

REPORT

Frasers Property

Telopea Estate Redevelopment

Concept DA - Utilities Servicing

20 November 2020

Prepared by

J. Wyndham Prince
Phone: 02 4720 3300
Email: jwp@jwprince.com.au
ABN: 67 002 318 621

Prepared for

Frasers Property
Level 2, 1C Homebush Bay Drive
Rhodes NSW

Version control



Issue	Author	Reviewer	Approver	Date approved
A	KS 05/06/2020	MS, CM 05/06/2020	MS 05/06/2020	05/06/2020
B	KS 26/06/2020	SR, MS, CM 26/06/2020	MS 26/06/2020	26/06/2020
C	KS 07/07/2020	SR MS 07/07/2020	MS 07/07/2020	07/07/2020
D	KS 15/07/2020	MS 15/07/2020	MS 15/07/2020	15/07/2020
E	KS 20/11/20 20	DJ 20/11/2020	DJ 20/11/2020	20/11/2020

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1. EXECUTIVE SUMMARY

This report has been prepared by J. Wyndham Prince Pty Ltd on behalf of *Frasers Property Telopea Developer Pty Ltd* (Frasers) and accompanies a State Significant Development Application (SSDA) submitted to the NSW Department of Planning, Industry and Environment (DPIE). The SSDA seeks Concept approval, in accordance with Division 4.4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), for the staged redevelopment of the '**Telopea Estate**', as well as a detailed proposal for the first stage of development, known as '**Stage 1A**'.

The purpose of this report is to provide utilities servicing assessment suitable for the Concept proposal applicable to the current Masterplan for redevelopment of Telopea Estate.

The key utility services expected to be required are;

- Sewerage via Sydney Water Corporation
- Potable water via Sydney Water Corporation
- Electricity via Endeavour Energy
- Cable communications via NBN Co
- Mobile communications by at least Telstra and Optus

Other utility services that may be needed or will be managed during development works are:

- Natural gas via Jemena
- Fibre and hybrid fibre services via Optus
- Copper cabling and fibre services via Telstra

Based on DBYD information, responses to date from authorities and expected future responses, servicing assessment, and site inspection, utility services can be suitably provided for the proposed redevelopment subject to some lead-in works, augmentations, network adjustments, and changes detail highlighted within the report. These have been summarised in the table below.

Coordination and detailing of utility servicing would occur following Concept consent for the redevelopment. Authorities such as Sydney Water and Endeavour Energy will have specific design requirements some of which will be contained in their feasibility assessment responses. Other details would be resolved at time of application for the particular utility service.

In summary, no utility has an impediment that would prevent the redevelopment of Telopea Estate. Utility provision can be staged.

Utility	Authority	Can the Masterplan area be serviced by existing network	Summary of Network Upgrades / Changes Required	Other Network Considerations
Sewerage	Sydney Water Corporation	Yes for Stage 1a and much of Stage 3b based on staging. Amplification of sections would be needed for the core area at some time after Stage 1a.	Network amplification and expansion for core area to Evans Rd required after Stage 1a Potential amplification for part of the South precinct	Sydney Water feasibility assessment guidance. Specific design requirements. Potential additional network upgrades or changes from network age, existing alignment clashes and maintaining existing services

Utility	Authority	Can the Masterplan area be serviced by existing network	Summary of Network Upgrades / Changes Required	Other Network Considerations
Potable Water	Sydney Water Corporation	The network will require larger size mains for the height of buildings in the core area. Outside of the core area will need some larger mains or augmentation	Progressive replacement or augmentation of watermains is needed as development occurs Lead-in trunk watermain required for overall supply based on development staging	Early planning of lead-in works Sydney Water feasibility assessment guidance. Specific design requirements. Potential additional network upgrades or changes from network age, existing alignment clashes and maintaining existing services
Electricity	Endeavour Energy	Yes, for much of the north, south and possibly east, but existing supply will be exceeded and capacity increased required. The core area will need early capacity increase.	4 x 11kV lead-in feeders required for full development Chamber substations in buildings Undergrounding of existing overhead networks in nominated locations	Early planning of lead-in works Endeavour Energy specific design requirements New streetlighting
Gas	Jemena	Yes for portions of development needing gas, with minor augmentation	Some mains augmentation and new connection lines or network reconfiguration	Temporary disconnection of existing service at buildings to be demolished and redeveloped.
National Broadband Network (NBN)	NBN Co	Yes	Some realignments in the core area and minor network refinements. Possible extra backhaul for capacity to the core	None foreseen. Possible use or incorporation of Optus hybrid fibre network as part of NBN
Telecoms	Telstra	Copper wire network use mostly not required due to NBN. Limited fibre network available in part of core	Possible use or incorporation of part of Telstra fibre network as part of NBN	Connection to key Telstra equipment to be retained. Preservation of required sections of Telstra conduits
Telecoms	Optus	Yes	Undergrounding of existing overhead networks	Early planning for undergrounding works to avoid utilities congestion in road verges

2. INTRODUCTION

This report has been prepared by J. Wyndham Prince Pty Ltd on behalf of *Frasers Property Telopea Developer Pty Ltd* (Frasers) and accompanies a State Significant Development Application (SSDA) submitted to the NSW Department of Planning, Industry and Environment (DPIE). The SSDA seeks Concept approval, in accordance with Division 4.4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), for the staged redevelopment of the '**Telopea Concept Plan Area**' (CPA), as well as a detailed proposal for the first stage of development, known as '**Stage 1A**'.

The purpose of this report is to provide utilities servicing assessment suitable for the Concept Plan Area for redevelopment of Telopea Precinct.

2.1. Background

The Telopea CPA forms part of the **Telopea Precinct Master Plan** (adopted March 2017), which was prepared by NSW Land and Housing Corporation (LAHC) and Parramatta City Council to facilitate the rezoning of the precinct which occurred in December 2018. The Master Plan seeks to revitalise the Telopea Precinct through the redevelopment of LAHC's social housing assets, as well as sites under private ownership, to deliver an integrated community with upgraded public domain and community facilities – and to capitalise on access to the new Parramatta Light Rail network.

The Telopea CPA is the land identified in Figure 1 and is currently owned by LAHC and incorporates land owned by Council and Telopea Christian Church. The proposed redevelopment of the CPA is part of the NSW Government Communities Plus program, which seeks to deliver new communities where social housing blends with private and affordable housing with good access to transport, employment, improved community facilities and open space. The program seeks to leverage the expertise and capacity of the private and non-government sectors.

In December 2019, the NSW Government announced that the Affinity Consortium, comprising Frasers and Hume Community Housing, were awarded the contract to redevelop the Telopea CPA. The SSDA represents the first step in the delivery of the planned redevelopment of the Telopea CPA.

2.2. Site description

Telopea is located in the Parramatta Local Government Area (LGA). It is approximately 4km north-east of the Parramatta Central Business District (CBD), 6km south-west of Macquarie Park Strategic Centre, and 17km from Sydney CBD.

The Telopea CPA site is approximately 13.4 (ha) not including Council and church land. The site also contains 99 individual LAHC houses. It currently accommodates 486 social housing dwellings, across a mix of single houses, townhouse, and 3-9 storey residential flat buildings. The CPA currently accommodates a range of existing community facilities including the Dundas Community Centre, Dundas Branch Library, Community Health Centre, Hope Connect church, and Telopea Christian Centre.

The immediate surrounds comprise predominantly residential properties within an established landscape setting. The broader Precinct contains the Telopea Public School, a neighbourhood centre known as the Waratah Shops, and two large Council parks known as Sturt Park and Acacia Park.

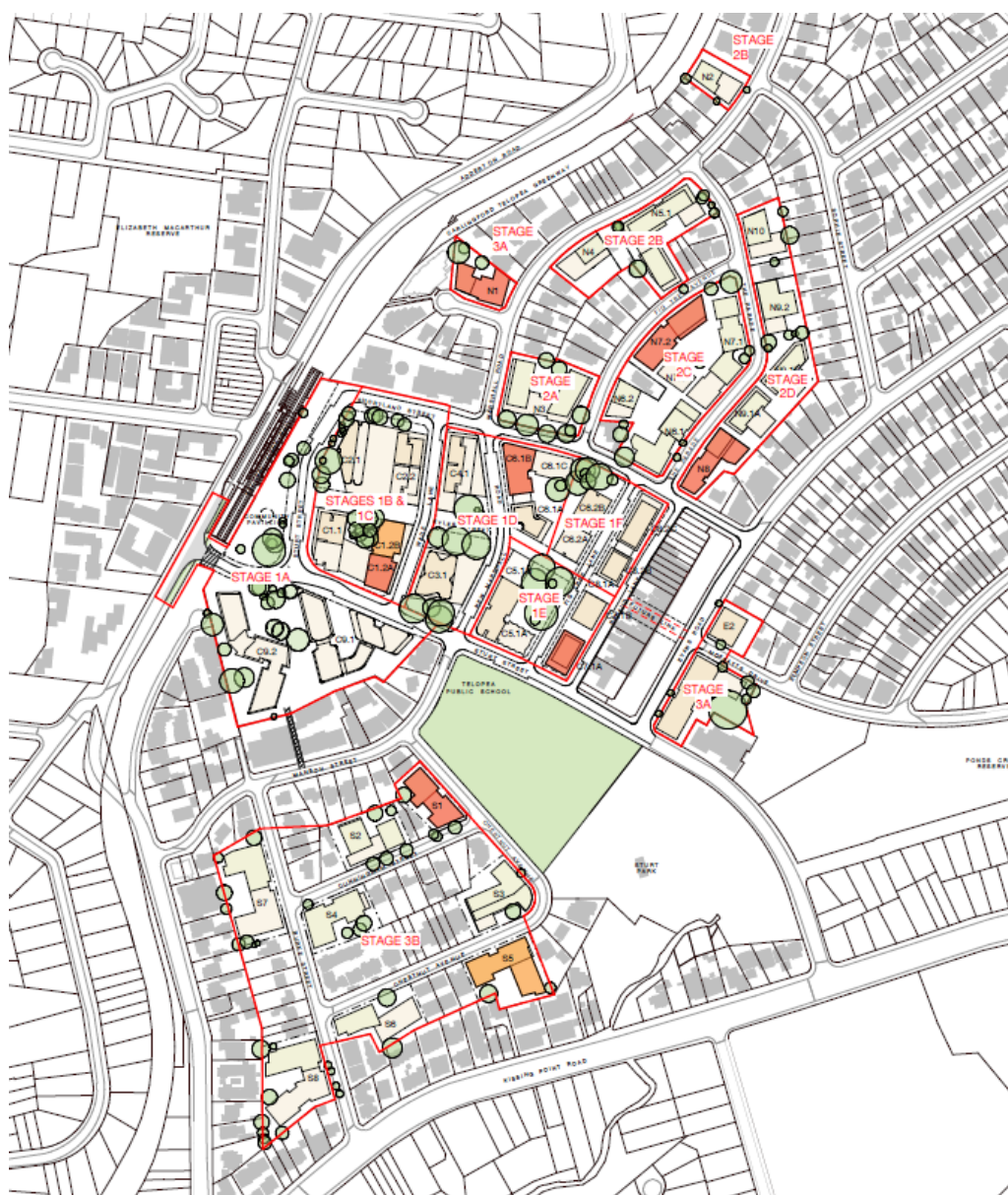


Figure 1 – Telopea Concept Plan Area

2.3. Proposed development

The SSDA seeks Concept Approval for the staged redevelopment of the Telopea CPA, as well as a detailed proposal for the first stage of development. The Concept proposal sets out the maximum building envelopes and GFA that can be accommodated across the Estate and identifies the land uses and public infrastructure upgrades to be provided. The Concept proposal will establish the planning and development framework which any future development application will be assessed against.

The Telopea CPA proposal comprises:

- A mixed-use development including:
 - Approximately 4700 dwellings, including a mix of social, affordable and market dwellings
 - Inclusion of a new retail precinct with a new supermarket, food and beverage, and speciality retail
 - Proposed childcare facility
 - Proposed combined library and community centre
 - Proposed combined Church, Residential Aged Care Facility and Independent living unit's facility

- Delivery of new public open space, including:
 - A new light rail plaza
 - Hill top park
 - Elyes pedestrian link
 - Open space associated with the proposed library
- Retention of existing significant trees
- Road and intersection upgrades
- Cycle way upgrades
- Upgrade of utility services

The Telopea CPA is divided into four precincts known as Core, North, South and East incorporating a total of 29 parcels. The Concept proposal is further detailed in the Urban Design Report prepared by Bates Smart and Hassell.

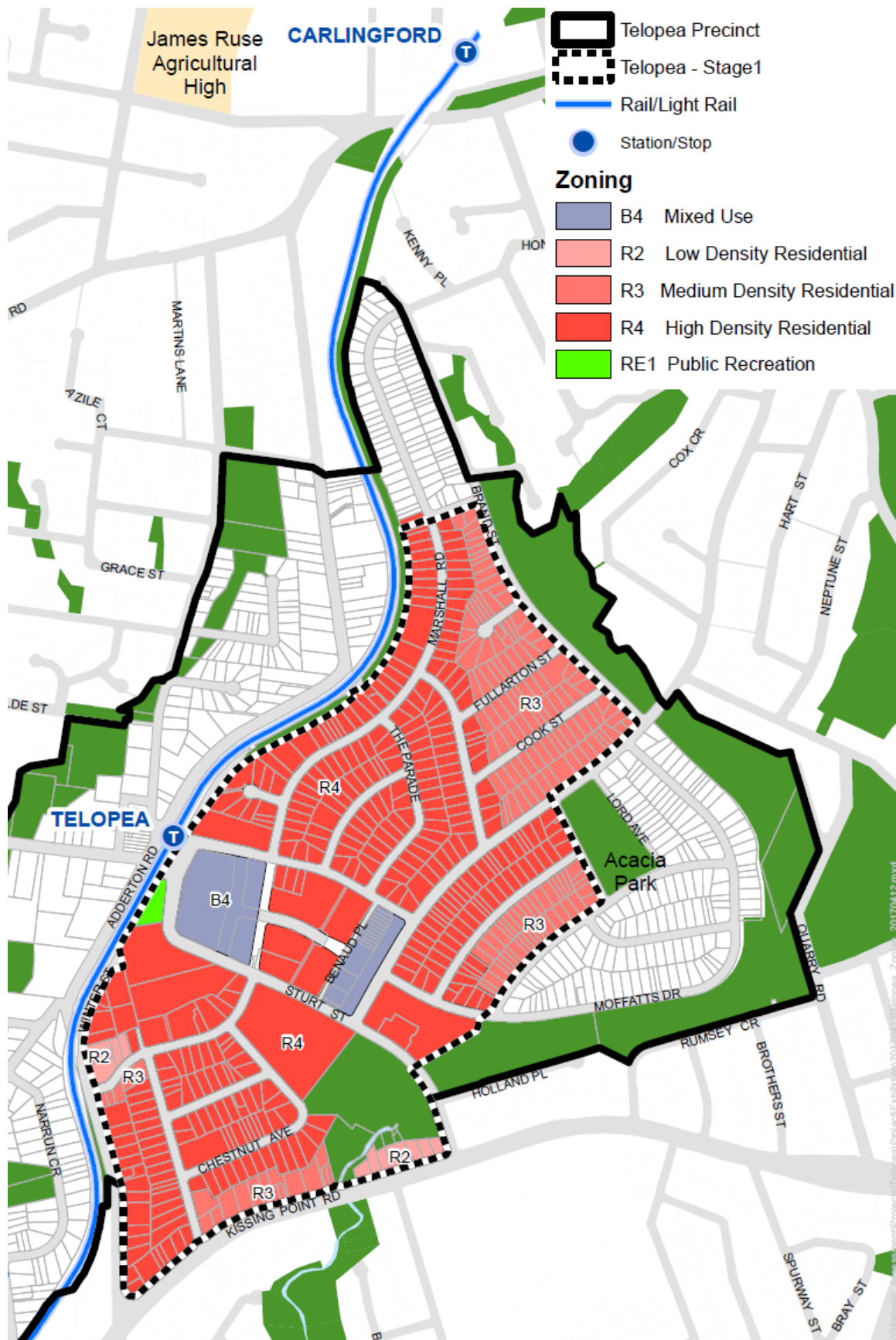
2.4. Masterplan, Land Use Zoning & Utilities

The Concept Plan Area is also shown on the masterplan for the estate redevelopment to make it easier to see relative to local roads, Parramatta light rail and other local features. Figure 2 shows the masterplan which is used as a base for utilities assessment.

The applicable zoning and densities with respect to residential and mixed uses have significant impact on demands for utility services particularly with sewer, potable water and electricity,

The current zonings are shown in Figure 3.





3. UTILITIES

The utilities in the Telopea CPA were identified based on information received from Dial Before You Dig (DBYD), site inspection, utility authority database information, and enquiry with utility authorities.

The existing number of units within the CPA is 486 dwellings. Approx 4,700 units (dwellings) are currently proposed for the redevelopment. In broad terms this represents an increase of about 4,214 units.

The proposed number of units for each precinct and total CPA has been considered in determining the loading aspects of each utility.

3.1. Sewer

The content this section of the report has been provided by Water Services Coordinator, Qalchek with minor contextual edits by J. Wyndham Prince in consultation with Qalchek.

The sewerage system is owned and operated by Sydney Water Corporation. Sydney Water have design criteria for determining capacity and sizing of their system components and hence some judgement on immediate and downstream capacity of system components such as pipe sizes is required when assessing the ultimate development proposed for Telopea Estate.

The following information is based on information obtained from Sydney Water's hydra database. The existing network content is also mostly reflected in Sydney Water map obtained from a DBYD request.

3.1.1 Existing Network

The Telopea CPA is bounded by Adderton Road to the West, Sophie Street to the North, Evan Road and Chestnut Road to the South and Burke Street to the South West. Levels through the site range from RL70 AHD in the North to RL30 AHD to the South.

The large majority of the CPA falls within a sewer catchment area that ultimately discharges to the south to a DN450mm reinforced concrete sewer carrier at the intersection of Kissing Point Road with the southern limit of Sturt Park, being the confluence of reticulation sewerage system network. The reticulation sewerage network consists of DN150mm, DN225mm and DN300mm Vitrified Clay pipes, generally laid within privately owned land. The reticulation sewerage network and sewer carrier were laid circa 1958, with some reticulation sewers remediated with an internal lining. Figure 4 shows a plan of the existing sewer carrier and reticulation sewer network.

3.1.2 Preliminary Servicing Advice for Development Works

There are existing sewers that service the Core, North, South, and East precincts. They vary in size from DN150mm to DN225mm sewers. It is anticipated that some of the existing sewer infrastructure will be removed and replaced with new reticulation mains of varying sizes allowing for increased discharge loadings from the proposed redevelopment, whilst accommodating existing upstream catchment flows and in parts the consolidation of lots.

The size of the new reticulation and alignment of the sewers will be dependent on more in-depth analysis and planning. Consideration and allowance for urban renewal under R3 Medium density and R4 High density zoning would be a factor in the proposed sewer servicing strategy for the area.. With consideration of the zoning plan (Figure 3) detail modelling would be undertaken by Sydney Water following a concept consent for redevelopment.

The existing road network dictates boundaries to catchment areas and as such critical sewer drainage nodes have been identified. These nodes are labelled 1 to 7 on Figure 5. The node equivalent locations can be easily found on the existing sewer reticulation network in Figure 4. Sewage discharge loadings will be calculated at these nodes based on and adjusted for the proposed loadings (Equivalent Persons – EP) due to the precinct redevelopments. An analysis has been made on the immediate downstream reticulation network based on pipe size and grade of this reach to determine if there is capacity for the increase in yield from redevelopment. This analysis outcomes are shown in Table 2 below:

Table 1 - Summary of sewer loadings and capacity

Drainage Node	Anticipated Loading (EP)	Downstream Sewer Size (DNmm)	Grade %	Pipe Capacity litres/sec	Design Flow litres /sec	Spare Capacity Yes / No
1	419	225	1.79%	58.2	8.3	Yes
2	1082.5	225	0.45%	29.1	17.2	Yes
3	2348.8	225	0.60%	33.6	30.5	Very limited
4	6445.9	300	1.49%	114.5	67.7	Yes
5	4042.2	225	0.50%	30.7	45.9	No
6	2706.2	225	8.50%	127.1	23.1	Yes
7	1554	225	3.24%	78.4	21.9	Yes

As indicated from the summary table, node 3 draining most of the south precinct, and especially node 5 at the downstream end of the core precinct highlights that some network amplification will be needed to optimise the network purely from a sizing perspective. This is required for the core area to Evans Rd, the details of which would only be determined through future modelling following concept consent and would be upgraded as part of redevelopment.

A feasibility application was lodged with Sydney Water Corporation. It is expected that the outcome of the feasibility will be a platform for further discussion and planning to supply sections of new system within the precincts and or upgrades that meet Sydney Water Corporation's design criteria for sewerage systems.

The details of any works would be undertaken at time of section 73 application to Sydney Water with a development consent.

3.1.3 Sewer Conclusions

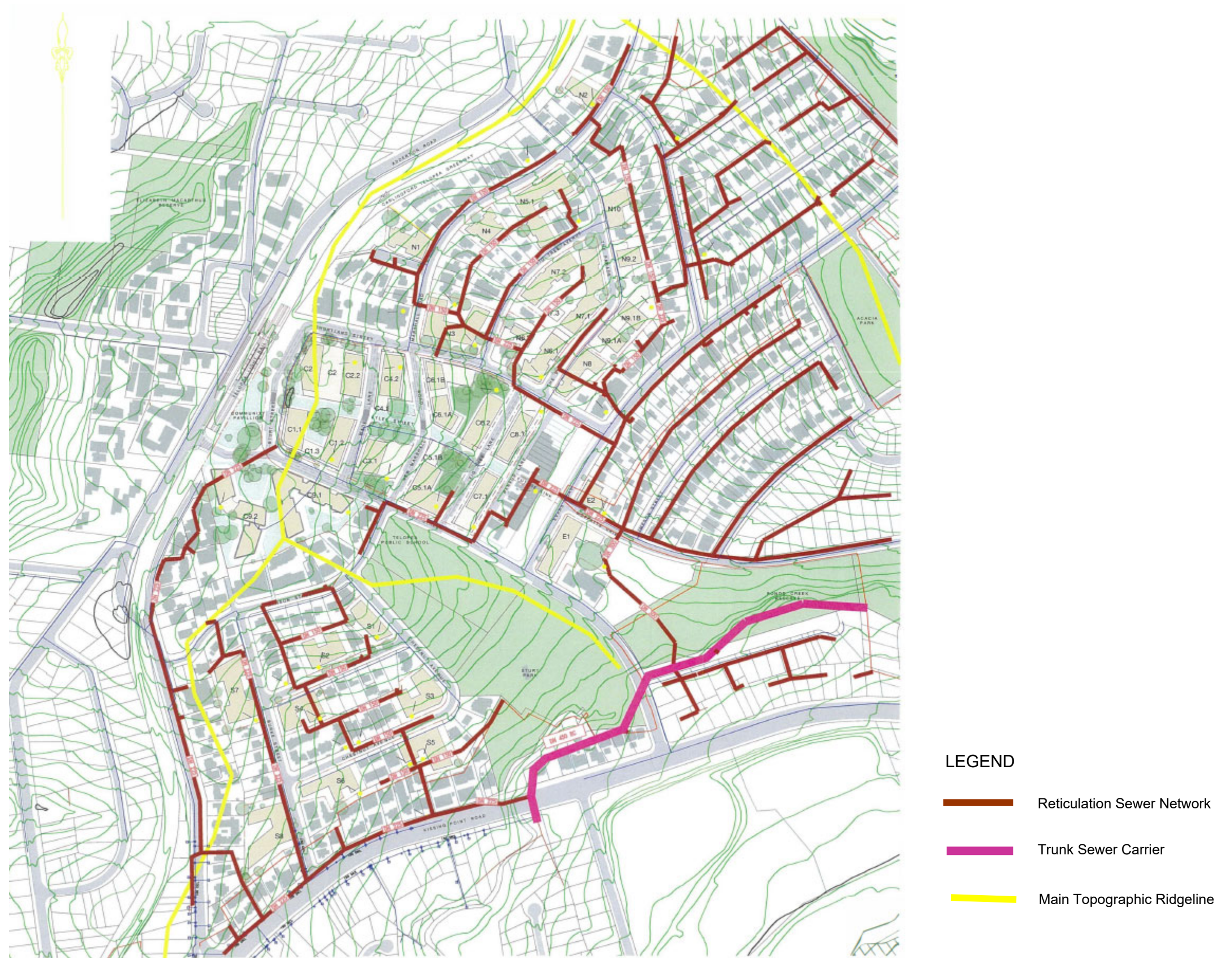
A reticulated gravity sewerage network is located within the site with a major trunk sewerage network adjacent the site. The reticulation sewerage network consists of DN150mm, DN225mm Vittrified Clay pipes. The major trunk sewerage consists of DN300 Vittrified Clay pipe and DN450 Reinforced concrete pipes.

The preliminary analysis of the proposed discharge loadings on the existing network was conducted to determine ability of the system to accept the additional loading generated by the development. The outcome as per summary reflects that the existing system may be optimised through size changes. All upgrades can be achieved.

Some other considerations that influence the network optimisation are:

- the age and condition of the existing sewerage network
- alignment of the existing sewerage network, some realignments will be needed
- maintaining service to upstream properties and catchments while developing precincts
- natural topography
- other existing utility services and stormwater infrastructure

Further assessment of the proposed internal development loadings on downstream systems external to the site boundaries would be undertaken by Sydney Water. Sydney Water have been provided with the anticipated loadings to assess the capacity of external carrier network infrastructure and to identify remedial works and or amplification to their system.





LEGEND

	CATCHMENT BOUNDARY
	DRAINAGE NODE
	CRITICAL SEWER DRAINAGE NODE LOCATIONS

Figure 5 – Sewer catchment area drainage node indicative critical reticulation network discharge points

3.2. Potable Water

The content of the potable water section of this utilities servicing report has been provided by Water Services Coordinator, Qalchek with minor contextual edits by J. Wyndham Prince in consultation with Qalchek.

The potable system is owned and operated by Sydney Water Corporation. Sydney Water have design criteria for determining capacity and sizing of their system components and hence some judgement on immediate and downstream capacity of system components such as pipe sizes is required when assessing a development proposed for Telopea Estate.

The following information is based on information obtained from Sydney Water's hydra database. The existing network content is also mostly reflected in Sydney Water map obtained from a DBYD request.

3.2.1 Existing Network

The potable water reticulation network consists of DN100mm, DN150mm, DN200mm and DN250mm Cast Iron Cement Lined (CICL) pipes, generally laid 2.6m from the property line within public footpath area. The reticulation water network was laid circa 1956, with some reticulation laid as early as 1911. Figure 6 shows the existing potable water network.

The potable water supply is from the Mobbs Hill water reservoir located some 2km to the North East at the intersection of Pennant Hills Road and Marsden Road. Capacity and water levels of the surface reservoirs have not been obtained for the purpose of this report.

There is no non-drinking ie recycled water systems in the area.

3.2.2 Preliminary Servicing Advice for Development Works

The objective of the planning and design of the potable water network is to provide sufficient supply and water quality at a sufficient pressure head to serve commercial and high-rise residential development by meeting peak day to peak hourly demands.

Sydney Water service requirements for multiple high-density residential developments over 8 storeys stipulate frontage to a DN200 or DN225 watermain. The existing pipe diameters will require review by a hydraulic engineer to ensure adequate flow rates and pressures are made available to the development.

Upgrades to the Sydney Water system will be required to meet demands for future development in accordance with zoning.

It is also anticipated that a DN450mm or potentially a DN375mm trunk lead-in main will be required to be from an existing DN500 main at the intersection of Adderton Road and Homelands Avenue or possibly from the DN600mm main slightly further north along Adderton Road.

With the lead-in watermain there are two opportunities (options) to allow for crossing the Parramatta light rail line via:

- The northern end of the site at the bend in Adderton Rd connecting to Marshall Rd. Favourable level differences exist at this location. The lead-in would then continue down Marshall Rd to the core precinct.
- The new link road between Adderton Rd and Sturt St. This is a slightly longer route with additional constraints at traffic control signals.

In both options an opportunity exists with early works to plan for and construct a services culvert under the rail line due to the construction program for Parramatta Light Rail or underbore at a later time.

A feasibility application was lodged with Sydney Water Corporation. It is expected that the outcome of the feasibility will be a platform for further discussion and planning to supply sections of new system within the precincts and or upgrades that meet Sydney Water Corporation's design criteria for potable water systems.

The details of the works would be undertaken at time of section 73 application to Sydney Water following concept consent for the redevelopment.

3.2.3 Potable Water Conclusions

A reticulated potable water network is located within the site which consists of DN100mm, DN150mm, DN200mm and DN250mm CICL pipes.

A modelling analysis by a hydraulic engineer on the existing network will determine ability of the system to draw on the additional loading required by the development. Upgrade to the existing reticulation network will be required by the developer. There would be some potential subsidy from Sydney Water due to broader area benefits.

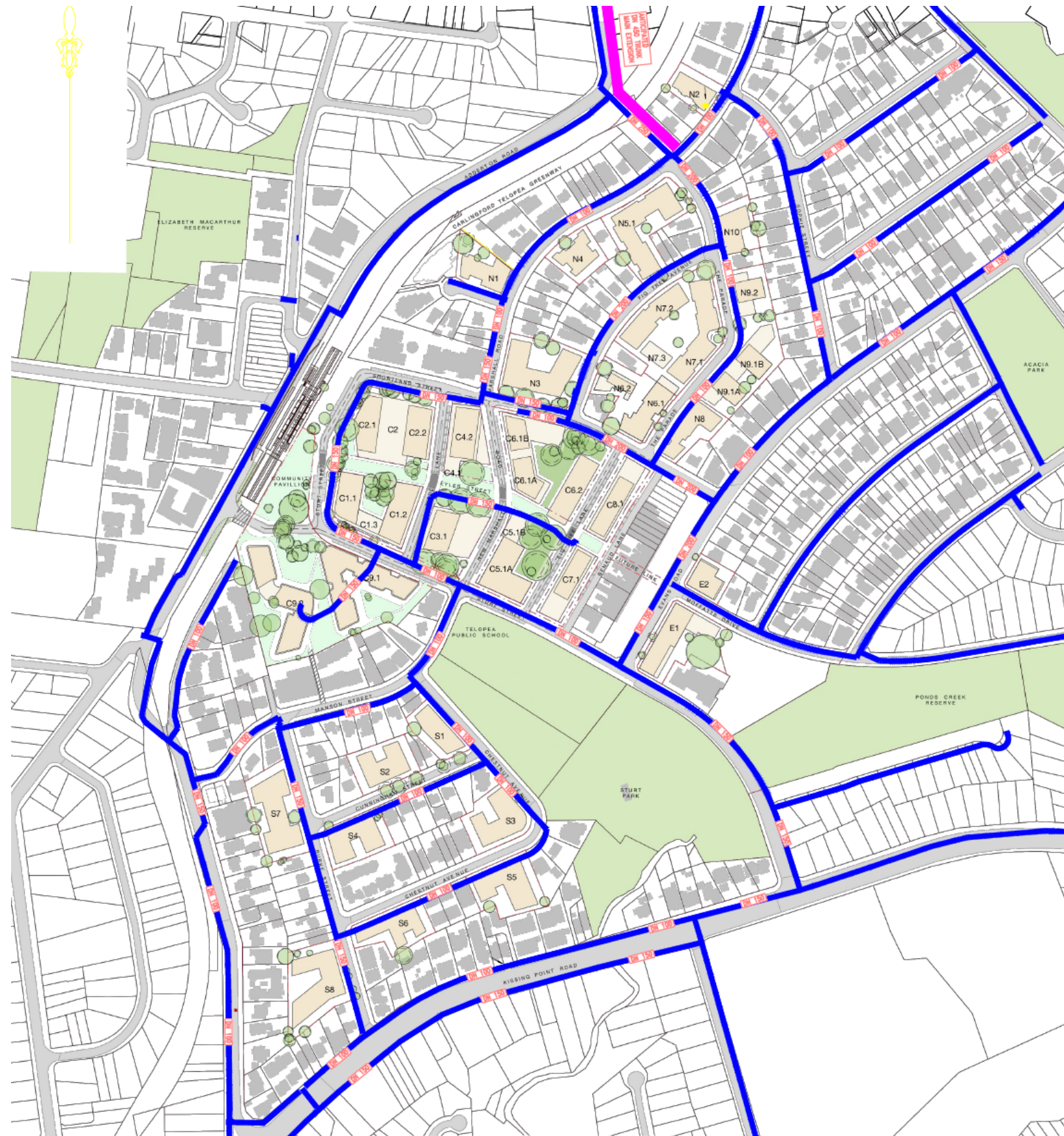
Although future detailed modelling will determine sizing requirements there are other constraints deemed to influence network upgrades such as:

- the age and condition of the existing potable water network
- alignment of the existing potable water network.
- maintaining service to adjacent properties while developing precincts & upsizing of mains
- other existing utility services and stormwater infrastructure

Multi storey buildings normally require booster systems as they are too tall to be supplied by normal pressure in the reticulated mains. The detail of boosters required would be determined at time of section73 application to Sydney Water.

Further assessment of the proposed internal development loadings on existing systems will need to be undertaken following the feasibility assessment response from Sydney Water. Sydney Water have been provided with the anticipated loadings to assess the capacity of their network infrastructure and to initially identify remedial works and or amplification to their system.

Early works planning for potable water servicing can take advantage of the present ease of crossing the Parramatta light rail line due to the construction program with the rail line.



LEGEND

	RETICULATION WATER NETWORK
	POTABLE WATER MAIN SIZE
	ANTICIPATED TRUNK MAIN EXTENSION

Figure 6 – Existing potable water reticulation network

3.3. Electricity

The content of the electricity section of this utilities servicing report has been provided by Shelmerdines Consulting Engineers with minor contextual edits by J. Wyndham Prince in consultation with Shelmerdines.

3.3.1 Electricity Supply

The proposed urban renewal development location is in Telopea and bounded by Kissing Point Road in the south and Adderton Road running south-west to north-east. The existing area is supplied from the Endeavour Energy 11kV Zone Substation called Dundas Zone Substation. Dundas Zone Substation is located in Jenkins Road, Carlingford which is approximately 1km north of the proposed development

Below in Figure 7 is an extract of the High Voltage GIS from the Endeavour Energy GIS system.

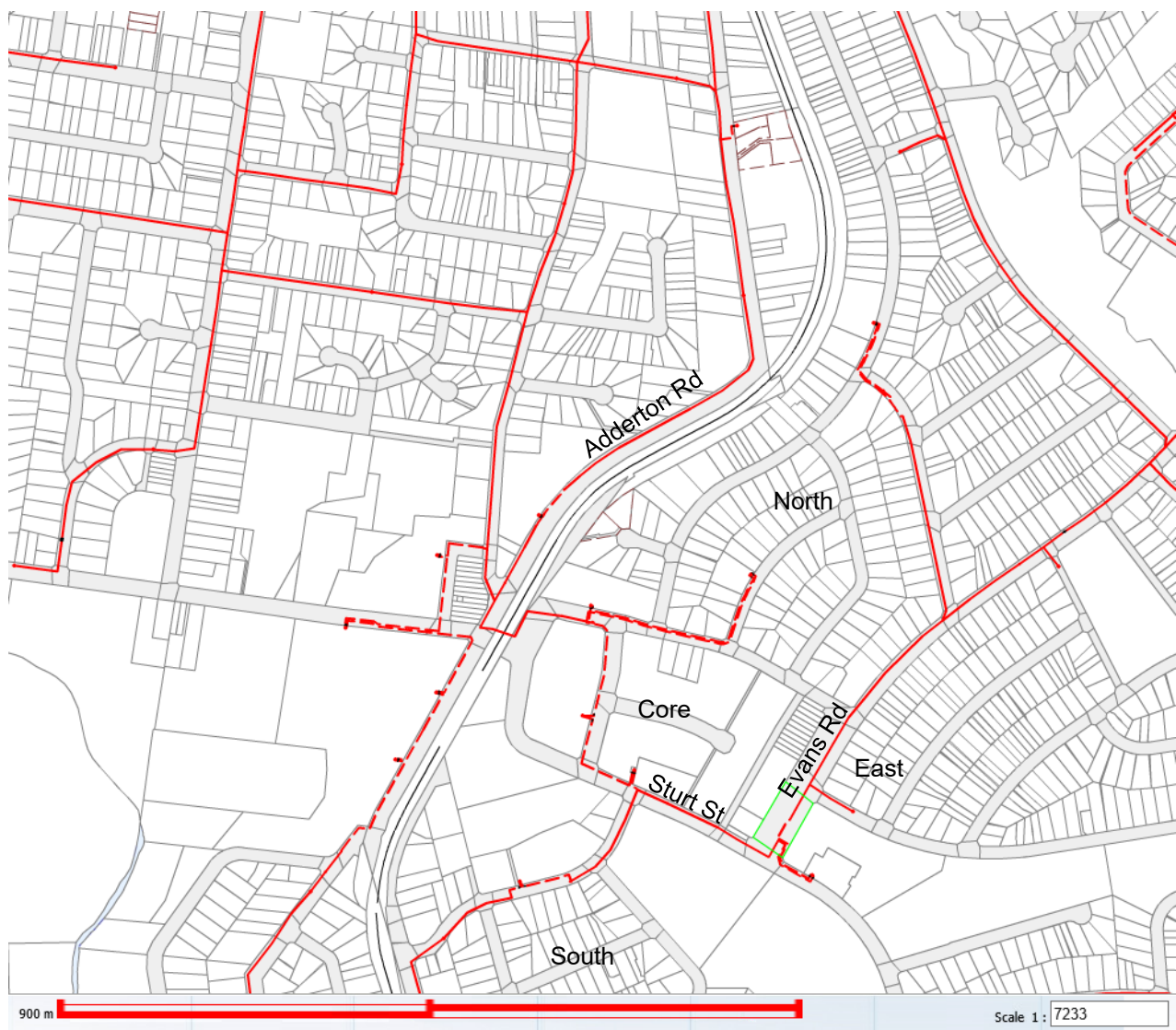


Figure 7 – High Voltage Reticulation through the Site

The site is fed from a mixture of aerial and underground 11kV HV cables. The dashed red lines above represent underground cable and the solid lines represents aerial.

There are approximately seven existing padmount substations and pole mounted transformers in the area, however it is considered that a lot of these would be removed during the redevelopment.

There are three existing feeders serving the area, two from Dundas Zone substation and one from Rydalmere Zone Substation.

One feeder from Dundas runs as an aerial feeder along Adderton Road, the second one runs aerial along Brand Street from the north. The feeder from Rydalmere enters from the south.

Additionally, there is an aerial transmission line running through the site, generally along Brand Street Fullarton Street, Sophie Street, Evans Road and Sturt Street down to Kissing Point Road. The transmission line is depicted below by the purple line in Figure 8. It is proposed that this line is retained in its current form.

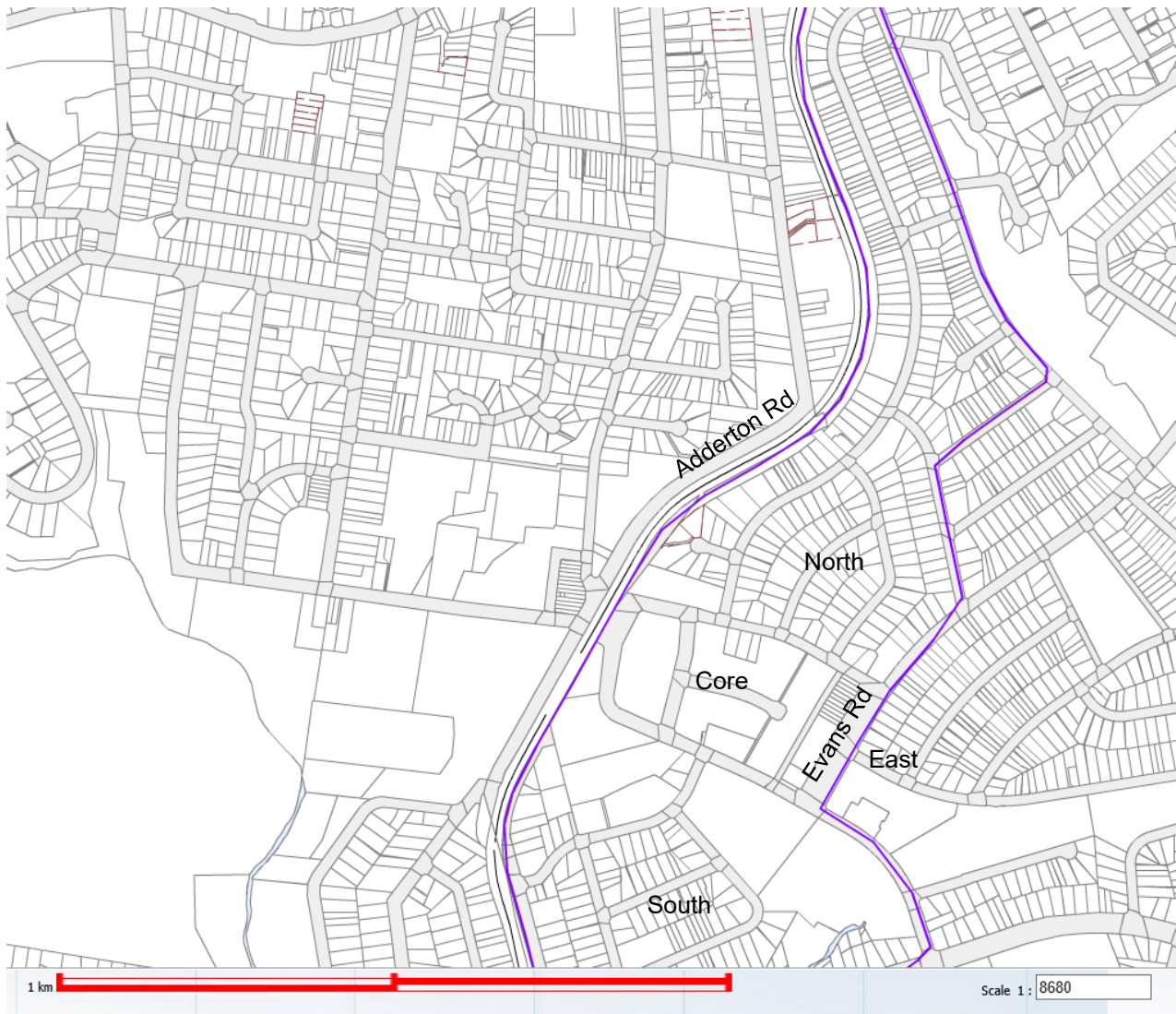


Figure 8 –Transmission Reticulation through the Site

3.3.2 Undergrounding of existing Cables

As part of the redevelopment, existing overhead electricity would be placed underground where possible, generally in front of CPA development parcels. Figure 9 indicates the proposed extent for undergrounding of existing aerial services.



Figure 9 – Proposed extent of undergrounding of existing overhead electricity

The below image (Figure 10) is a photo at the corner of Evans Rd and Sturt St. The existing Transmission lines are shown on the right of Evans Road. On the left of the road is the existing aerial high voltage and low voltage aerial cables.



Figure 10 - Corner Evans Road and Sturt Street

3.3.3 Endeavour Energy Technical Review Request

In 2016, another consultant submitted a technical review request on behalf of Land and Housing Corporation for this development. The result of the technical review was that this proposed development will require four new 11kV feeders to be installed and connected to the existing Dundas Zone Substation. Additionally, the Dundas Zone substation was at capacity in 2016 and the upgrade of high voltage switchgear at the substation would be required. The four feeders would be installed over time and depending on the staging of the development. The installation of the feeders would be staged as follows:

- Stage 1 – install pit and pipe conduits underground from Dundas Zone substation. Conduits would have capacity for 4 x 11kV feeders, however only 1 x 11kV feeder cable would be installed.
- Next Stage – run additional 3 x 11kV feeders in the spare conduits when required.

The route to the site is complicated due to having to cross the existing railway line. Figure 11 indicates two options for the feeder routes. It may be possible to amend the blue coloured route to enter the site via the new link road between Adderton Rd and Sturt St. It also should be noted that as this is a new development, Endeavour Energy will more than likely insist the new feeders are installed underground their entire length.

Shelmerdines have submitted a new Technical Review Request to Endeavour Energy in order to confirm that the above four feeder situation is still required.

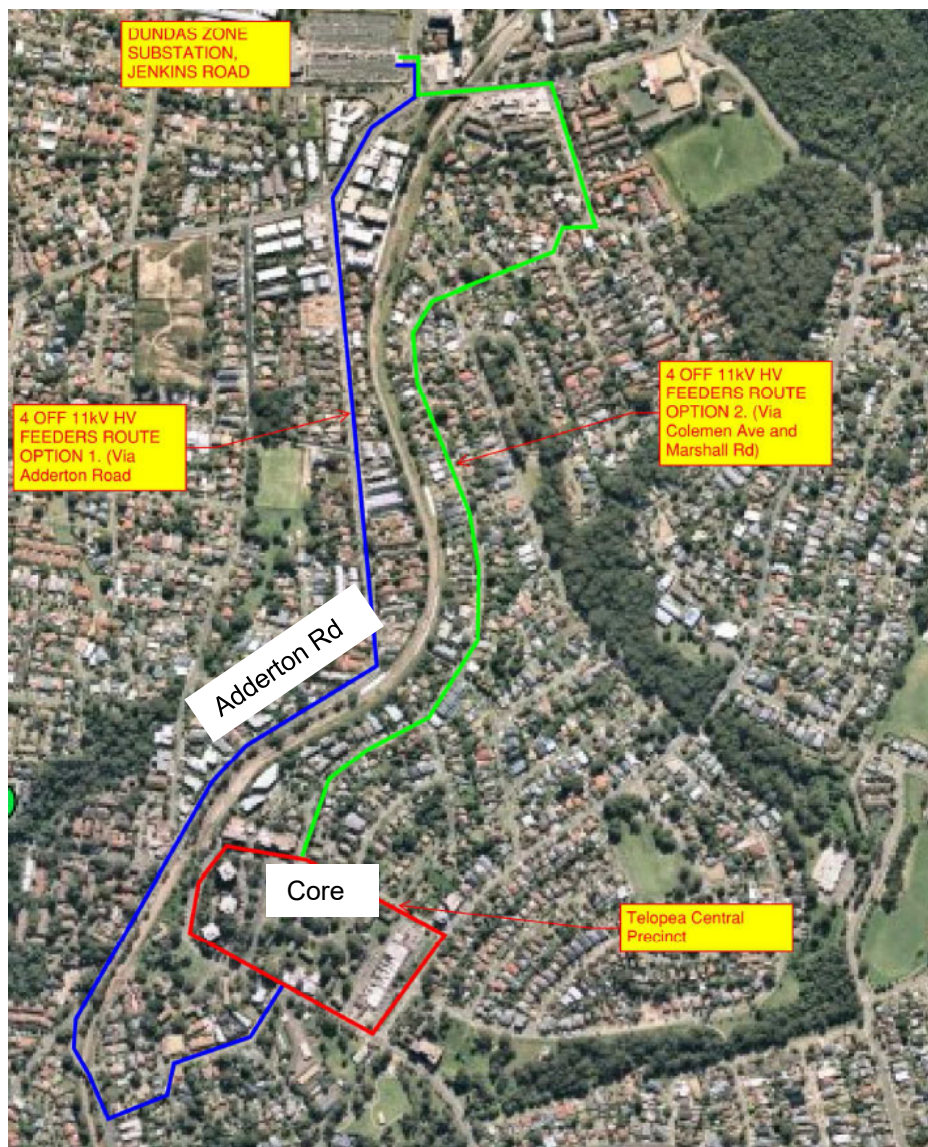


Figure 11 – High Voltage feeders routes

3.3.4 Required Substations and Locations

It is Frasers Property Australia intention to install chamber substations for the redevelopment of CPA parcels so substations are hidden in each building. The below table indicates the required numbers of substations to suit the proposed numbers of units and buildings. The numbers of required substations have been minimised where possible and fed some buildings from an adjacent building substation via a low voltage direct distributor.

Figure 12 indicates the proposed locations of the substations and relevant transformer sizes. Table 3 below provides a summary of the locations and sizes. Endeavour Energy available transformer sizes are 315kVA, 500kVA, 1000kVA and 1500kVA.

Table 2 - Summary of chamber substations and sizes

Building	No. Units	Load per Unit (kVA)	Total (kVA)	Required Substation
Central Precinct				
C1.1	198	3.5	693	1000kVA Chamber Substation
C1.2a	132	3.5	462	
C1.2b	122	3.5	427	
			889	1000kVA Chamber Substation
C2.1	228	3.5	798	2x1000kVA Chamber Substation
C2.2	216	3.5	756	
			1554	
C3.1	130	3.5	455	500kVA Chamber Substation
C4.1	9520	0.1	952	1500kVA Chamber Substation
C4.2	96	3.5	336	
			1288	
C5.1a	48	3.5	168	1000kVA Chamber Substation
C5.1b	115	3.5	402.5	
C5.1c	26	3.5	91	
			661.5	1000kVA Chamber Substation
C6.1a	68	3.5	238	1500kVA Chamber Substation
C6.1b	91	3.5	318.5	
C6.1c	67	3.5	234.5	
C6.2a	60	3.5	210	
C6.2b	76	3.5	266	
			1267	
C7.1	58	3.5	203	1000kVA Chamber Substation
C7.2	62	3.5	217	
C8.1a	45	3.5	157.5	
C8.1b	31	3.5	108.5	
C8.1c	70	3.5	245	
			931	
C9.1	242	3.5	847	2x1000kVA Chamber Substation
C9.2	231	3.5	808.5	
			1655.5	
Northern Precinct				
N1	65	3.5	227.5	400Amp Distributor from N3
N2	42	3.5	147	400Amp Distributor from N5
N3	158	3.5	553	1000kVA Chamber Substation

N4	56	3.5	196	400Amp Distributor from N3
N5	116	3.5	406	1000kVA Chamber Substation
N6.1	111	3.5	388.5	1000kVA Chamber Substation
N6.2	38	3.5	133	
			521.5	
N7.1	108	3.5	378	1000kVA Chamber Substation
N7.2	81	3.5	283.5	
N7.3	6	3.5	21	
			682.5	
N8	86	3.5	301	1000kVA Chamber Substation
N9.1a	41	3.5	143.5	
N9.1b	46	3.5	161	
N9.2	40	3.5	140	
			745.5	
N10	45	3.5	157.5	400Amp Distributor from N9.1

East Precinct

E1	143	3.5	500.5	1000kVA Chamber Substation
E2	56	3.5	196	400Amp Distributor from E1

South Precinct

S1	72	3.5	252	400Amp Distributor from S2
S2	90	3.5	315	1000kVA Chamber Substation
S3	98	3.5	343	1000kVA Chamber Substation
S4	90	3.5	315	400Amp Distributor from S7
S5	72	3.5	252	400Amp Distributor from S3
S6	62	3.5	217	400Amp Distributor from S8
S7	92	3.5	322	500kVA Chamber Substation
S8	92	3.5	322	500kVA Chamber Substation



3.3.5 New Streetlighting

Where new streets are constructed and where existing cables are relocated underground, it is envisaged that the streetscape would be improved with the installation of smart poles and more decorative style of light poles. Below in Figure 13 is an example from another development.



Figure 13 – Example decorative light poles

3.3.6 Electricity Conclusions

This development requires the removal of existing housing units and single standing homes to make way for the increased number of new residential units including a Residential Aged Care Facility. In addition, there will be new open public space, a new church a new library with community centre, and retail. Existing aerial electricity infrastructure located around the Central Precinct will be relocated underground and the streetscape will be improved with smart pole or decorative type lighting poles.

Due to the number of units proposed for the development, four (4) new 11kV high voltage feeders will be required and installed in a staged manner over the construction of the development and installed underground from the Dundas Zone Substation which is located 1km north of the site.

Initially, parts of the north, south and possibly east can be serviced from the existing HV network. Later, extra supply will be needed subject to staging. Very early work with the core redevelopment can be supplied from existing supply but this is expected to be exceeded quickly and hence the first of 4 new 11kV feeders will need to be brought in for the first significant stage of core redevelopment. The other 3 feeders would follow depending on staging.

A technical review request has been submitted to Endeavour Energy to confirm the required 11kV feeders for the site.

3.4. Gas

3.4.1 Existing Network

A DBYD search was undertaken and it was found that low pressure (210kPa) nylon gas lines exist in and around much of the site. The plans show:

- a 110mm dia main along the north side Kissing Point Rd, east of Sturt St
- 75mm dia mains along the eastern side of Bourke St, south side of Manson St between Bourke St & Sturt St, part of the northern side of Sturt St, all of Evans Rd, and Kissing Point Rd west of Sturt St.
- a 50mm dia main along part of Bernaud Lane
- 32mm dia mains along Chestnut Ave, Cunningham St, Wade St, Shortland St, Figtree Ave, The Parade, Marshall Rd, Moffatts Dve, Tilley St, Simpson St, Sophie St, and part of Adderton Rd

The existing network is presented in Figure 14. Site inspection has also showed that most buildings which are due to be redeveloped have a gas connection.

3.4.2 Preliminary Servicing Advice

A request for preliminary gas servicing advice relative to Concept Masterplan was made to Jemena in May 2020. Jemena advised that natural gas services are available within the Masterplan area and could be extended to supply any proposed development in this redevelopment area depending upon its commercial viability. Jemena did however highlight it does not reserve capacity for any individual project.

Natural gas infrastructure exists in the majority of streets nominated in the CPA and Masterplan. It is currently sized according to the existing building densities and an anticipated natural gas network amplification will be required to specifically support the Core area adjacent to the future Telopea Light Rail Station. Additional network may be required along the new extension of Marshall Rd and Wade Lane subject to building hydraulic design considerations.

Jemena is working to develop a network strategy which will support the Concept masterplan and would be completed following a Concept consent for the redevelopment. Details on individual buildings and gas needs, and likely connection locations would assist Jemena with producing an economical network design and could be provided at the due time of application to Jemena.

Jemena appreciated the opportunity to be involved in the forward planning of this development and would like to pursue the potential for the connection to the natural gas network. An offer for supply could be made available once staging and construction is more clearly defined.

3.4.3 Gas Conclusion

Based on the preliminary advice from Jemena, gas supply and reticulation to the Masterplan area is not envisaged to present a constraint. Some amplification of mains will be required depending on the gas needs in buildings. Also, existing gas connections will need to be temporarily decommissioned at time of demolition of existing buildings. New connections could then be made where needed.

Frasers Property is not intending to provide gas to any residential apartment and would be proceeding with an electric solution for apartments.



3.5. National Broadband Network (NBN)

3.5.1 Existing NBN Network

A DBYD search was undertaken and it was found that the Masterplan area has substantial NBN network coverage consisting of fibre along roads and most likely some copper network into building areas. The overall network covers nearly all the required parts of the redevelopment.

A plan of the existing network relative to the current Masterplan is shown in Figure 15.

3.5.2 Preliminary Servicing Advice

A request for servicing advice was sent to NBN Co. Their preliminary response is that they are keen to provide NBN services for the estate redevelopment and can deliver a full fibre to the premise solution (FTTP) to all the approx. 4700 dwellings. Backhaul capacity is not seen as a constraint.

To supplement NBN Co's response, J Wyndham Prince has provided the following advice based on DBYD information and NBN experience from other projects:

- In part of the core area the existing network alignment clashes with the Masterplan. These lines would be relocated where there is a clash and, in some cases, redundant lines removed.
- Some new cable alignments would be constructed such as along new Marshall Rd, and part way along the new link road under the light rail line between Sturt St and Adderton Rd.
- If additional cable capacity is required these could be hauled in from the nearest high capacity fibre connection node which could be on Adderton Rd, Kissing Point Rd or Pennant Hills Rd. The backhaul lead-in routes would be determined at time of application to NBN Co. It is expected that capacity increases could be provided incrementally over time especially for the staged redevelopment of the core area.
- Some minor reconfiguration of the network connections in conduits in roads may be necessary to provide additional capacity for core area especially in the more higher density section adjacent to Telopea light rail station.
- Developer financial contributions for network relocations would be required which will be determined at time of application for Developer Agreement with NBN Co.
- As the NBN network may use existing Telstra pits it is possible that some pits may need replacement due to asbestos concerns. This is a detail and cost issue that is resolved at time of construction.

A plan of the existing network is shown in Figure 15 and proposed changes with the existing network in the core area relative to the current Masterplan is shown in Figure 16.

3.5.3 NBN Conclusions

Based on the NBN Co preliminary response, DBYD information, extent of existing network coverage and the relatively small network changes needed for NBN over the Masterplan area, the site can be easily serviced. Any details with network adjustments would be resolved at time of application for Developer Agreement with NBN Co.

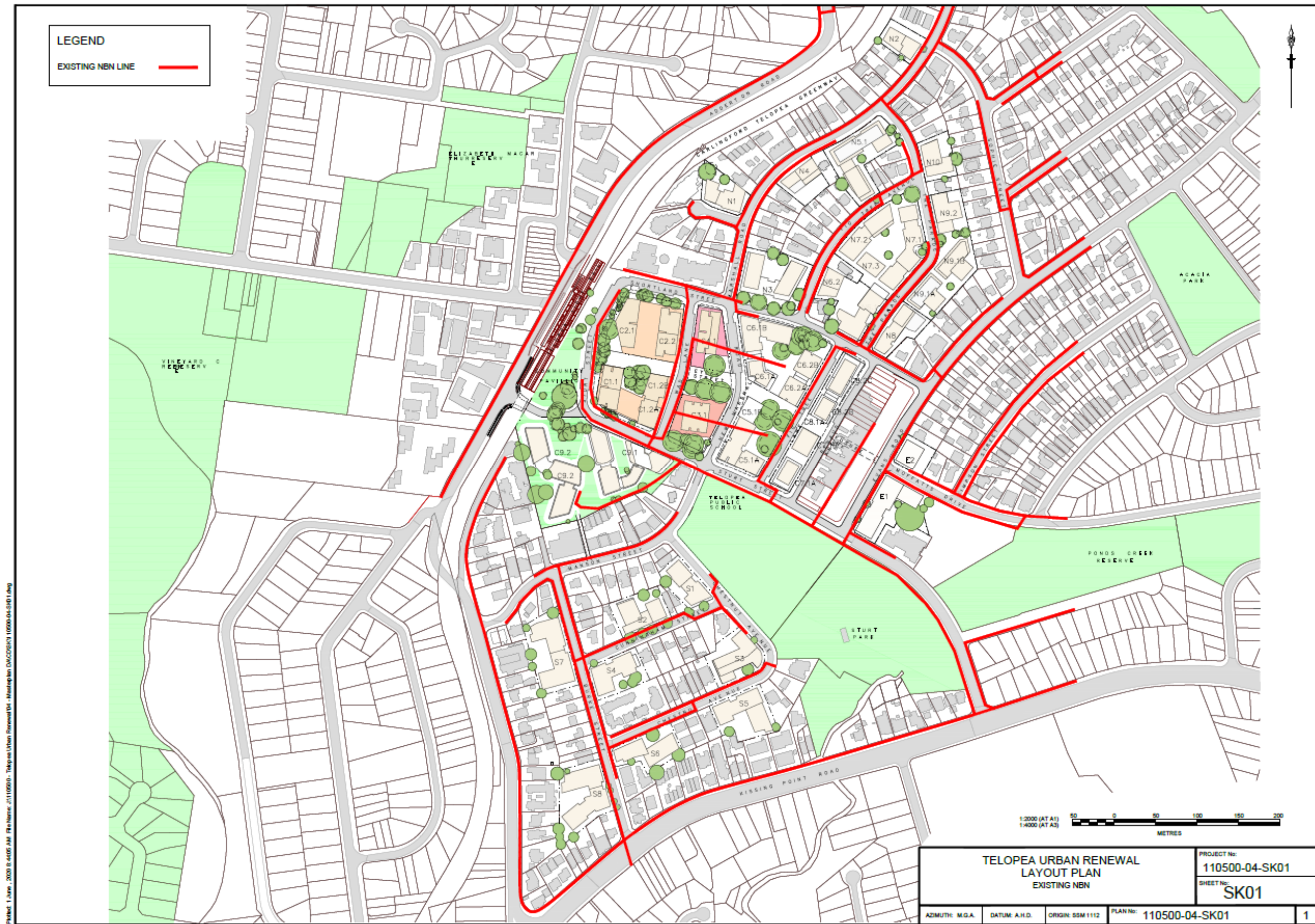


Figure 15 – Existing NBN Network

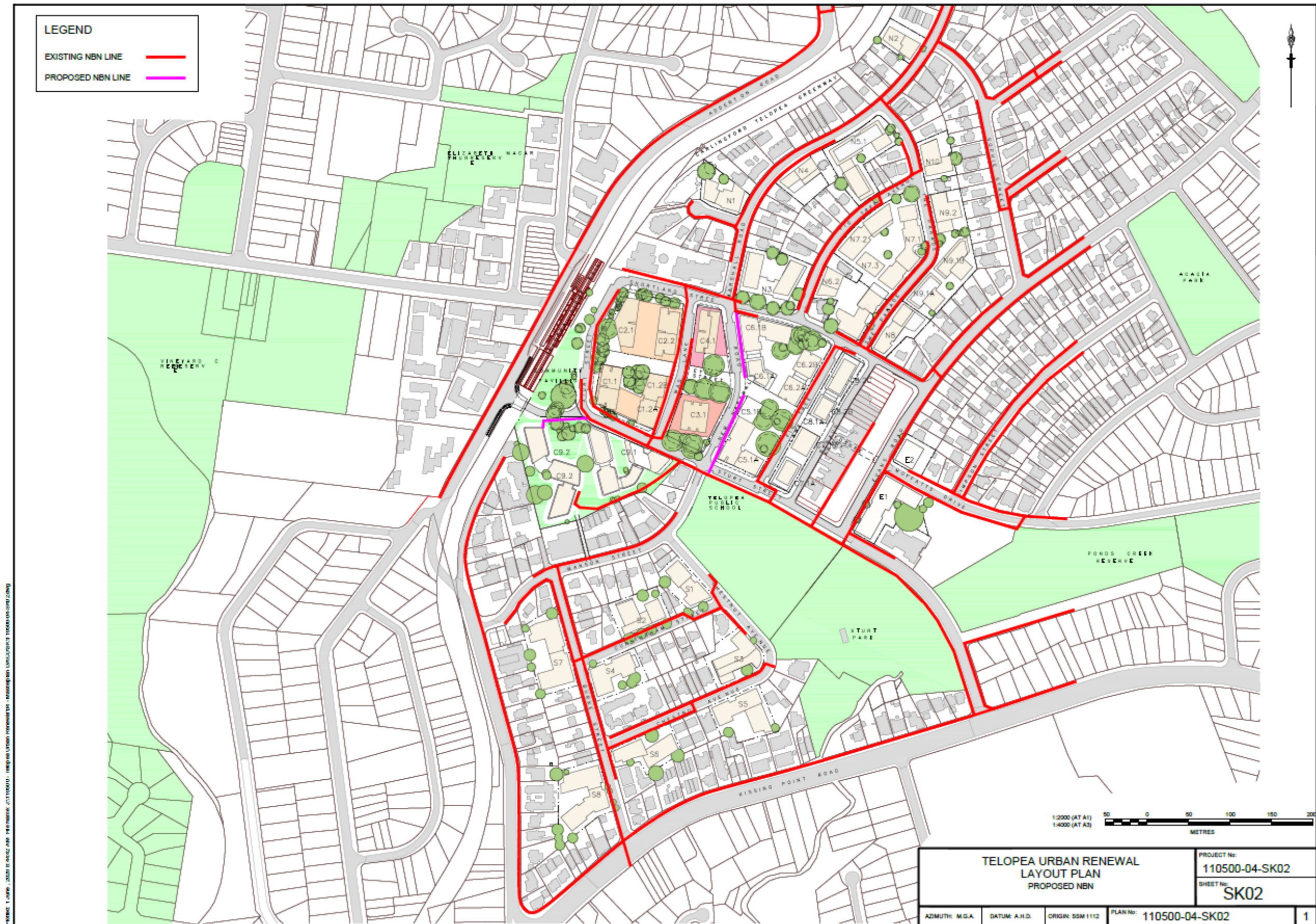


Figure 16 – Existing and Proposed NBN Network

3.6. Telstra

3.6.1 Existing Telstra Cable Network

A DBYD search was undertaken and it was found that the Masterplan area has an extensive Telstra network of copper cabling. The network covers all parts of the redevelopment and for a long time operated as a component of the key telecommunications network for the suburb of Telopea. Due to the extent of network there is too much detail to clearly display in a single diagram small enough for this report. The extent is however presented in Figure 17.

There is a limited extent of Telstra fibre optic cabling in the core area and with some extension to the south. A plan of the existing fibre network relative to the current Masterplan is shown in Figure 18.

A small section of Pipe Networks (TPG) cabling exists in the Telstra conduit on the northern side of Sturt St only in the area near the present Dundas Branch Library and Community Centre.

3.6.2 Preliminary Servicing Advice

Much of the old copper network is now superseded by the NBN. Subject to future acceptance from Telstra, much of the old copper cabling could be removed at time of redevelopment. The fibre optic network is still in operation and would likely need to be retained if it cannot be replaced by or incorporated within NBN services. Fibre connections to key Telstra equipment in the core and south areas would need to be retained. Some service relocation would be required where there is a clash with new building envelopes. Details of relocations would be resolved after a Concept consent for the redevelopment is obtained.

Should some parts of the redeveloped area specifically require Telstra services (eg remote connection to new traffic control signals), the additional servicing would be obtained by standard application to Telstra. Following Development Approval the required sections of Telstra network conduits to be retained would be coordinated with Telstra.

Next to the intersection with Sturt St and Manson St there is radio and microwave equipment on a high steel pole which is operated via Telstra. This pole may need to be removed and the equipment placed on top of a new building. There is also equipment in a cabinet in Sturt Park next to Chestnut Ave which will be retained by Telstra.

3.6.3 Mobile Network

Telstra provides full mobile coverage of the Telopea area and is continually improving its network. Currently the area is serviced by 4G. Fifth generation (5G) services are being progressively rolled out and is expected to be soon available in the Telopea area. Mobile coverage especially 5G is partly an alternative to cable networks. In some cases, Telstra's 5G network could be a viable alternative to NBN services.

3.6.4 Telstra Conclusions

The use and extent of Telstra cable networks would be resolved after a development approval is obtained and then at time of staged redevelopment. No impediments are foreseen with Telstra servicing or adjustments to networks. Network applicability relative to NBN would be considered.

With the mobile network no concerns are foreseen for Telopea and the 5G network will be seen as an alternative to NBN.



Figure 17 – Existing Telstra Network

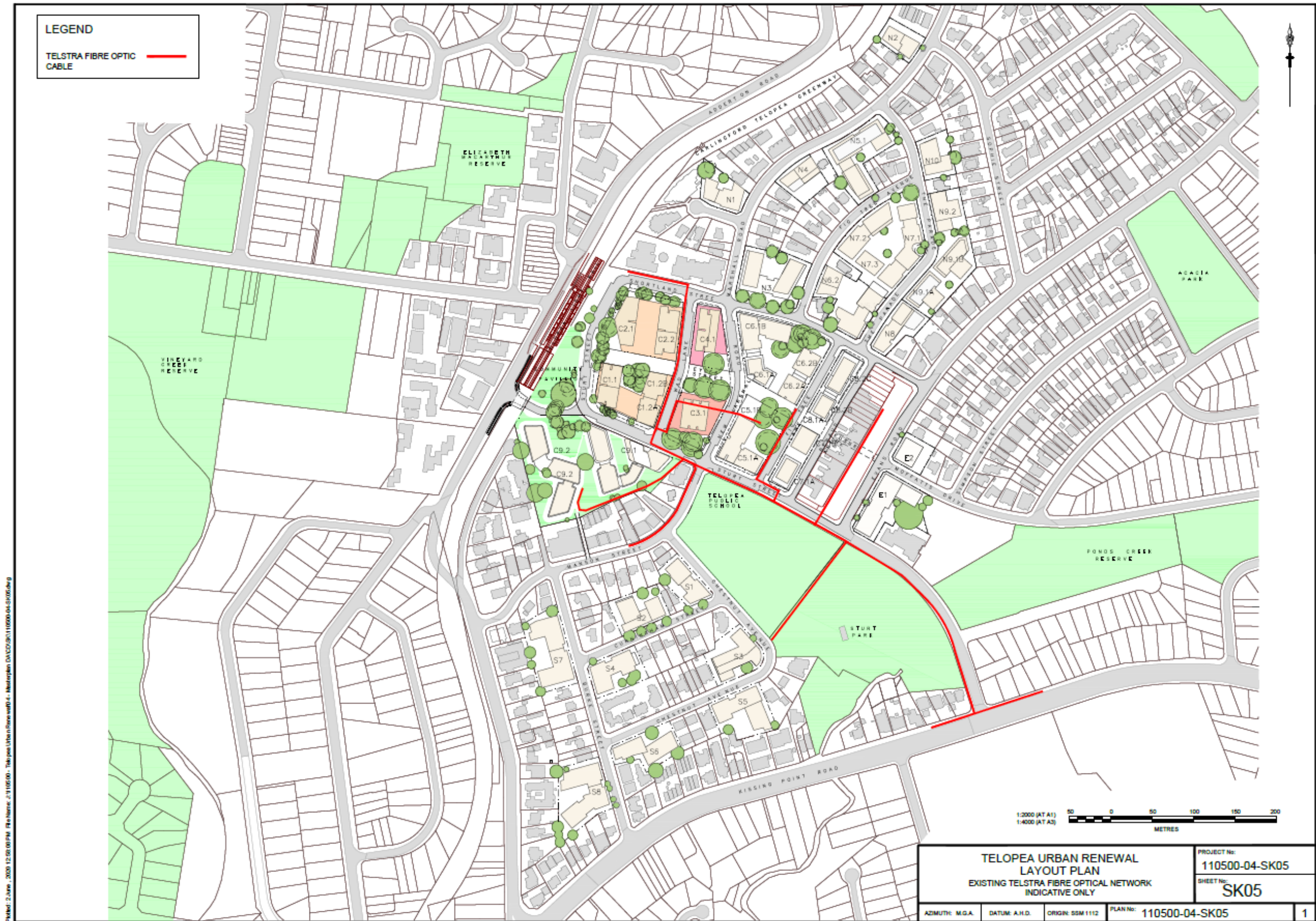


Figure 18 – Existing Telstra Fibre Optic Network

3.7. Optus

3.7.1 Existing Optus Overhead Cable Network

During field inspections and earlier project follow up it was found that an extensive overhead Optus network was present on electricity poles. An update with Optus was requested in May 2020 who advised the network components were:

- a main fibre running through part of the centre of the site – all of which is overhead
- an overhead hybrid fibre cable network for most of the Masterplan area except for some gaps in the core. The hybrid is a mix of fibre and coaxial cables.
- a large number of overhead property connections throughout the north and south areas and part of the core. These connect to the hybrid network.

Figure 19 shows the main fibre and hybrid networks. The large number of property connections has not been shown as this is a detail which would be considered after a Concept consent for redevelopment is obtained.

3.7.2 Preliminary Servicing Advice – Cable Networks

In the core, north and east areas, part of the south area the existing overhead electricity network will be placed underground. As a consequence, the existing overhead Optus network will need to be also placed underground. Optus has advised the network undergrounding can be provided and saw no impediments. Early planning is needed as some road verges could become congested with utilities.

An undergrounding request can be made through the Optus Damage and Relocation Team (DART) NSW who would then arrange Project Engineers and Schedule of Works details. In general, the developer would cover the cost of the undergrounding but there could be some compromises considering potential new connections.

New service connections to the Optus network could be potentially achieved if not covered by NBN. Use of the Optus hybrid fibre network to be considered as part of NBN services.

3.7.3 Mobile Network

Optus provides full mobile coverage of the Telopea area and is continually improving its network. Next generation 5G services will become progressively available. Mobile coverage is partly an alternative to cable networks.

3.7.4 Optus Conclusions

A significant Optus cable network is available for most of the Masterplan area which can be augmented and placed underground where proposed. New cable connections capability is also available. No concerns are foreseen from Optus with servicing for Telopea redevelopment. Details of cable changes would be resolved at time of application following Concept consent for the redevelopment.

With the mobile network no concerns are foreseen for Telopea.



4. UTILITIES SERVICING CONCLUSIONS

The utilities servicing assessment within this report is applicable for Concept DA use with the current Masterplan for redevelopment of Telopea Estate.

Based on the DBYD information, responses to date from authorities and expected future responses, servicing assessment, and site inspection, utility services can be suitably provided for the proposed redevelopment subject to some lead-in works, augmentations, network adjustments, and changes detail highlighted within the report. These have been summarised in the table below.

Coordination and detailing of utility servicing would occur following Concept consent for the redevelopment. Authorities such as Sydney Water and Endeavour Energy will have specific design requirements some of which will be contained in their feasibility assessment responses. Other details would be resolved at time of application for the particular utility service.

In summary, no utility has an impediment that would prevent the redevelopment of Telopea Estate. Utility provision can be staged.

Utility	Authority	Can the Masterplan area be serviced by existing network	Summary of Network Upgrades / Changes Required	Other Network Considerations
Sewerage	Sydney Water Corporation	Yes for Stage 1a and much of Stage 3b based on staging. Amplification of sections would be needed for the core area at some time after Stage 1a.	Network amplification and expansion for core area to Evans Rd required after Stage 1a Potential amplification for part of the South precinct	Sydney Water feasibility assessment guidance. Specific design requirements. Potential additional network upgrades or changes from network age, existing alignment clashes and maintaining existing services
Potable Water	Sydney Water Corporation	The network will require larger size mains for the height of buildings in the core area. Outside of the core area will need some larger mains or augmentation	Progressive replacement or augmentation of watermain is needed as development occurs Lead-in trunk watermain required for overall supply based on development staging	Early planning of lead-in works Sydney Water feasibility assessment guidance. Specific design requirements. Potential additional network upgrades or changes from network age, existing alignment clashes and maintaining existing services
Electricity	Endeavour Energy	Yes, for much of the north, south and possibly east but existing supply will be exceeded and capacity increased required. The core area will need early capacity increase.	4 x 11kV lead-in feeders required for full development Chamber substations in buildings Undergrounding of existing overhead networks in nominated locations	Early planning of lead-in works Endeavour Energy specific design requirements New streetlighting

Utility	Authority	Can the Masterplan area be serviced by existing network	Summary of Network Upgrades / Changes Required	Other Network Considerations
Gas	Jemena	Yes for portions of development needing gas, with minor augmentation	Some mains augmentation and new connection lines or network reconfiguration	Temporary disconnection of existing service at buildings to be demolished and redeveloped.
National Broadband Network (NBN)	NBN Co	Yes	Some realignments in the core area and minor network refinements. Possible extra backhaul for capacity to the core	None foreseen. Possible use or incorporation of Optus hybrid fibre network as part of NBN
Telecoms	Telstra	Copper wire network use mostly not required due to NBN. Limited fibre network available in part of core	Possible use or incorporation of part of Telstra fibre network as part of NBN	Connection to key Telstra equipment to be retained. Preservation of required sections of Telstra conduits
Telecoms	Optus	Yes	Undergrounding of existing overhead networks	Early planning for undergrounding works to avoid utilities congestion in road verges