydney Water Edition – Version 3)

Utility (Existing service)	Minimum horizontal clearance mm		Minimum vertical clearance ¹ mm
	New sewer size		
	≤DN 300	>DN 300	
Sewers ≤DN 300	300	600	150 ² /300
Sewers >DN 300	600	600	300
Gas mains	300 ³	600	150 ² /300
Telecommunication conduits and cables	300 ³	600	150 ² /300
Electricity conduits and cables	500	1000	225 ² /300
Drains ⁷	300 ³	600	150 ² and ⁴ /300 ⁴
Water mains	1000 ⁵ /600	1000 ⁵ /600	500 ⁴
Kerbs	150	600 ⁶	150 (where practicable)

NOTES:

- 1 Vertical clearances apply when sewers cross one another, except in the case of water mains when a vertical separation shall always be maintained, even when the sewer and main are parallel. *The sewer should always be located below the main to minimise the possibility of backflow contamination in the event of a main break.*
- 2 A minimum vertical clearance of 300 mm applies if the size of either the existing service or proposed sewer is >DN 300.
- 3 *Clearances can be further reduced to 150 mm for distances up to 2 m when passing installations such as poles, pits and small structures, providing the structure is not destabilised in the process.*
- 4 *Sewers should always cross under water mains and stormwater drains.* If this requirement cannot be met, consult Sydney Water in respect of alternatives such as adjusting the water main or stormwater drain. Where a sewer crosses a water main at or close to 90 degrees, the vertical clearance may be reduced to not less than 200 mm provided that the sewer is concrete encased and a 50 mm compressible material is placed over the encasement. The encasement shall not have any joints within 1000 mm either side of the water main and shall conform to Drawing SEW-1205-V.
- 5 When the sewer is at the minimum vertical clearance below 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 increases to 750 mm.*
- 6 Clearance from kerbs shall be measured from the nearest point of the kerb.
- 7 A sewer to be constructed under an existing or proposed stormwater pipe or channel \geq DN 375 shall be concrete encased. The concrete encasement shall extend at least one metre each side of the stormwater pipe or channel. Clearances between the sewer and other services shall be measured from the outer surface of the concrete encasement.

4.6 Approvals and Next Steps

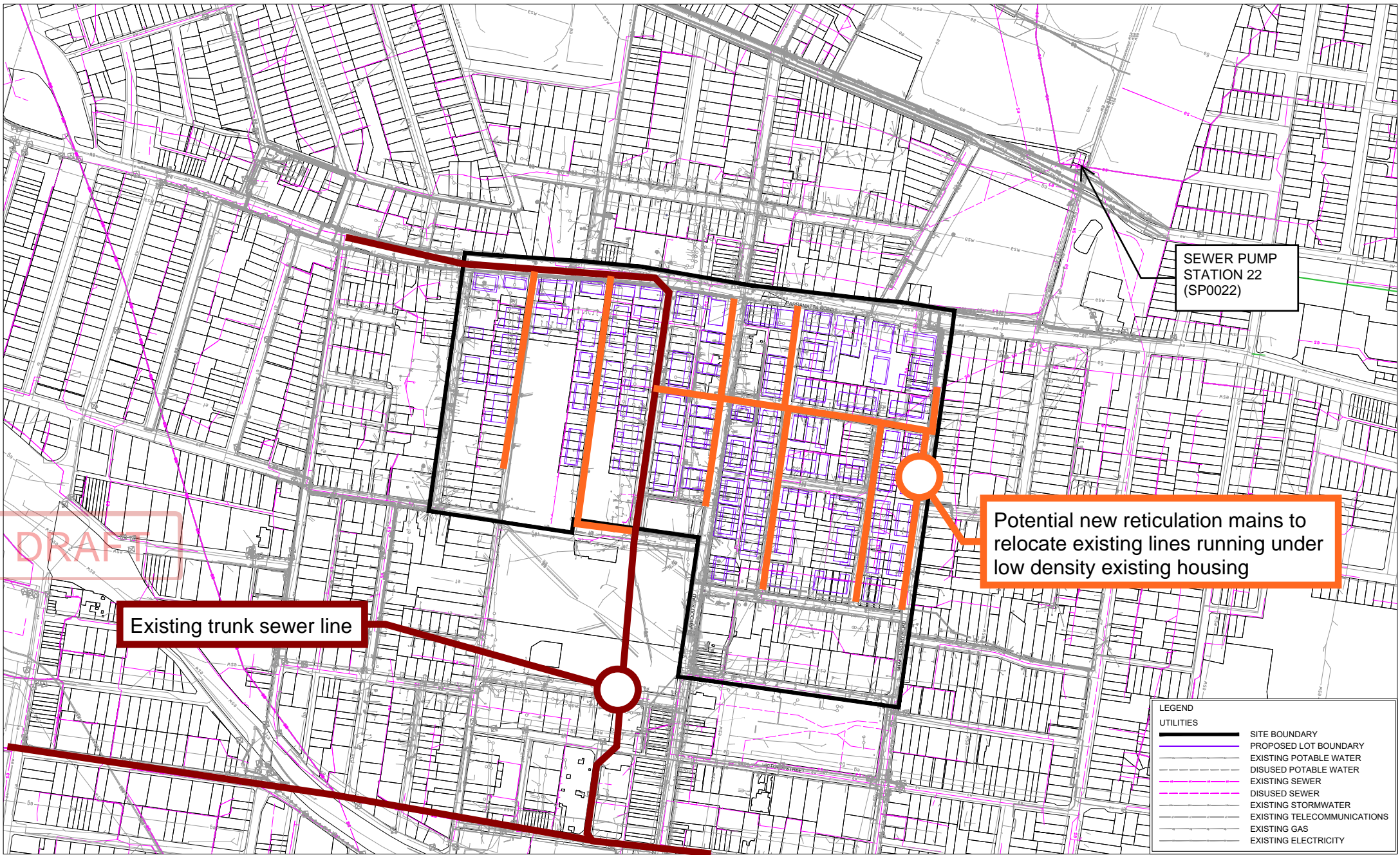
The sewer strategy is to be confirmed through hydraulic modelling, with separate reports outlining the modelling outcomes to be submitted to Sydney Water. Further discussion is also to be undertaken with Sydney Water to confirm lead-in infrastructure requirements and to check inverts of gravity pipes to ensure falls are achievable.

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

1. Undertake hydraulic modelling to confirm extent of any lead-in infrastructure upgrades required – Post Rezoning/Development Application;
2. Undertake site investigations to confirm the layout and extent of existing on-site infrastructure (including non-Sydney Water infrastructure) – Post Rezoning/Development Application;
3. Develop an overall wastewater masterplan for the site including staging considerations and agree these with Sydney Water. Being a gravity service, this will need to include consideration of the depth of the existing sewer infrastructure to be maintained and/or connected to (based on manhole survey) and proposed grading of the site - As a part of Development Applications;
4. Develop a diversion strategy (including any interim works to suit staging) and protection/build-over requirements for infrastructure that cannot be diverted - As a part of Development Applications;
5. Establish a Head Deed to be signed by required parties (Sydney Water, Designer, WSC, Developer, Constructor) – As a part of detailed design;
6. Submit application/s for individual detailed design packages to SWC with drawing of proposed works in stages, Section 73 – As a part of detailed design;

7. SWC to issue of Notice of Requirements (NOR) with their requirements for water main layout, sizing and funding matters confirmed – As a part of detailed design; and
8. Detailed design to be progressed based on the NOR and submitted to Sydney Water for approval – As a part of detailed design.

It is noted that the above is for delivery of the wastewater network through the street network. Depending on the strata arrangement, individual buildings will still need to make separate applications for each connection.



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Figure 6 Sewer Plan

5 Electricity

5.1 Background

Electrical servicing to the Burwood North Precinct is provided by Ausgrid. The Ausgrid network area is shown below.

Figure 7 Ausgrid Energy Network Area (Source: Ausgrid, 2022)



A plan showing these mains and nearby zone substations are shown at the end of this section.

5.2 Existing On-Site Utility Infrastructure

The entire site is serviced by Burwood Zone Substation No. 2835, which is a 132 kV zone substation located at 26-32 Ada St, Concord. If there is insufficient capacity for this development at Burwood Zone Substation, it is recommended that connections be made to either Drummoyne Zone Substation No. 3922 or Concord Zone Substation No.874. It should be noted that connections to these substations may require interconnectors.

The locations of all substations are shown in the figure below.

Figure 8 Locations of Ausgrid Substations (Source: Ausgrid)



The existing electrical infrastructure on the site has been identified based on BYDA records. The existing electrical assets within and adjacent to the site boundary are detailed below.

Table 8 Existing Electrical Infrastructure

OWNER	ASSET TYPE	LOCATION
Ausgrid	HV Cable (HV, In Service)	From Rowley St and continuing onto Grantham St. Ends at 28-32 Grantham St.
Ausgrid	HV Cable (HV, In Service)	From Rowley St and continuing onto Grantham St. Ends at 15-17 Grantham St.
Ausgrid	HV Cable (HV, In Service)	Along and across Grantham St. From 15-17 Grantham St and ends at 28-32 Grantham St.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	From Rowley St and continuing onto Grantham St. Ends at 15-17 Grantham St.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	From Rowley St and continuing onto Grantham St. Ends at 15-17 Grantham St.
Ausgrid	LV Cable (Service, In Service)	At 21-29 Grantham St
Ausgrid	LV Cable (Service, In Service)	At 27 Grantham St
Ausgrid	LV Cable (Mains, In Service)	At 15-17 Grantham St
Ausgrid	LV Cable (Mains, In Service)	At 15-17 Grantham St
Ausgrid	LV Cable (Mains, Out of Service)	Along and across Grantham St. From 15-17 Grantham St and ending adjacent to 28-32 Grantham St.
Ausgrid	LV Cable (Mains, Out of Service)	Along and across Grantham St. From 15-17 Grantham St and ending adjacent to 28-32 Grantham St.

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Mains, In Service)	Along Grantham St. From 28-32 Grantham St.
Ausgrid	LV Cable (Mains, In Service, partially Out of Service)	Along and across Grantham St.
Ausgrid	LV Cable (Mains, Out of Service)	Along Grantham St, adjacent to 28-32 Grantham St
Ausgrid	LV Cable (Mains, In Service)	Along Grantham St, adjacent to 28-32 Grantham St
Ausgrid	LV Cable (Mains, In Service)	Along Grantham St, from 24 to 28-32 Grantham St.
Ausgrid	LV Cable (Service, In Service)	At 18 Grantham St
Ausgrid	LV Cable (Service, In Service)	At 8 Grantham St
Ausgrid	LV Cable (Service, In Service)	At 6 Grantham St and 408 Paramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 4 Rowley St
Ausgrid	LV Cable (Service, In Service)	At 4A Rowley St
Ausgrid	LV Cable (Service, In Service)	Along Rowley St, adjacent to 4 Rowley St
Ausgrid	LV Cable (Service, In Service)	At 388-390 Parramatta Rd
Ausgrid	HV Cable (HV, In Service)	Along east side of Park Rd, from Parramatta Rd to 24 Park Rd
Ausgrid	HV Cable (HV, In Service)	Along east side of Park Rd, from Parramatta Rd to 18 Park Rd
Ausgrid	HV Cable (HV, In Service)	Along east side of Park Rd, from 18 to 24 Park Rd
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, at intersection with Park Rd
Ausgrid	LV Cable (Service, In Service)	At 3 Park Rd
Ausgrid	LV Cable (Service, In Service)	At 5 Park Rd
Ausgrid	LV Cable (Mains, In Service)	At 22-24 Park Rd
Ausgrid	LV Cable (Mains, In Service)	Along Park Rd, between 22-24 Park Rd
Ausgrid	LV Cable (Mains, In Service)	Along Park Rd, between 24 Park Rd to 28-36 Park Rd
Ausgrid	LV Cable (Mains, In Service)	At 28-36 Park Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Mains, In Service)	Along Park Rd, between 26 Park Rd to 28-36 Park Rd to
Ausgrid	LV Cable (Service, In Service)	At 360-370 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 12 Britannia Ave
Ausgrid	LV Cable (Service, In Service)	At 19 Neich Pde
Ausgrid	LV Cable (Service, In Service)	At 27 Neich Pde
Ausgrid	LV Cable (Service, In Service)	At 27A Neich Pde
Ausgrid	LV Cable (Service, In Service)	At 29 Neich Pde
Ausgrid	HV Cable (HV, In Service)	From Parramatta Rd and continues along and across Neich Pde. Continues along Milton Ln and Riley Ln. Ends at 7A Burwood Rd.
Ausgrid	Auxiliary Cable (In Service)	From Parramatta Rd and continues along Neich Pde. Ends at Comer St.
Ausgrid	HV Cable (HV, In Service)	From Comer St and continues along and across Neich Pde. Continues along Nicoll Ln and Riley Ln. Ends at 27-29 Burwood Rd.
Ausgrid	HV Cable (HV, In Service)	From 7A Burwood Rd and along Riley Ln and Milton Ln. Continues along Niech Pde and Nicoll Ln and Riley Ln. Ends at 27-29 Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Comer St, at intersection with Niech Pde
Ausgrid	HV Cable (HV, In Service)	Along north side of Comer St
Ausgrid	LV Cable (Mains, In Service)	At 7A Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Riley Ln, adjacent to 7A Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Riley Ln, from 7A Burwood Rd to 11-13 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Riley Ln, from 7A Burwood Rd to 24 Neich Pde
Ausgrid	LV Cable (Mains, In Service)	Along Riley Ln, from 7A Burwood Rd to Milton Ln
Ausgrid	LV Cable (Mains, In Service)	Along Riley Ln, from 9 Burwood Rd to 24 Neich Pde
Ausgrid	LV Cable (Mains, In Service)	Along Neich Pde, from 30 Neich Pde. Ending on Riley Ln, at 24 Neich Pde.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Niech Pde, from 25 Neich Pde, and continuing along Milton Ln.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Niech Pde, from 25 Neich Pde, and continuing along Milton Ln.

OWNER	ASSET TYPE	LOCATION
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Neich Pde, from 18 Neich Pde, and ending at intersection of Milton Ln and Riley Ln.
Ausgrid	LV Cable (Mains, In Service, partially Out of Service)	From 24 Neich Pde and continuing onto Milton Ln and ending on Milton St.
Ausgrid	LV Cable (Mains, In Service)	From 24 Neich Pde and continuing onto Milton Ln and ending on Burwood Rd, adjacent to 11-13 Burwood Rd.
Ausgrid	LV Cable (Mains, In Service, partially Out of Service)	From 24 Neich Pde and continuing onto Milton Ln
Ausgrid	LV Cable (Mains, Out of Service)	From intersection of Milton Ln and Riley Ln. Ending at intersection of Burwood Rd and Milton Ln
Ausgrid	LV Cable (Service, In Service)	On Milton Ln, adjacent to 11-13 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	At 40 Neich Pde
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	From Neich Pde and continuing onto Nicoll Ln. Continues onto Riley Ln and ends at 33 Burwood Rd.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	From Neich Pde and continuing onto Nicoll Ln. Continues onto Riley Ln and ends at 33 Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Neich Pde and continues onto Nicoll Ln. Continues onto Riley Ln and ends at 27-29 Burwood Rd.
Ausgrid	HV Cable (HV, In Service)	Along Riley Ln, from 27-29 to 33 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 27-29 Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Neich Pde, between 27-29 to 33 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Neich Pde, from 27-29 Burwood Rd. Continues along Nicoll Ln and ends at intersection with Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	At 33 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 33 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Neich Pde, from 33 Burwood Rd and ends at intersection with Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Milton Ln, from intersection with Riley Ln to intersection with Burwood Rd.
Ausgrid	LV Cable (Service, In Service)	At 35 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Milton Ln, from 35A Burwood Rd to 3-13 Neich Pde
Ausgrid	LV Cable (Service, In Service)	At 35A Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Milton Ln, from intersection with Riley Ln to intersection with Burwood Rd.

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Mains, In Service)	Along Riley Ln, from 27-29 Burwood Rd. Continues along Burwood Rd. Ends at 60 Burwood Rd.
Ausgrid	LV Cable (Service, In Service)	At 60 Burwood Rd.
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to 2A Burwood Rd
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to 10 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	At 10 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to 348-352 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to 348-352 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to 7A Burwood Rd
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd and at 15 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	At 21 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	At 25 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	From Burwood Park onto Burwood Rd
Ausgrid	LV Cable (Service, In Service)	On Burwood Rd, adjacent to Burwood Park
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	In Burwood Park and onto Burwood Rd
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to Burwood Park
Ausgrid	LV Cable (Service, In Service)	At 88 Burwood Park
Ausgrid	LV Cable (Service, In Service)	At 46 Burton St
Ausgrid	LV Cable (Service, In Service)	On Broughton St, at intersection with Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 49 Parramatta Rd
Ausgrid	LV Cable (Mains, In Service)	At 29-45 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, near Neichs Ln
Ausgrid	LV Cable (Service, In Service)	Along Burwood Rd, adjacent to 4 Burwood Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, adjacent to 1 Burwood Rd
Ausgrid	LV Cable (Service, In Service)	At 24 Burton St
Ausgrid	LV Cable (Service, In Service)	Along Burton St, adjacent to 26 Burton St
Ausgrid	LV Cable (Service, In Service)	At 2-4 Burton Rd
Ausgrid	LV Cable (Service, In Service)	At 13 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 3-5 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 312-314 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 320-324 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	At 8 Esher St
Ausgrid	LV Cable (Service, In Service)	At 25 Milton St
Ausgrid	LV Cable (Service, In Service)	At 12 Milton St
Ausgrid	LV Cable (Service, In Service)	At 25 Esher St
Ausgrid	LV Cable (Service, In Service)	At 31 Esher St
Ausgrid	LV Cable (Service, In Service)	At 39 Esher St
Ausgrid	LV Cable (Service, In Service)	At 28 Esher St
Ausgrid	LV Cable (Service, In Service)	At 38-40 Meryla St
Ausgrid	LV Cable (Service, In Service)	Along Meryla St, adjacent to 36 Meryla St
Ausgrid	LV Cable (Service, In Service)	At 34 Meryla St
Ausgrid	LV Cable (Service, In Service)	At 6-8 Meryla St
Ausgrid	LV Cable (Service, In Service)	Along Meryla St, adjacent to 11 Meryla St
Ausgrid	LV Cable (Service, In Service)	At 19 Meryla St
Ausgrid	LV Cable (Service, In Service)	At 25 Meryla St

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Service, In Service)	At 17 New St
Ausgrid	LV Cable (Service, In Service)	At 19 New St
Ausgrid	LV Cable (Service, In Service)	At 32 Archer St
Ausgrid	LV Cable (Service, In Service)	At 31 Shaftesbury St
Ausgrid	LV Cable (Service, In Service)	At 15 Shaftesbury St
Ausgrid	HV Cable (HV, Out of Service)	Along Milton Ln and continuing onto Milton St
Ausgrid	HV Cable (HV, Out of Service)	Along Milton Ln and continuing onto Milton St
Ausgrid	LV Cable (Mains, In Service)	At 28-30A Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Ln. From 28-30A to 18-22 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Ln. From 28-30A to intersection with Milton St.
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Ln. From 28-30A and onto Milton St. Ends adjacent to 19 Esher St.
Ausgrid	LV Cable (Service, In Service)	At 18-22 Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Lane, from 10-12 Burwood Rd to 16-22 Burwood Rd.
Ausgrid	HV Cable (HV, In Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	HV Cable (HV, In Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	HV Cable (HV, In Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	HV Cable (HV, In Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	Auxiliary Cable (In Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	Auxiliary Cable (In Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	Auxiliary Cable (Out of Service)	Along south side of Parramatta Rd and continuing onto Burwood Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Burwood Rd, from 7B Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Burwood Rd, from 11-13h Burwood Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Mains, In Service)	Along Burwood Rd, from intersection with Milton Ln to 21 Burwood Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Burwood Rd, from 25 to 31 Burwood Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	At 27-29 Burwood Rd
Ausgrid	HV Cable (HV, Out of Service)	Along Parramatta Rd, between Park Rd and Niech Pde
Ausgrid	HV Cable (HV, Out of Service)	Along Parramatta Rd, between Park Rd and Neich Pde
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd, between Park Rd and Neich Pde
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd, between Park Rd and Neich Pde
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, adjacent to 374 Parramatta Rd
Ausgrid	LV Cable (Street Lighting, In Service)	Along Burton St and continues onto Loftus St
Ausgrid	LV Cable (Street Lighting, In Service)	Across and along Loftus St. Ends on Parramatta Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Burton St. Continues along Loftus St and onto Parramatta Rd.
Ausgrid	LV Cable (Mains, In Service)	Along and across Loftus St.
Ausgrid	LV Cable (Mains, In Service)	Along Loftus St and ends on Parramatta Rd.
Ausgrid	LV Cable (Street Lighting, In Service)	Across Loftus St, adjacent to 2 Loftus St.
Ausgrid	LV Cable (Mains, In Service)	Along east side of Loftus St, adjacent to 8 Loftus St.
Ausgrid	LV Cable (Mains, In Service)	Along east side of Loftus St, adjacent to 8 Loftus St.
Ausgrid	LV Cable (Mains, Out of Service)	At 8 Loftus St.
Ausgrid	HV Cable (HV, Out of Service)	Along east side of Loftus St, adjacent to 8 Loftus St.
Ausgrid	HV Cable (HV, Out of Service)	Along east side of Loftus St, adjacent to 8 Loftus St.
Ausgrid	HV Cable (HV, In Service)	Along east side of Loftus St, from 8 Loftus St and onto Parramatta Rd
Ausgrid	HV Cable (HV, In Service)	Along east side of Loftus St, from 8 Loftus St and onto Parramatta Rd
Ausgrid	HV Cable (HV, In Service)	Along east side of Loftus St, from 8 Loftus St and onto Parramatta Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	HV Cable (HV, In Service)	Along east side of Loftus St, from 8 Loftus St and onto Parramatta Rd
Ausgrid	LV Cable (Mains, In Service)	Along Burton St and Broughton St. Ends at 1E Broughton St.
Ausgrid	LV Cable (Mains, Out of Service)	Along Broughton St. Ends at 1E Broughton St.
Ausgrid	LV Cable (Mains, Out of Service)	Along Broughton St. Ends at 1E Broughton St.
Ausgrid	HV Cable (HV, Out of Service)	Along Broughton St. Ends adjacent to 1E Broughton St.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Broughton St. Ends adjacent to 1E Broughton St.
Ausgrid	HV Cable (HV, In Service)	Along Broughton St. Ends at 1E Broughton St.
Ausgrid	HV Cable (HV, In Service)	Along Broughton St. Ends at 1E Broughton St.
Ausgrid	Auxiliary Cable (In Service)	Along Broughton St. Ends adjacent to 1 Broughton St.
Ausgrid	Auxiliary Cable (In Service)	Along Broughton St and continues along Parramatta Rd.
Ausgrid	HV Cable (HV, In Service)	Along and across Broughton St, from Burton St. Continues onto Parramatta Rd.
Ausgrid	HV Cable (HV, In Service)	Along and across Broughton St, from Burton St. Continues onto Parramatta Rd.
Ausgrid	HV Cable (HV, In Service)	Along and across Broughton St, from Burton St. Continues onto Parramatta Rd.
Ausgrid	Auxiliary Cable (In Service)	Along and across Broughton St, from Burton St.
Ausgrid	Auxiliary Cable (Out of Service)	Along and across Broughton St, from Burton St. Continues onto Parramatta Rd.
Ausgrid	Auxiliary Cable (Out of Service)	Along and across Broughton St, from Burton St. Ends at intersection with Parramatta Rd.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	On Broughton St and at 1E Broughton St.
Ausgrid	LV Cable (Mains, In Service)	On Broughton St and at 1E Broughton St.
Ausgrid	LV Cable (Mains, In Service)	Along Broughton St. From 1E Broughton St to 59 Parramatta Rd.
Ausgrid	HV Cable (HV, Out of Service)	Along north side of Burton St
Ausgrid	LV Cable (Mains, In Service)	Along west side of Broughton St and continues onto Parramatta Rd
Ausgrid	LV Cable (Mains, In Service)	Across Broughton St, at intersection with parramatta Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Street Lighting, In Service)	Along Parramatta Rd, starting at intersection with Broughton St
Ausgrid	LV Cable (Mains, In Service)	Across Parramatta Rd, adjacent to 56-60 Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, at intersection with Park Rd
Ausgrid	Auxiliary Cable (In Service)	Across and along Burton St. Ends at 26 Burton St.
Ausgrid	Auxiliary Cable (In Service)	At 26 Burton St.
Ausgrid	Auxiliary Cable (In Service)	At 26 Burton St.
Ausgrid	Auxiliary Cable (In Service)	Along Burwood Rd, from 26 Burton St.
Ausgrid	HV Cable (HV, In Service)	Along Parramatta Rd and Neich Pde
Ausgrid	HV Cable (HV, In Service)	Along Parramatta Rd
Ausgrid	HV Cable (HV, Out of Service)	Along Parramatta Rd, ending at Neich Pde
Ausgrid	HV Cable (HV, Out of Service)	Along Parramatta Rd, ending at Neich Pde
Ausgrid	HV Cable (HV, Out of Service)	Along Parramatta Rd, and continuing along Neich Pde
Ausgrid	Auxiliary Cable (In Service)	Along Parramatta Rd, and continuing along Neich Pde
Ausgrid	Auxiliary Cable (In Service)	Along Parramatta Rd, ending at Broughton St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd, ending at Broughton St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd, ending on Broughton St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd, ending at Neich Pde
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd and crossing Parramatta Rd, at Neich Pde
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	From Broughton St, adjacent to 59 Broughton St, and continues along Parramatta Rd
Ausgrid	H Cable (HV, Out of Service)	At corner of 59 Parramatta Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	From Broughton St, adjacent to 59 Broughton St, and continues along Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, adjacent to 49 Parramatta Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, between 29-45 and 49 Parramatta Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, between 29-45 and 49 Parramatta Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, adjacent to 29-45 Parramatta Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, adjacent to 2 Burwood Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Parramatta Rd, between Loftus Rd and 7-9 Parramatta Rd
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, adjacent to 1 Loftus St
Ausgrid	LV Cable (Mains, In Service)	Across Parramatta Rd and at 316 Parramatta Rd
Ausgrid	HV Cable (HV, In Service)	From 316 Parramatta Rd and continuing along Parramatta Rd. Ends at Loftus St.
Ausgrid	LV Cable (Street lighting, In Service)	Along Parramatta Rd, from Loftus St.
Ausgrid	Auxiliary Cable (Out of Service)	Along Parramatta Rd, from Loftus St and continuing along Shaftesbury Rd.
Ausgrid	Auxiliary Cable (Out of Service)	Along Parramatta Rd, from Loftus St and continuing along Shaftesbury Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, from intersection with Loftus St
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, from intersection with Loftus St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Burwood Rd, from intersection with Loftus St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Burwood Rd, from intersection with Loftus St
Ausgrid	HV Cable (HV, In Service)	From Parramatta Rd and continuing onto Shaftesbury Rd
Ausgrid	LV Cable (Street Lighting, Out of Service)	Along Parramatta Rd
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, near intersection with Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	Along Parramatta Rd, and continuing along Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	Along Parramatta Rd, near intersection with Shaftesbury Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Burwood Rd, from intersection with Shaftesbury Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Burwood Rd, from intersection with Shaftesbury Rd

OWNER	ASSET TYPE	LOCATION
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Burwood Rd, from intersection with Shaftesbury Rd
Ausgrid	Auxiliary Cable (In Service)	Across Burwood Rd, from intersection with Shaftesbury Rd
Ausgrid	Auxiliary Cable (In Service)	Across Burwood Rd, from intersection with Shaftesbury Rd
Ausgrid	LV Cable (Mains, Out of Service)	Along Parramatta Rd, and continuing along Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	At 1A Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	Along south side of Parramatta Rd and continues along Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	At intersection of Parramatta Rd and Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	Along Shaftesbury Rd, from 1 Shaftesbury Rd and continuing south
Ausgrid	LV Cable (Service, In Service)	Along Shaftesbury Rd, from 3 to 5A Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	At 5 Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	At 3 and 5 Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	At 6 Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	At 20 Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	Along Shaftesbury Rd, from Milton St, and continues onto Arthursleigh St
Ausgrid	LV Cable (Service, In Service)	At 30 Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	At 36 Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	Along Shaftesbury Rd, adjacent to 27A Shaftesbury Rd, and continues onto Arthursleigh St
Ausgrid	LV Cable (Mains, Out of Service)	Along Shaftesbury Rd, adjacent to 27A Shaftesbury Rd, and continues onto Arthursleigh St
Ausgrid	LV Cable (Mains, Out of Service)	From Arthursleigh St and continues onto Shaftesbury Rd to 33 Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	From Arthursleigh St and continues along and across Shaftesbury Rd to 33 Shaftesbury Rd
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Shaftesbury Rd at intersection with Arthursleigh St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Across Shaftesbury Rd at intersection with Arthursleigh St

OWNER	ASSET TYPE	LOCATION
Ausgrid	HV Cable (HV, In Service)	From Arthursleigh St and continuing south onto Shaftesbury Rd
Ausgrid	LV Cable (Service, In Service)	Along south side of Comer St
Ausgrid	LV Cable (Mains, In Service)	Along and across Burwood St and continues onto Meryla St. Ends at 76 Burwood Rd.
Ausgrid	LV Cable (Service, In Service)	Along Meryla St, adjacent to 70A Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	From 74-76 Burwood St, on Meryla St. Ends at 27 Meryla St.
Ausgrid	Auxiliary Cable (In Service)	Across and along Meryla St. From 74-76 Burwood Rd. Continues onto Shaftesbury Rd.
Ausgrid	HV Cable (HV, In Service)	Across and along Meryla St. From 74-76 Burwood Rd. Continues onto Shaftesbury Rd.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Meryla St and continuing along Burwood Rd. Ends at 78-82 Burwood Rd.
Ausgrid	LV Cable (Service, In Service)	At 33-39 Wilga St
Ausgrid	LV Cable (Service, In Service)	At 25 Wilga St
Ausgrid	LV Cable (Service, In Service)	At 21-23 Wilga St
Ausgrid	LV Cable (Service, In Service)	At 17 Wilga St
Ausgrid	LV Cable (Mains, In Service)	At 9 Wilga St
Ausgrid	LV Cable (Mains, In Service)	Along Wilga St, adjacent to 7 Wilga St
Ausgrid	LV Cable (Service, In Service)	At 3 Wilga St
Ausgrid	LV Cable (Mains, In Service)	At 3 Wilga St
Ausgrid	LV Cable (Mains, In Service)	From 3 Wilga St and on Shaftesbury Rd
Ausgrid	LV Cable (Mains, In Service)	From 3 Wilga St and along Shaftesbury Rd. Continues along Wilga St and ends at 11-15 Wilga St.
Ausgrid	HV Cable (HV, In Service)	From 3 Wilga St and along Shaftesbury Rd. Continues along Wilga St and ends at 9 Wilga St.
Ausgrid	HV Cable (HV, In Service)	Along Shaftesbury Rd and continues along Eurella St.
Ausgrid	LV Cable (Mains, In Service)	Along Shaftesbury Rd, at intersection with Wilga St.
Ausgrid	LV Cable (Street Lighting, In Service)	Along Shaftesbury Rd, at intersection with Wilga St.

OWNER	ASSET TYPE	LOCATION
Ausgrid	HV Cable (HV, Out of Service)	Along Shaftesbury Rd, starting at intersection with Wilga St.
Ausgrid	HV Cable (HV, Out of Service)	Along Shaftesbury Rd, starting at intersection with Wilga St.
Ausgrid	HV Cable (HV, Out of Service)	Along Shaftesbury Rd, starting at intersection with Wilga St.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Shaftesbury Rd, starting at intersection with Wilga St.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Shaftesbury Rd, starting at intersection with Wilga St.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Shaftesbury Rd, starting at intersection with Wilga St.
Ausgrid	LV Cable (Street Lighting, In Service)	Along Burwood Rd, near intersection with Wilga St
Ausgrid	LV Cable (Mains, In Service)	At 84-86 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Lane, ending at 84-86 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	Along Webbs Lane, starting at 84-86 Burwood Rd, and continuing along Wilga St and Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Lane, starting at 84-86 Burwood Rd, and continues onto Wilga St. Ends at 98 Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Webbs Lane, starting at 84-86 Burwood Rd, and ending at intersection with Wilga St.
Ausgrid	LV Cable (Mains, Out of Service)	Along Wilga St, from intersection with Webbs Lane. Continues onto Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Along Wilga St and continues onto Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	At intersection of Wilga St and Burwood Rd.
Ausgrid	LV Cable (Mains, In Service)	Across Wilga St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Wilga St. From intersection with Burwood Rd.
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Wilga St, from 98 Burwood Rd to 25 Wilga St.
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd and along Wilga St
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd and along Wilga St
Ausgrid	Lead Cable (Oil/Gas/Thermocouple)	Along Wilga St, from 25 Wilga St to intersection with Shaftesbury Rd.
Ausgrid	HV Cable (HV, Out of Service)	Along Wilga St, from 25 Wilga St to intersection with Shaftesbury Rd.

OWNER	ASSET TYPE	LOCATION
Ausgrid	HV Cable (HV, In Service)	Along Wilga St, between 25 and 17 Wilga St.
Ausgrid	HV Cable (HV, In Service)	Along and across Wilga St, between 9 to 17 Wilga St.
Ausgrid	HV Cable (HV, Out of Service)	Along Wilga St, from 9 Wilga St to intersection with Shaftesbury Rd.
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	HV Cable (HV, In Service)	At 100 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 100 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 100 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 100 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 100 Burwood Rd
Ausgrid	LV Cable (Mains, In Service)	At 100 Burwood Rd
Sydney Trains Central	HV Cable	Along Rowley St. Continues through Burwood Park and onto Burwood Rd, Wilga St, and Shaftesbury Rd.
Sydney Trains Central	HV Cable	Along Shaftesbury Rd.
TfNSW	Electric supply cable in 20NB GI Pipe	On north corner of Burwood Rd and Park Ave.
TfNSW	Electric supply cable in 40NB GI Pipe	Along Parramatta Rd, near intersection with Broughton St
TfNSW	Electric supply cable in 32 HD PVC Conduit	At south corner of Wilga St and Shaftesbury Rd

5.3 Demand Assessment

An assessment of the estimated net electrical demand for the development has been undertaken to assist in determining the required infrastructure upgrades. Demand forecasting and profiles were developed based on AS3000 Table C3 rates and Ausgrid NS109 Table B unless indicated otherwise. These are shown respectively in Table 10 and Table 11.

Table 9: AS3000:2007 – Table C3 Maximum Demand (non-domestic installations)

Type of occupancy		Energy demand	
		Range, VA/m ²	Average, VA/m ²
Offices	Light and Power	40-60	50
	Airconditioning		
	- cooling	30-40	35
	- reverse cycle	20-30	25
	- zonal reheat	40-60	50
	- variable volume	20	20
Carparks	Open air	0-10	5
	Basement	10-20	15
Retail shops	Light and power	40-100	70
	Airconditioning	20-40	30
Warehouses	Light and power	5-15	10
	Ventilation	5	5
	Special equipment	(use load details)	
Light industrial	Light and power	10-20	15
	Ventilation	10-20	15
	Airconditioning	30-50	40
	Special equipment	(use load details)	
Taverns, licensed clubs	Total	60-100	80
Theatres	Total	80-120	100

Table 10: Ausgrid NS109 – Table 4 Guide to Typical Load Densities

Type of Development		Range VA/m ²	Average VA/m ²
Offices -	- Not air-conditioned	40-60	50
	- air-conditioned - cooling only	70-100	85
	- reverse cycle	60-90	75
	- electrical reheat open areas	80-120	100
	- electrical reheat zonal or package units	90-130	110
	- variable volume	60-80	70
Car parking	- open air	0-10	5
	- ventilated	10-20	15
Warehousing	- unventilated	5-15	10
	- ventilated	10-20	15
Shops	- Not air-conditioned	40-100	70
	- air conditioned	60-140	100
Shopping centres (assumed air-conditioned shops)	- Not air-conditioned public areas	60-140	100
	- air conditioned public areas	80-160	120
Industrial	- light	10-20	15
	- if ventilated add	10-20	15
	- if air-conditioned add (see note)	30-50	40
Theatres, halls, etc	- ventilated	50-70	60
	- air-conditioned	80-120	100
Hotels, Taverns, Restaurants (Residential section, use Annexure C)		60-100	80

5.4 Forecast Demand

The maximum demand for peak usage was calculated to be approximately 20.3MVA. At this stage of the design, an 80% diversity factor has been used.

Table 11 Minimum and Maximum Estimated Electrical Demand¹

Development Type	Block Tag	Estimated Demand
Residential	A1	0.2
Residential	A2	0.1
Residential	A3	0.6
Residential	A4 (MLC)	0
Residential	B1	0.2
Residential	B2	0.5
Residential	B3	0.2
Residential	B4	0.2
Residential	B5 (MLC)	0
Residential	B6 (OS)	0
Residential	C1	0.1
Residential	C2	0.2
Residential	C3	0.9
Residential	C4 (SCC)	0
Residential	C5	0.5
Residential	D1	0.5
Residential	D2	0.8
Residential	D3	0.6
Residential	D4	0.4
Residential	D5	0.4
Residential	D6	0
Residential	D7	0
Residential	D8	0.2
Residential	D9	0.2
Residential	E1 (Metro)	0.0
Residential	E2	0.1
Residential	E3	0.7
Residential	E4	1.0
Residential	E5	0.8
Residential	E6	0.6
Residential	E7 (OS)	0

Development Type	Block Tag	Estimated Demand
Residential	E8	0
Residential	F1	0.5
Residential	F2	1.2
Residential	F3	0.5
Residential	F4	0.4
Residential	F5	0.3
Residential	F6	0.2
Residential	G1	0.9
Residential	G2	0.2
Residential	G3 (OS)	0.0
Residential	H1	1.6
Residential	H2	0.5
Residential	I1	0.3
Residential	I2	0.8
Residential	I3 (OS)	0
Residential	I4	0.1
Residential	J1	0.0
Residential	J2	0.5
Residential	J3	0.2
Non-Residential	A1	0.1
Non-Residential	A2	0
Non-Residential	A3	0
Non-Residential	A4 (MLC)	0
Non-Residential	B1	0.1
Non-Residential	B2	0
Non-Residential	B3	0
Non-Residential	B4	0
Non-Residential	B5 (MLC)	0
Non-Residential	B6 (OS)	0
Non-Residential	C1	0.1
Non-Residential	C2	0
Non-Residential	C3	0
Non-Residential	C4 (SCC)	0
Non-Residential	C5	0
Non-Residential	D1	0.2

Development Type	Block Tag	Estimated Demand
Non-Residential	D2	0
Non-Residential	D3	0
Non-Residential	D4	0.1
Non-Residential	D5	0
Non-Residential	D6	0
Non-Residential	D7	0
Non-Residential	D8	0.1
Non-Residential	D9	0
Non-Residential	E1 (Metro)	0.4
Non-Residential	E2	0
Non-Residential	E3	0
Non-Residential	E4	0.3
Non-Residential	E5	0
Non-Residential	E6	0
Non-Residential	E7 (OS)	0
Non-Residential	E8	0.2
Non-Residential	F1	0.2
Non-Residential	F2	0.4
Non-Residential	F3	0.2
Non-Residential	F4	0
Non-Residential	F5	0
Non-Residential	F6	0
Non-Residential	G1	0
Non-Residential	G2	0
Non-Residential	G3 (OS)	0
Non-Residential	H1	0
Non-Residential	H2	0
Non-Residential	I1	0
Non-Residential	I2	0
Non-Residential	I3 (OS)	0
Non-Residential	I4	0
Non-Residential	J1	0
Non-Residential	J2	0
Non-Residential	J3	0
Total (MVA)		20.8

Development Type	Block Tag	Estimated Demand
Total (MVA, including 0.8 Diversity Factor)		20.3
Total (MVA, including 0.8 Diversity Factor, +15%)		23.3
Total (MVA, including 0.8 Diversity Factor, -15%)		17.2

¹ Since the demand calculations do not include carparks, lifts, or impacts of ESD initiatives, a $\pm 15\%$ range is recommended.

5.5 Coordination with Other Services

Coordination of the proposed electrical infrastructure with other services in the proposed street network would generally be based on the Streets Opening Conference standards.

Ausgrid 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 will also comply with Ausgrid standards.

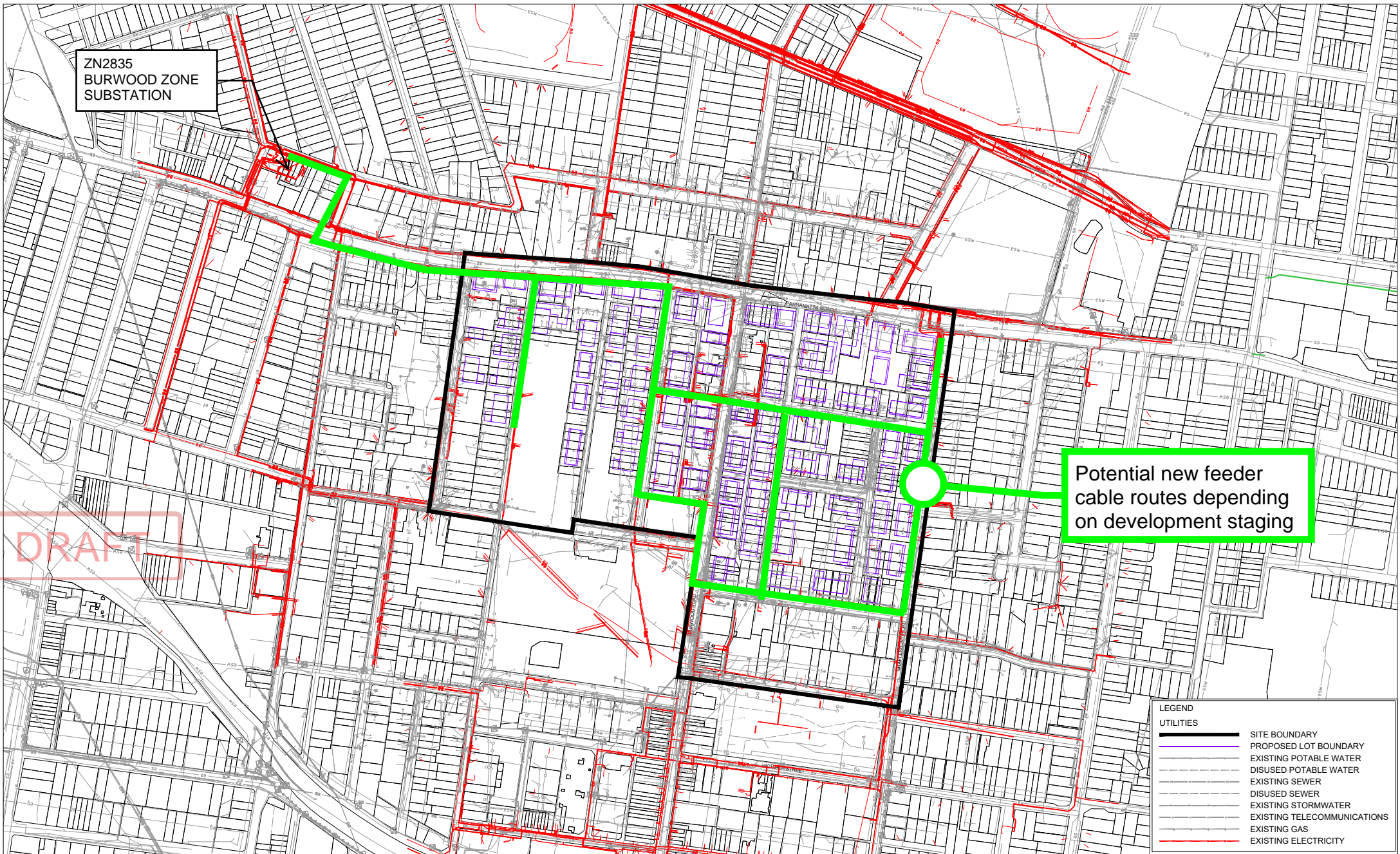
It is assumed that developers would be responsible for undergrounding nearby electrical assets as part of their development process. Where this has not occurred historically, the overhead powerlines will likely be retained unless removed as a part of any future council public domain upgrades

5.6 Approvals and Next Steps

The key next steps in progressing the delivery of electrical infrastructure through detailed design including the formal Ausgrid approval processes consists of the following (in conjunction with further Ausgrid coordination and consultation with all placeholders):



1. Undertake site investigations to confirm the layout and extent of existing services (including non-Ausgrid assets) – Post Rezoning/Development Application;
2. Confirm arrangements for supply and ownership of street lighting – As a part of Development Applications;
3. Confirm extent of existing infrastructure that can be abandoned and/or requires diversion – Post Rezoning/Development Application;
4. Develop duct masterplan and make submission to set up case with Ausgrid – As a part of Development Applications;
5. Develop staged designs for delivery of the new infrastructure – As a part of detailed design;
6. Liaise with Burwood Municipality and City of Canada Bay LGAs to confirm requirements for undergrounding of existing infrastructure – As a part of Development Applications;
7. Ausgrid to provide detailed requirements – As a part of Development Applications, As a part of detailed design;
8. Ausgrid to issue Design Information Pack (DIP), Design Contract & Deed of Agreement As a part of detailed design; and
9. Submit detailed design of individual packages for approval – As a part of detailed design;

It is noted that the above is for delivery of the duct network through the street network. It is expected that the buildings will need to make separate applications for connection, including installation of new feeders.



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Figure 9 Electrical Plan

6 Gas

6.1 Background

Gas servicing to the precinct site is provided by Jemena Gas.

6.2 Existing On-Site Utility Infrastructure

The existing gas infrastructure within and in close proximity to the development site has been identified based on BYDA records. These records indicate the presence of numerous gas mains within and adjacent to the development boundary. These are detailed within the table below.

Table 12 Existing Gas Infrastructure

OWNER	ASSET TYPE	LOCATION
Jemena	210kPA Medium Pressure gas main	Across Broughton St
Jemena	210kPA Medium Pressure gas main	Along east side of Broughton St
Jemena	210kPA Medium Pressure gas main	Across Burton St
Jemena	210kPA Medium Pressure gas main	Along Parramatta Rd and continuing along west side of Burwood Rd
Jemena	210kPA Medium Pressure gas main	Along west side of Burwood Rd
Jemena	210kPA Medium Pressure gas main	Along Comer St, ending at intersection with Burwood Rd
Jemena	210kPA Medium Pressure gas main	Along north side of Burton St
Jemena	7kPA Low Pressure gas main	Along the north side of Parramatta Rd, ending at 56-60 Parramatta Rd
Jemena	7kPA Low Pressure gas main	Along the south side of Parramatta Rd, ending at 360-370 Parramatta Rd
Jemena	7kPA Low Pressure gas main	Along the east side of Loftus St
Jemena	7kPA Low Pressure gas main	Along Parramatta Rd, at intersection with Loftus St
Jemena	7kPA Low Pressure gas main	Along the south side of Parramatta Rd, from intersection with Burwood Rd
Jemena	7kPA Low Pressure gas main	Along the east side of Grantham St
Jemena	7kPA Low Pressure gas main	Along the north side of Rowley St
Jemena	7kPA Low Pressure gas main	Along the east side of Park Rd
Jemena	7kPA Low Pressure gas main	Along Britannia Ave

OWNER	ASSET TYPE	LOCATION
Jemena	7kPA Low Pressure gas main	Along the north side of Comer St
Jemena	7kPA Low Pressure gas main	Along the east side of Neich Pde
Jemena	7kPA Low Pressure gas main	Across Neich Pde, adjacent to 37 Neich Pde
Jemena	7kPA Low Pressure gas main	Along Shaftesbury Rd
Jemena	7kPA Low Pressure gas main	Along Shaftesbury Rd, starting at intersection with Eurella Rd
Jemena	7kPA Low Pressure gas main	Along Milton St
Jemena	7kPA Low Pressure gas main	Along Archer St, from Milton St to 41 Archer St
Jemena	7kPA Low Pressure gas main	Along New St
Jemena	7kPA Low Pressure gas main	Along Esher St
Jemena	7kPA Low Pressure gas main	Along Meryla St
Jemena	7kPA Low Pressure gas main	Along Wilga St
Jemena	7kPA Low Pressure gas main	Along the east side of Burwood Rd
Jemena	7kPA Low Pressure gas main	Along the west side of Burwood Rd
Jemena	7kPA Low Pressure gas main	Along Comer St and Burwood Rd

6.3 Demand Assessment

An assessment of the net gas demand has not been completed as it is assumed that there will be no new gas connections within the precinct. However, it is noted that existing properties may retain their current gas connections.

6.4 Coordination with Other Services

Coordination of the proposed gas infrastructure with other services in the proposed street network would generally be based on the Streets Opening Conference standards.

Jemena to 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 the table below.

Table 13 Jemena minimum separation between utilities

Utility	Minimum Separation	
	Gas Mains up to 75mm diameter	Gas Mains of 110mm diameter or larger
Telecommunication cables and/or conduits	150 mm	300 mm
Protected ² Low Voltage electricity cables	150 mm	300 mm
Protected ² High Voltage electricity cables	300 mm	300 mm

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

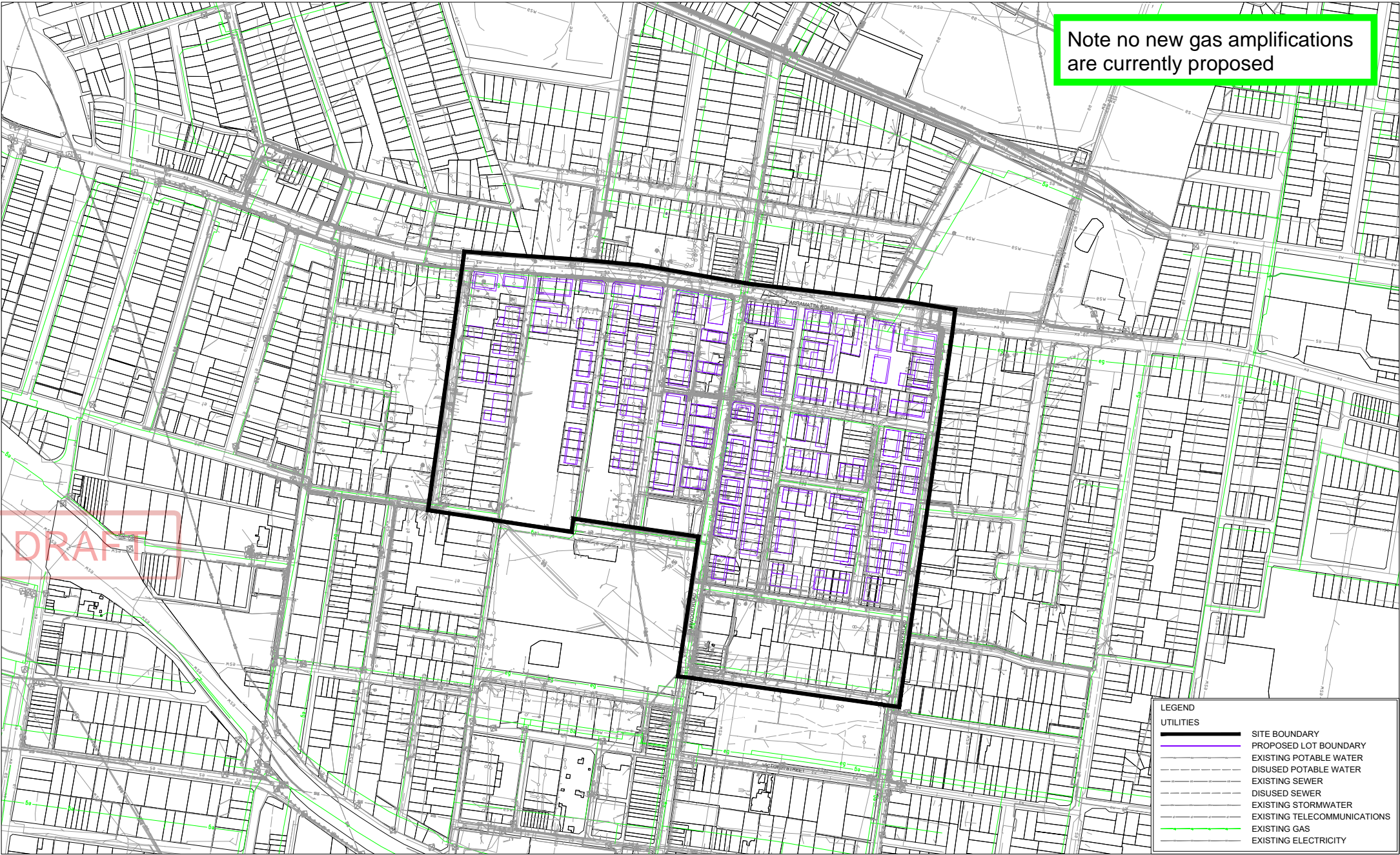
6.5 Approvals and Next Steps

Jemena does not have a formal approval process, with supply arrangements being confirmed by Jemena as part of their quotation for construction to be provided following submission of applications for connection.

The formal approval process for provision of Jemena infrastructure to be progressed through detailed design processes consists of the following main steps:

1. Undertake site investigations to confirm the layout and extent of existing services (including non-Jemena infrastructure) – Post Rezoning/Development Application.
2. Submit masterplan including staging of delivery to Jemena for agreement – As a part of detailed design.
3. Submit application for design to Jemena for individual detailed design packages (to include proposed alignment) – As a part of detailed design; and
4. Jemena will provide a quote for construction works – As a part of detailed design.

It is noted that the above is for delivery of the gas network through the street network, depending on the strata arrangement individual buildings will still need to make separate applications for each connection



Note no new gas amplifications
are currently proposed

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LEGEND	
UTILITIES	
	SITE BOUNDARY
	PROPOSED LOT BOUNDARY
	EXISTING POTABLE WATER
	DISUSED POTABLE WATER
	EXISTING SEWER
	DISUSED SEWER
	EXISTING STORMWATER
	EXISTING TELECOMMUNICATIONS
	EXISTING GAS
	EXISTING ELECTRICITY

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Figure 10 Gas Plan

7 Telecommunications

7.1 Background

Numerous communication providers have assets running within and adjacent to the site:

- Broadband;
- LBNCo;
- NBN Co NswAct;
- OptiComm;
- Optus/Uecomm Nsw;
- Telstra, NSW;
- TPG Telecom (NSW);
- Verizon; and
- Vocus.

While there are numerous utility providers within the development, if a developer does not choose another developer, then NBN is the infrastructure provider of last resort for developments greater than 100 units.

The existing telecommunication services is shown in the plan at the end of this section.

7.2 Existing On-Site Utility Infrastructure

7.2.1 Broadband

Existing underground Broadband services have been located within the site as well as along Rowley St, Comer St, Burwood Rd, Meryla St, and Shaftesbury Rd. It has been assumed that the existing Broadband services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.2 LBNCo

No LBNCo assets have been identified within the site or adjacent to the site boundary.

7.2.3 NBN

Existing underground NBN services have been located within the site as well as along Broughton St, Burton St, Loftus St, Parramatta Rd, Shaftesbury Rd, Wilga St, Burwood Rd, Comer St, Rowley St, and Grantham St. It has been assumed that the existing NBN services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.4 OptiComm

Existing underground OptiComm services have been located on Burwood Rd, near the intersection with Wilga St. It has been assumed that the existing OptiComm services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent

with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.5 Optus/ Uecomm

Existing underground Optus services have been located within the site as well as along Shaftesbury Rd and Wilga St. Existing underground Uecomm services have been located within the site and on Burton St, Rowley St, Grantham St, Comer St, Burwood Rd, and Wilga St. It has been assumed that the existing Optus/Uecomm services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.6 Telstra

Existing underground Telstra services have been located within the site as well as along Shaftesbury Rd, Wilga St, Burwood Rd, Comer St, Grantham St, Parramatta Rd, Broughton St, Burton St, and Loftus St. It has been assumed that the existing Telstra services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.7 TPG

Existing underground TPG services have been located within the site as well as on Parramatta Rd, Burton St, Comer St, Wilga St, and Loftus St. It has been assumed that the existing TPG services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.8 Verizon

Existing underground Verizon services have been located within the site as well as on Burwood Rd and Shaftesbury Rd. It has been assumed that the existing Verizon services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.2.9 Vocus

Existing underground Vocus services have been located Burwood Rd, near the intersection with Meryla St. It has been assumed that the existing Vocus services at the site boundary can be maintained and services within will be required to be abandoned, relocated, or replaced as a part of the site development, since the existing levels are unlikely to be consistent with the proposed building locations. This assumption is to be confirmed during detailed design of the Burwood North Precinct Masterplan.

7.3 Demand Assessment

No demand has been calculated for telecommunications infrastructure as it cannot be estimated in the same way as other utilities.

7.4 Coordination with Other Services

Coordination of the proposed communications infrastructure with other services in the proposed street network would generally be based on the Streets Opening Conference standards.

The clearances for NBN services from other utilities is given in Section 5.2.13 of “New Development: Deployment of the NBN Co Conduit and Pit Network – Guidelines for Developers”, these requirements are presented in Figure 11.

Figure 11: NBN Clearances from other carriers and underground services

Service Item		Minimum Radial Clearances* ¹
Gas Pipe	Over 110 mm	300 mm
	110 mm or Less	150 mm
Power	High Voltage	300 mm
	Low Voltage	100 mm* ²
Water Mains	High Pressure/Capacity	300 mm
	Local Reticulation	150 mm
Sewer	Main	300 mm
	Connection Pipe	150 mm
Other Telecommunications	100 mm* ¹	

* 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.

It is assumed that redundant cabling is to remain onsite unless conflicting with development lots where it may progressively be replaced or removed by either the developer or NBN.

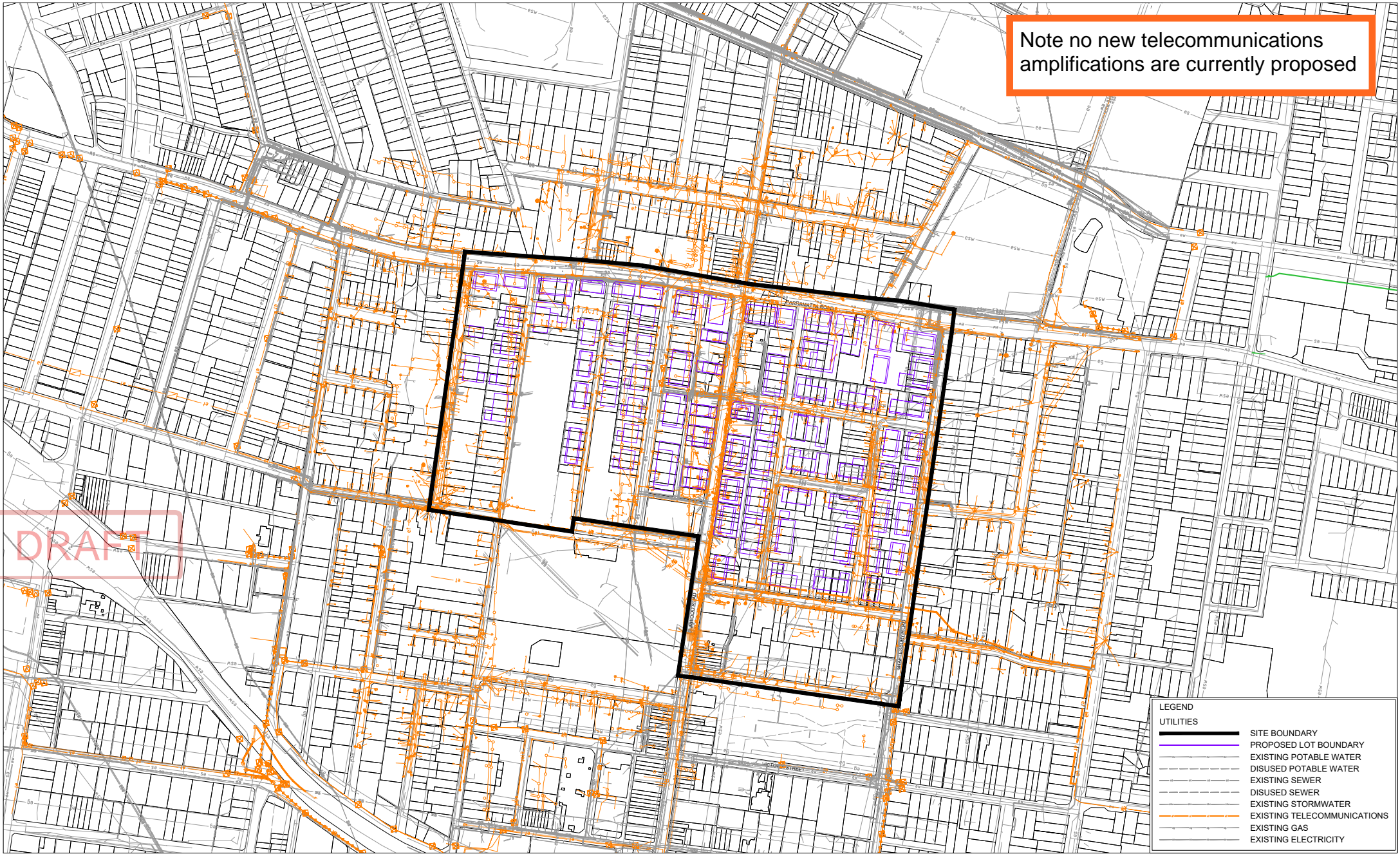
7.5 Approvals and Next Steps

Confirmation is required from NBN Co that the site is eligible for supply from their network. Following this an initial application is required and a formal agreement entered between NBN Co. and the developer prior to construction works commencing (this does not prevent designs from being approved). The next steps generally consist of the following:

1. Undertake site investigations to confirm the layout and extent of existing services (including private infrastructure associated with previous land-uses) – Post Rezoning/Development Application;
2. Liaise with existing telecommunication providers to confirm the requirement for diversion and/or relocation of their existing infrastructure – Post Rezoning/Development Application;
3. Confirm proposed infrastructure masterplan (including staging) and in principle supply arrangements with NBN or other provider - As a part of Development Applications;
4. Initial application submitted to NBN Co. for supply of the site from their network - As a part of Development Applications;
5. NBN Co. to confirm supply can be provided and provide draft agreement – As a part of detailed design;
6. Revisions of agreement where required – As a part of detailed design;
7. The developer to sign NBN Co. agreement – As a part of detailed design;
8. Liaise with existing telecommunication providers for quotes for diversions or abandonments including any interim works – As a part of detailed design; and

9. Submit detailed design of individual packages for approval – As a part of detailed design.

It is noted that the above is for delivery of the NBN pit and pipe network through the new street network, it is expected that the buildings will need to make separate applications for connection.



Note no new telecommunications amplifications are currently proposed

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LEGEND

UTILITIES

- SITE BOUNDARY
- PROPOSED LOT BOUNDARY
- EXISTING POTABLE WATER
- DISUSED POTABLE WATER
- EXISTING SEWER
- DISUSED SEWER
- EXISTING STORMWATER
- EXISTING TELECOMMUNICATIONS
- EXISTING GAS
- EXISTING ELECTRICITY

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Figure 12 Telecommunications Plan

8 Stormwater

8.1 Flooding

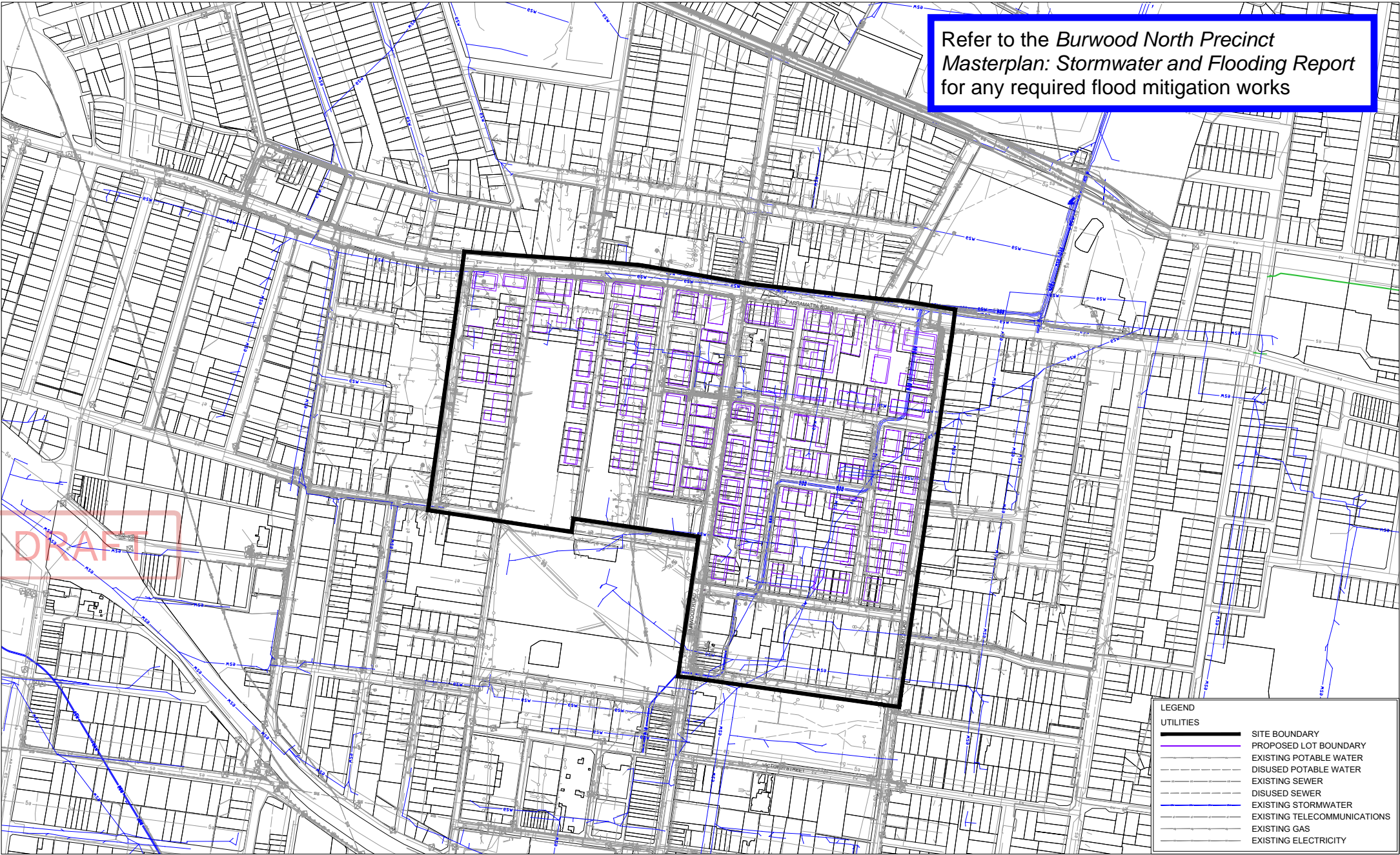
Refer to Mott Macdonald's *Burwood North Master Plan Flooding Report* for detailed information relating to flooding.

8.2 Existing Stormwater infrastructure

Stormwater infrastructure within the site is owned by Burwood Council, City of Canada Bay Council, and Sydney Water.

The existing stormwater infrastructure within and in close proximity to the development site has been identified based on BYDA records. These records indicate the presence of numerous mains within and adjacent to the development boundary. Refer to Mott Macdonald's *Burwood North Master Plan Flooding Report* for further information.

It should be noted that Council currently undertakes CCTV inspection to 10% of its stormwater assets at each financial year. These may include assets in Burwood North Precinct. This report will be updated at later stages of the project to include assets from this inspection.



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Figure 13 Stormwater Plan

9 Separation Between Services

9.1 Streets Opening Conference Service Corridors

The NSW Streets Opening Coordination Council (SOCC) is a voluntary association of member organisations that have agreed to meet to resolve issues on a cooperative basis. The most widely used publication is the Guide to Codes and Practices for Street Opening (2018).

This guide is published to document industry practice and provide essential information and guidance on managing street openings for the provision of underground utility services, the typical allocation of utilities is shown below in Figure 14.

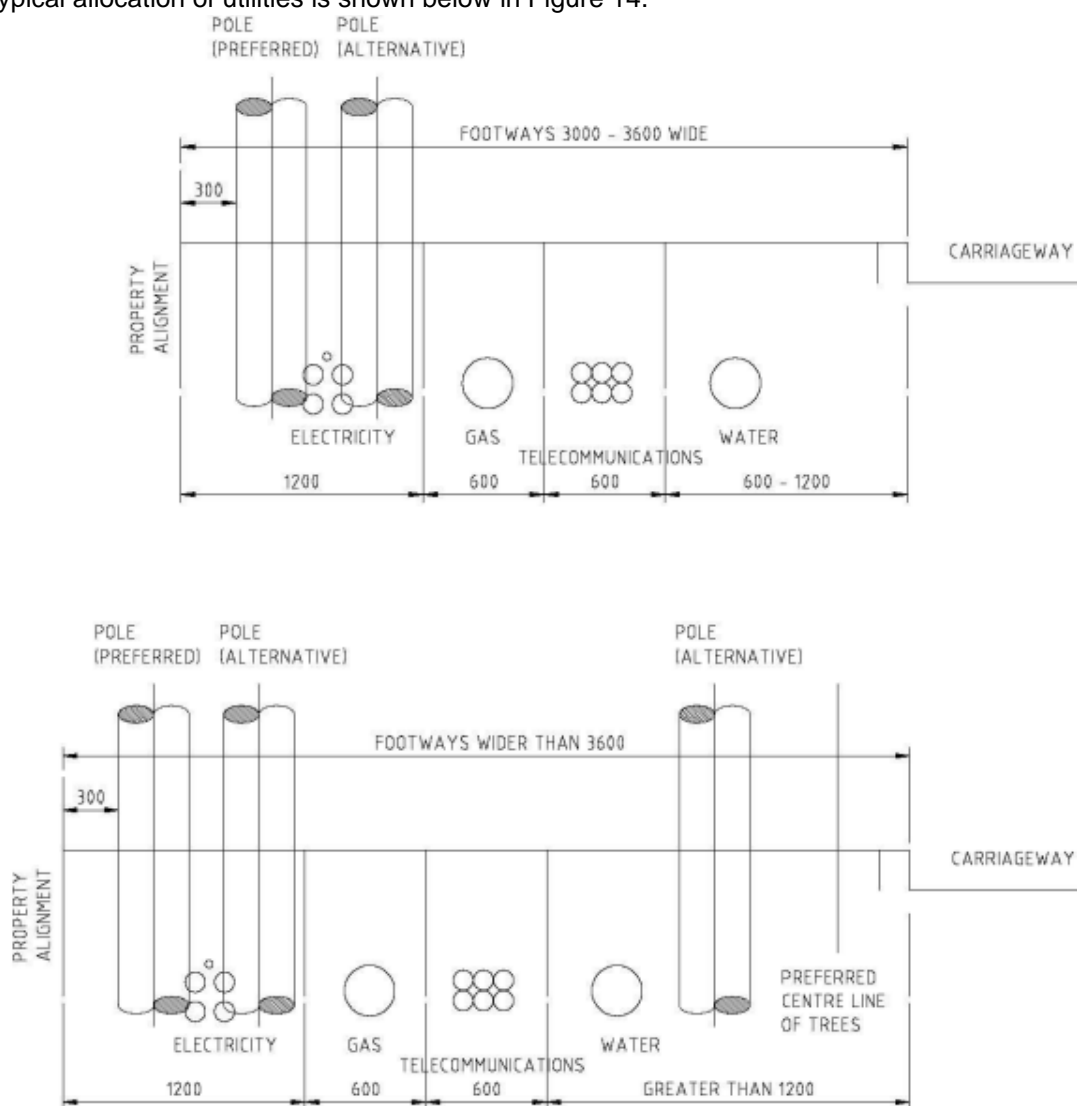


Figure 14 SOCC Utility Allocation

This section does not typically allow for the provision of precinct utilities or street trees and while elements of this have been used for the concept Utilities Services instead key elements from the Western Sydney Engineering & Street Design Manual have been used to better align with the Precinct goals.

10 Conclusion

10.1 Assessment Summary

This Utility Servicing Assessment has concluded that servicing is available to site with indicative connections for each service being:

- **Potable Water:** The site is well serviced from trunk assets on Parramatta Road, but local reticulation services may require amplification as a result of the proposed development uplift;
- **Sewer:** The site is well serviced from trunk assets on Parramatta and Neich Road, but local reticulation services may require amplification as a result of the proposed development uplift, additionally the reticulation network predominately runs under low density residential lots and may need to be relocated to the street network as a part of any change in building form;
- **Electricity:** It is likely that new feeder cables from the Burwood Zone substation will be required when existing LV distribution is at capacity. Additionally existing overhead power may need to be under grounded;
- **Gas:** While there are existing gas services to a large proportion of the site, consideration should be given to a "zero-gas" precinct to reduce use of non-renewable resources; and
- **Telecommunications:** No servicing constraints based on anticipated land uses however should this change and high use development (e.g., data centre, research, or university) then potential infrastructure upgrades may be required.

It should be noted that the above assessment is preliminary only and will be further developed upon consultation with utility providers. Additionally, restoration of any future utility upgrades that will affect Council road reserve assets will be dealt with Council's current road restoration policies.

It should also be noted that the development should additionally consider impacts upon other utility assets owned by Transport for NSW and Sydney Trains Central as they are within and adjacent to the site. The details of these assets have been included in this report.

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