

# Frenchs Forest Planned Precinct

**Utilities Capacity Assessment** 

November 2020

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# **Executive Summary**

The NSW Department of Planning, Industry and Environment is preparing a master plan to guide the future land uses, built form proposals and growth projections of the Frenchs Forest Planned Precinct. The Precinct forms part of the Northern Beaches Hospital Precinct Structure Plan

(NBHSP), which proposes the phased delivery of 5,360 dwellings and 2,300 jobs for the area surrounding the Northern Beaches Hospital (NBH). The Frenchs Forest Precinct forms Phase 1 of the Structure Plan and will yield 2,100 new dwellings.

Mott MacDonald has been engaged to undertake a utilities services study to assist in developing the urban design and planning work for the Precinct. The scope of this study included an investigation of the potable water, sewer, electricity, gas and telecommunications networks.

#### **Potable Water**

The Planned Precinct area is currently supplied potable water predominately from the Frenchs Forest Reservoir, located to the south of the site. A 450mm main along Frenchs Forest Road and a 250mm main along Warringah Road supply water to the Planned Precinct and surrounding areas to the east.

To determine the water supply requirements for the Priority Precinct, a high-level assessment was undertaken using the Water Supply Code of Australia. This involved calculating the peak hourly demand for the proposed development to determine the required trunk water main size.

Assuming there is no available capacity within the existing network to supply the increased demand generated by the development, the following mains would need to be constructed from the reservoir:

- Approximately 2.2km of a 225mm main along Frenchs Forest Road; and
- Approximately 1.0km of a 150mm main along Warringah Road.

These upgrades could be achieved by constructing a new main along the existing alignment at the size specified above, or by upsizing the existing main.

The additional demand generated by the development south of Warringah Road is minimal and there is potential for the development to be serviced from the existing infrastructure without upgrades. The upgrade requirements will be confirmed by Sydney Water in their feasibility assessment.

To support the additional 2,430 dwellings in Phases 2 and 3 of the NBHSP, the equivalent of a 300mm main would be required to support the proposed development. If the infrastructure for the Planned Precinct and the balance of the NBHSP are provided concurrently, a single 400mm trunk main or equivalent could be constructed on Forest Way, tapering down to a 225mm main on Frenchs Forest Road West.

#### Sewer

The Precinct generally falls into two drainage catchments separated by a crest through the middle of the site. The northern catchment drains northward via a series of smaller reticulation mains to the 375mm Middle Creek Carrier while the southern catchment drains southward to the 400mm Bantry Bay Carrier.

The Sewerage Code of Australia was used to determine the proposed sewer loads for the Frenchs Forest Planned Precinct. To provide a worst-case scenario, the assessment identified the required infrastructure to service the development assuming there is no available spare capacity within the existing sewer network.

For the development north of Warringah Road the following new mains would be required:

- 550m of 225mm main for the Northern Draining Catchments on the western portion of Epping Drive,
- 325m of 300mm main for the Northern Draining Catchments along the existing Middle Creek Carrier alignment,
- Potential for 615m of 225mm main for the Northern Draining Catchments Wakehurst Parkway and on the eastern portion of Epping Drive (Subject to detailed modelling)

For the development south of Warringah Road the equivalent of 705m of new 150mm main would be required from Fitzpatrick Avenue to the Bantry Bay Carrier at Currie Road. This would service the Southern Draining Catchments (subject to detailed modelling).

The above upgrades could be achieved via construction of a new main or upsizing the existing main. These upgrades cater for the ultimate development build out and would need to be incrementally provided as development occurs.

As the southern catchment upgrades are smaller in comparison to those in the northern catchments, it is likely that there may be potential residual capacity in the existing mains to accommodate the small increase in development. As such, whilst a need to upgrade the pipes has been identified in this report it is unlikely that the upgrades will be required but will be subject to detailed modelling.

The above upgrades are required for the Planned Precinct. However to reduce the risk of further upgrades as Phases 2 and 3 of the NBHSP occur, the Planned Precinct recommended upgrades could be further increased to accommodate the future growth. In particular, the portion of Phase 2 draining to the northern catchment has an approximate increased sewer load of 3,150 EP which may increase the 550m of 225mm main on Epping Drive to a 300mm main.

Upgrades to reticulation mains are also to be expected but would not typically delay development. It is noted that no trunk mains pass through the proposed development sites and as such there are no observed restrictions to development footprints from a sewer perspective.

#### Electricity

#### Capacity

Electricity is supplied to the Precinct and surrounding area by Ausgrid. The Warringah Sub-Transmission Substation is located approximately 1.1km east of the Precinct and supplies Ausgrid's bulk power to much of area within and surrounding the Precinct. This is facilitated via three zone substations (ZS):

- The Belrose ZS located 1.3km north west of the Precinct;
- The Beacon Hill ZS located 1.0km east of the Precinct; and
- The Killarney ZS located 1.8km south of the Precinct.

The NBH is expected to require 5.3MVA which will be supplied from the Beacon Hill ZS. Consequently, according to Ausgrid's published projected capacity tables there is approximately 20MVA of spare firm capacity in the three surrounding substations at the time of preparation of this study.

To determine the servicing requirements for the Precinct, the anticipated demand generated by the development was calculated using rates provided in AS/NZS3000 and Endeavour Energy Technical Bulletin TB0188.

The total demand was calculated at 17.29MVA, which indicates there would be sufficient existing capacity in the network to supply the development. As capacity cannot be reserved for specific developments this capacity may be exhausted by external developments should they progress ahead of the Planned Precinct.

Two high voltage cables (11kV feeders) would be required to supply the Precinct, one from the Belrose ZS and one from the Killarney ZS. 11kV feeders can generally supply between 1,000 – 1,500 dwellings. These feeders can be delivered in a staged fashion as development progresses. A single feeder could be provided to supply initial development and after the first 1,500 dwellings are delivered, a second feeder would be required.

The additional demand generated by the balance of the NBHSP area is unlikely to be completely serviced by the existing network. An additional 10.6MVA of electrical capacity will be required to service the 2,430 dwellings delivered in Phases 2 & 3. Upgrades to the trunk electrical network will be required to support the balance of the NBHSP to meet the shortfall in available capacity. This could be achieved through augmentation to an existing substation or via construction of a new substation. The upgrades required to facilitate development will be confirmed by Ausgrid through their feasibility assessment.

#### Overhead Transmission Constraint

An existing overhead 33kV powerline bisects the Precinct and poses a constraint to development. The powerline connects the Belrose ZS and Warringah STS via Frenchs Forest Road. If the powerline remains in its current location, development cannot occur within 3m of the existing property boundaries.

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Ausgrid have advised there are two options available for the relocation of the powerline:

- The transmission line could be undergrounded along the existing alignment. Ausgrid noted that as the road corridor is currently congested with services the transmission line would likely be routed down the centre of the road corridor. Rabbett Reserve and the intersection of the Wakehurst Parkway and Frenchs Forest Road East have been flagged as potential transition points for the works. This route would require approximately 1.2km of cable be undergrounded.
- Alternatively, the transmission line could be re-aligned to the north. No appropriate path has been identified at this stage.

#### Gas

Gas is supplied to the Precinct and surrounding area by Jemena. 1050kPa secondary mains are located along Fitzpatrick Avenue and Bantry Bay Road in the south of the Precinct and Warringah Road and Rabbett Street in the north. The NBH also appears to be supplied with gas via a secondary main bisecting the NBH and school sites. The existing dwellings are supplied gas via 210kPa network mains located in most streets.

As gas is not an essential service, Jemena is required to ensure that any connection to the natural gas distribution system is commercially viable and therefore must assess each request for supply on an individual basis (as gas supply is a non-essential service). Mott MacDonald's experience is that Jemena will be able to assess individual lots once a final layout is prepared and a connection application is made.

As there is already gas infrastructure in the vicinity of the study area, it is likely that Jemena will be able to facilitate the upgrade of infrastructure if required to support the increased demand generated by the development.

#### Telecommunications

The Planned Precinct is currently well serviced by telecommunications with assets owned by Telstra, Optus and NBN Co present throughout the Precinct. All future development will be serviced by NBN Co. The construction of the NBN has commenced across the Precinct and is expected to be completed by December 2018.

An Optus mobile tower is located in the south east corner of the FHS site. If the tower needs to be relocated to accommodate development, the developer will be responsible for the relocation costs unless Optus agree to other arrangements. Telecommunications providers generally prefer towers to be positioned atop new apartment buildings to ensure adequate coverage can be maintained.

#### Summary

A summary of the trunk infrastructure items is provided below. As spare capacities cannot be reserved, it is noted that there may be limited availability at the time of application which may result in acceleration of the required trunk upgrades to meet demand.

Conversely, there may also be an opportunity to reduce the scope of works should utility authorities advise that there is available spare capacity in the existing network. The authorities may also provide regional upgrades as part of their future capital works programs.

Service	Projected Trunk Requirements	Indicative Anticipated Cost
Water	<ul> <li>2.2km of a 225mm main along Frenchs Forest Road</li> </ul>	• \$920,000
	• 1.0km of a 150mm main along Warringah Road	• \$300,000
Sewer	<ul> <li>550m of 225mm main for the Northern Draining Catchments</li> </ul>	• \$410,000
	<ul> <li>325m of 300mm main for the Northern Draining Catchments</li> </ul>	• \$315,000
	<ul> <li>Potential for 615m of 225mm main for the Northern Draining Catchments (Subject to detailed modelling)</li> </ul>	• \$460,000
	<ul> <li>Potential for 705m of 150mm main for the Southern Draining Catchments (Subject to detailed modelling)</li> </ul>	• \$415,000
Electricity	<ul> <li>1x 11kV feeder from Belrose ZS, approximately 1.3km from the site</li> </ul>	• \$1,370,000
	<ul> <li>1x 11kV feeder from Killarney ZS, approximately 1.8km from the site</li> </ul>	• \$1,890,000
Telecommunications	No trunk upgrade requirements, NBN new connection free will each	• \$600 per single dwelling unit
	connection tees will apply.	\$400 per multi dwelling unit

Table 1:	Trunk	Utility	Requirem	ents
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\*Indicative costs do not include land acquisition

This report has outlined the servicing requirements likely to be required for the balance of the Northern Beaches Hospital Structure Plan area, however these requirements will need to be further assessed as more detail on the proposed development in these areas becomes available.

# **1** Introduction

Mott MacDonald has been engaged by the NSW Department of Planning and Environment to assist with the preparation of a Utilities Capacity Assessment to guide the development of the Frenchs Forest Planned Precinct.

# 1.1 Scope of Works

The NSW Department of Planning, Industry and Environment (DPIE) is preparing a master plan to guide the future land uses, built form proposals and growth projections of the Frenchs Forest Planned Precinct. Mott MacDonald has been engaged to undertake a utilities services study to assist in developing the urban design and planning work for the Precinct. The study aims to identify existing opportunities, constraints and risks associated with civil engineering and services infrastructure to support the delivery of the master plan.

To assist in the preparation of the master plan, Mott MacDonald has undertaken the following tasks:

- Undertaken a desktop review of existing services and utilities within the Precinct;
- Liaised with Ausgrid in relation to 33kV power poles erected on Frenchs Forest Road West. This included:
  - Obtaining plans that identify the 33kV power lines on Frenchs Forest Road, including any easements;
  - Obtaining building setback controls that may be required for medium density housing if the 33kV lines are to be retained on Frenchs Forest Road; and
  - Determining options and locations to relocate the power lines underground, including on Frenchs Forest Road and nearby roads.
- Determined the capacity of existing utility services (where available) and identified gaps to be addressed based on projected population growth;
- Mapped the extent of the existing services and utilities;
- Made recommendations for works/upgrades necessary to support the projected growth in the Planned Precinct, including upgrades and indicative costs;

These works have formed this Utilities Capacity Assessment Report.

This report will be updated following receipt of utility authority feedback. This will also include indicative costings of upgrades if available.

# 1.2 Purpose of Report

For DPE's Planned Precincts such as Frenchs Forest, the barriers to development are typically trunk infrastructure items such as medium-large water and sewer pipes, reservoirs, sewer pump stations, zone substations and electrical feeders. Our study aims to proactively identify trunk upgrades that may be necessary to facilitate the proposed growth in the Planned Precinct prior to specific developments occurring. The aim of our report is therefore to identify these items to inform DPIE of services that if not upgraded, could delay large portions of the Precinct. These suggested upgrades are then intended to inform the relevant authorities of amendments they should consider to their capital works programs to upgrade existing infrastructure as it reaches its capacity. This approach is considered appropriate for the purposes for DPIE to go on exhibition.

Local reticulation services will typically be provided by developers as development proceeds and depend on the form of blocks and timing of their development – which is unknown at this point in time. Consequently, these items are not the focus of this report.

Instead the purpose of this report is to identify existing trunk servicing infrastructure and outline requirements for new trunk services infrastructure to service the Frenchs Forest Planned Precinct. This report will therefore explore the following:

- Existing/proposed trunk servicing strategies (including sewer, water, electrical, telecommunications and gas);
- Review of current trunk supply (where possible);
- Determine available trunk capacity (where possible);
- · Key trunk constraints and opportunities;
- · Demand generated by the Precinct; and
- Adjustments/augmentations required to existing trunk infrastructure to enable development.

### 1.3 Limitations

The nature of rezoning existing urban land such as the Frenchs Forest Planned Precinct means it is currently unclear which blocks will be amalgamated by developers first and developed into the proposed densities. Consequently, staging of the Planned Precinct is currently uncertain. This means our report will suggest a form of the future ultimate utilities network that could feasibly be achieved. However initial developments are likely to influence initial upgrades which may deviate the ultimate network from the one we will propose.

The utility authorities operate under regulatory environments that encourage them to be reactive to development as it proceeds. Consequently, they will avoid committing to upgrades to their networks ahead of development progressing.

Having said this, they will generally be expected to undertake network planning studies to facilitate their funding and delivery mechanisms which include the yields provided to them as part of this study. The findings and recommendations of their more detailed network planning studies will eventually supersede our report.

# 1.4 Regional Context

Frenchs Forest is located approximately 18 kilometres north of the Sydney CBD, lies within the local government boundaries of the amalgamated Northern Beaches Council and forms part of the Northern Beaches region. The Northern Beaches region covers approximately 263 km<sup>2</sup> which is currently served by Manly and Mona Vale town centres and Brookvale and Dee Why major centres.

In the absence of railway infrastructure, access to the region is reliant upon the regional road network, including Warringah Road, Mona Vale Road, Wakehurst Parkway and Pittwater Road. While there are limited ferry services to Mosman and Manly there is heavy reliance on private vehicle and bus transportation.

In March 2018 the Greater Sydney Commission released the *Greater Sydney Region Plan*, which identified Frenchs Forest as a Health and Education Precinct. These precincts seek to facilitate place-based outcomes for specific employment and mixed-use centres across Sydney. The Frenchs Forest Precinct will deliver new homes and jobs located close to public transport, shops and services. The Greater Sydney Region Plan is shown on Figure 1.

The Frenchs Forest Precinct also forms part of the North District Plan, which was released in 2017. The Northern Beaches Hospital will form the centre of this Precinct, and will be supported by improved transport links, a new urban core and employment hub. The plan estimates that the Precinct will deliver between 12,000 – 13,000 new jobs by 2036.

Figure 1: Greater Sydney Region Plan



Source: Greater Sydney Region Plan – A Metropolis of Three Cities – Greater Sydney Commission (2018)

# 1.5 Northern Beaches Hospital Precinct Structure Plan (NBHSP

To complement the existing local centres and to capitalise on the major Northern Beaches Hospital (NBH) investment, the Northern Beaches Council (NBC) compiled the Northern Beaches Hospital Precinct Structure Plan (NBHSP) in 2017. This included a new town centre and neighbouring dwellings adjacent the new NBH as illustrated in Figure 2.

The NBHSP covers approximately 49 hectares of rezoned land in Frenchs Forest and proposes the phased delivery of 5,360 new dwellings and 2,300 new jobs over the next 20 years. The NBHSP envisages a transport interchange will be incorporated into the redevelopment of the town centre on the existing Forest High School site. Surrounding the town centre will be apartment buildings with a variety of building heights and forms with a maximum height of 40 metres to correspond with the height of the NBH.

The NBHSP identified that of the 5,360 new dwellings to be delivered in the full NBHSP area, 3,000 could be supported in the short term without major road infrastructure upgrades. DPIE have nominated a Planned Precinct which covers the area outlined in black on Figure 2 below. This area forms the Phase 1 area outlined in the NBHSP.

From the NBHSP, it appears the NBC and its consultants undertook the following supporting activities in developing the NBHSP:

- A transport and traffic study;
- A detailed community and stakeholder engagement process;
- An affordable housing study;
- A bushfire study;
- A development feasibility study; and
- A retail demand and economic study.

This report aims to support and provide further detail regarding utilities servicing strategies for both the Structure Plan and the Planned Precinct.



# Figure 2: Northern Beaches Hospital Precinct Structure Plan

# 1.6 Frenchs Forest Planned Precinct Area

### 1.6.1 Location and Topography

The NSW DPE's Precinct Plan study area is approximately 27 hectares in size and is generally bordered by:

- Karingal Crescent to the south;
- Wakehurst Parkway to the east;
- Sylvia Place to the west;
- Residential dwellings to the north.

The Precinct Plan area currently does not include any major transport facilities other than bus stops along Frenchs Forest Road and Warringah Road.

As illustrated in Figure 3, the Planned Precinct area sits approximately at the top of a local hill and grades as follows:

- The north of the Planned Precinct grades towards Jindabyne Reserve and Middle Creek which flows in a north westerly direction from the Precinct;
- To the north east, the study area grades towards Trefoil Creek which flows north until it meets Middle Creek;
- The crest of the hill continues east from the Precinct boundary;
- The south east of the site grades perpendicular from the Precinct until Manly Creek;
- The south and south west grades south into Sydney Harbour via Garigal National Park;
- The west of the Precinct grades perpendicular to the Precinct toward Carroll Creek.

It is noted that the elevation of the:

- Full Structure Plan region varies from a minimum of 125m to a maximum of about 162m;
- Planned Precinct region varies from a minimum of 136m to a maximum of about 162m.

Figure 3: Frenchs Forest Topography



Source: LIDAR

### 1.6.2 Proposed Development

Within the NBHSP area there are 103 existing dwellings:

- 53 of which are south of Warringah Road; and
- The remaining 50 are north of Warringah Road.

The core of the Precinct Plan area includes the NBH and Forest High School (FHS). The NBHSP proposes to move FHS to a site south east of the Precinct and replace it with a new mixed-use town centre.

As described in Section 1.5, the NBHSP proposed 5,360 dwellings to be delivered in three Phases over a 20-year period. Through consultation with Council, DPIE have now proposed 4,530 dwellings for the NBHSP area. The Frenchs Forest Planned Precinct covers the Phase 1 area and will deliver 2,100 dwellings, with the balance of dwellings to be delivered in Phases 2 and 3. The Planned Precinct will also deliver 82,722m<sup>2</sup> GFA of commercial space. The distribution of development is provided in Table 2 below. The Planned Precinct area has been divided into ten blocks as illustrated in Figure 4.

Block	Proposed Dwellings	Existing Dwellings	Additional Dwellings	Proposed Retail/ Commercial GFA (sqm)
Stage 1 North	335	24	311	3,292
Stage 1 North East	566	26	540	1,839
Stage 1 South	90	36	54	-
Stage 1 South Neighbourhood Centre	121	17	104	3,196
Stage 1 Central	1,000	1	999	74,395
TOTAL	2,129	103	2,008	82,722

## **Table 2: Proposed and Existing Yields**

Source: Chrofi Frenchs Forest Precinct Key Plan (10/7/18) & NSW Globe Clip & Ship Lots

#### Figure 4: Planned Precinct Key Plan



Source: Chrofi (10/7/18)

# 1.7 Northern Beaches Hospital Development

To inform this UCA, the following studies prepared for the NBH development were reviewed:

- Stage 1: Concept Design, Site Clearance & Preparatory Works Appendix J Infrastructure Management Plan – Warren Smith & Partners Pty Ltd – July 2013;
- Stage 1: Concept Design, Site Clearance & Preparatory Works NBH Stage 1 Submissions Report Final – February 2014;
- Stage 2: Hospital Design and Construction Appendix L Infrastructure Management Plan Thiess – November 2014.
- Their relevance is described below.

## 1.7.1 Stage 1: Concept Design, Site Clearance & Preparatory Works - Appendix J Infrastructure Management Plan – Warren Smith & Partners Pty Ltd – July 2013

This report outlined the proposed Infrastructure Management Plan for the new hospital with respect to:

- Electrical:
  - It confirmed through consultation with Ausgrid that NBH will have a maximum day demand of less than 10MVa;
  - A load of 10MVa from the NBH would have been considered sufficiently large to be a "tipping point" for a zone substation and associated 33kV feeder augmentation to have been required;
  - Instead the NBH was proposed to be serviced via 2x 11kV HV feeders from Beacon Hill ZS. These were proposed to follow separate feeder paths;
  - The existing Beacon Hill Zone Substation did not have the capacity to supply the NBH development. However, Ausgrid were planning to install a third zone transformer in 2013–14 to increase the zone substation's capacity. It is not clear if this has yet occurred.
- Gas:
  - Jemena confirmed the existing 160mm diameter 210kPa high pressure natural gas main situated on the northern side of Warringah Road, to be diverted into an easement on the southern boundary of the site, is available for connection to supply natural gas to the hospital;
  - Jemena advised that the existing 200mm diameter 1050kPa natural gas main in Frenchs Forest Road West, Bantry Bay Road (natural gas main to be relocated) is at full capacity and is not available for connection for the NBH;
  - Jemena advised the existing 200mm diameter 1050 kPa natural gas main in Bantry Bay Road would need to be removed and diverted to extend west along Frenchs Forest Road West in a 3m wide easement on the western boundary of the NBH and extend east along Warringah Road to reconnect to the existing 200 mm diameter high pressure natural gas main adjacent Bantry Bay Road (closed) and Warringah Road;
  - The NBH connection to the network will be via the Jemena 160mm diameter 210kPa high pressure natural gas main on the northern side of Warringah Road.
- Sewer:
  - Sydney Water advised the main sewer connection point for NBH would be to the existing 300mm Sydney Water sewer main adjacent to the northern side of NBH at Warringah Road and Bantry Bay Road;

- A 300mm diameter sewer extension would be required to extend from the existing 300mm diameter sewer in Bantry Bay Road that passes under Warringah Road (that reduces to 200mm in diameter) be disconnected. A 300mm diameter Sydney Water sewer extension will be installed to gravitate south along Bantry Bay Road and extend along Aquatic Drive to connect to the existing 300 mm diameter Sydney Water sewer in the parkland south of the Warringah Aquatic Centre;
- Sydney Water advised the existing 150 mm diameter sewer adjacent to the north-eastern corner of NBH in Frenchs Forest Road West is not available for connection for NBH.
- Water:
  - Sydney Water advised that the existing 250mm & 450mm diameter Sydney Water mains on the southern side of Frenchs Forest Road West are available for connection of domestic cold water supply and fire services for the hospital.
- Telecommunications:
  - The report advised that the existing telecommunications services within the area are not adequate to support the new proposed NBH;
  - Links to Telstra's exchange would be included consisting of relevant optical fibre, multicore copper PSTN lines and ISDN services from the Frenchs Forest Exchange.

### 1.7.2 Stage 1: Concept Design, Site Clearance & Preparatory Works - NBH Stage 1 Submissions Report Final – February 2014

This was prepared by SMEC to inform the early works for the NBH. Relevant sections for this report include:

- Electrical:
  - The 33kV Ausgrid line along Bantry Bay Road will be diverted around the NBH. This will extend east along Warringah Road from Bantry Bay Road intersection to Wakehurst Parkway. It will then extend north along Wakehurst Parkway and connect to the existing OH line at Frenchs Forest Road.

### 1.7.3 Stage 2: Hospital Design and Construction - Appendix L Infrastructure Management Plan – Thiess – November 2014

This Plan indicates the utility servicing strategy for the NBH Design & Construction. Relevant sections for this report include:

- Electrical:
  - The NBH maximum electrical demand was calculated as 5.3MVa including 20% spare capacity;
  - The NBH will be supplied via 2x 11kV feeders from Beacon Hill ZS.
- Telecommunications:
  - Separate telecommunications pathways will be provided from Warringah Road & Frenchs Forest Road to NBH;
- Sewer:
  - NBH connected via a 150mm sewer in Wakehurst Parkway;
  - Also, to a 300mm sewer in old Bantry Road reducing to a 200mm;
  - NBH Sewer flow is 37L/s.
- Water:
  - Three mains for connection to NBH, a 100mm in Frenchs Forest Road, also a 250mm & 450mm in Warringah Road;
  - Proposed flow for NBH is 300kL/day.
- Gas:
  - NBH could be serviced by either by 40mm 210kPa in Frenchs Forest Road, a 50mm 210kPa main in Frenchs Forest Road or a 160mm 210kPa main in Warringah Road;
  - Gas load of NBH is 32,406 mJ/hr.

# **2** Existing Services Infrastructure

The existing utilities assessment is primarily based on information received as a result of a Dial Before You Dig (DBYD) search. This information was supplemented by a site inspection and subsequent liaison with key personnel at the respective service authorities. Digital GIS files were provided by Sydney Water to supplement the DBYD information.

We are awaiting digital information from Ausgrid to supplement this information and will revise our documentation to account for this upon receipt.

The services information has been consolidated and displayed on a number of plans which can be found in Appendix A. The details shown on the plans should be considered as indicative only as the original DBYD information is not based on detailed survey data.

The following sections provide a commentary on the existing services within and adjacent to the site.

# 2.1 Water

Sydney Water currently supply water to the existing dwellings in the Planned Precinct. It is common practice for Sydney Water to continue to service urban development projects either:

- · With their existing network if there is sufficient unused network capacity; or
- To upgrade their assets (i.e. reservoirs, pipes, etc) as development proceeds if there is a capacity shortfall.

For the purpose of this study, we will focus on the reservoirs, trunk mains and major reticulation mains (down to around 225mm in diameter) servicing the Precinct. Generally speaking these are Sydney Water's assets that (if there is a capacity shortfall) have the potential to delay or prohibit development in a Precinct. This approach assumes that:

- Sydney Water's regional network can deliver sufficient filtered water to the reservoir(s) servicing the Precinct to cater for developments of up to 10,000 dwellings; and
- Minor reticulation mains will be provided for specific developments within the Precinct as needed without delaying development.

### 2.1.1 Reservoirs

The Frenchs Forest Reservoir is located near the southern border of the Planned Precinct on Fitzpatrick Avenue. The reservoir was constructed in 1974 and is not listed in the NSW Office of Environment and Heritage State Heritage Register.

Table 3 outlines the properties of the reservoirs in the vicinity of Frenchs Forest. The elevations of these reservoirs have been estimated from the LIDAR surrounding the reservoirs. Given the Planned Precinct region varies in elevation between 136m-162m, it is envisaged that the water would not be supplied from Beacon Hill without significant pumping.

The reservoirs in the vicinity of the Precinct and the trunk potable water pipes (225mm diameter and larger) are shown in Figure 5.

Reservoir Name	Date	Capacity (ML)	Туре	Unique Identifier (UAN)	Approx. Distance from Precinct	Approx. Ground Elevation
BEACON HILL	1974	27.2	Surface	WS0265	2.0km	98m
WARRINGAH	1936	76.6	Underground	WS0131	1.6km	143m
FRENCHS FOREST	1974	9.1	Surface	WS0283	0.06km	149m
BELROSE	1986	40	Surface	WS0282	3.5km	192m

#### **Table 3: Surrounding Reservoir Properties**

Source: Sydney Water Hydra & LIDAR

# Figure 5: Frenchs Forest Reservoirs and Potable Water Mains >225mm



Source: Sydney Water Hydra

# 2.1.2 Local Water Mains

Figure 6 shows the water mains surrounding the Precinct. It is likely that the majority of this water is supplied from the Frenchs Forest Reservoir. For simplicity, we have generalised the following service regions:

- Pink Region: Planned Precinct area mainly serviced by the 250mm main along Warringah Road (originating from the 300mm main along Karingal Crescent which connects into Frenchs Forest Reservoir);
- Green Region: Planned Precinct area mainly serviced by the eastern portion of the 450mm main along Frenchs Forest Road (originating from the 500mm main along Forest Way which connects into Frenchs Forest Reservoir via Fitzpatrick Avenue). It is noted that the southern portions of this region could also be serviced by the 250mm main along Warringah Road;
- Orange Region: NBH Structure Plan area outside the Planned Precinct area mainly serviced by the:
  - 300mm main along Forest Way (which connects into Frenchs Forest Reservoir via the 300mm main along Karingal Crescent) for the portion west of Forest Way;
  - The western portion of the 450mm main along Frenchs Forest Road (originating from the 500mm main along Forest Way which connects into Frenchs Forest Reservoir via Fitzpatrick Avenue).



#### Figure 6: Existing local water infrastructure

Source: Sydney Water Hydra

# 2.1.3 Review and Commentary on Existing Capacity

#### 2.1.3.1 Sydney Water Current Planned Growth in the Local Area

In 2014 Sydney Water published a Growth Servicing Plan (GSP) for 2014-2019 which outlined their strategy to provide water and sewer infrastructure to service the urban growth across Greater Sydney. The expected growth for this timeframe across the Northern Beaches LGA (formerly the Warringah and Pittwater LGAs) is outlined in Table 4. The locations of these developments are shown on Figure 7.

From Table 4 and Figure 7 we note:

- There were no notable forecast increases in water/sewer demand in the region immediately surrounding the Frenchs Forest Precinct;
- Any demand from the NBH was not included in the Growth Servicing Plan.

In 2017, Sydney Water released an updated GSP for 2017-2022. The following related to the Frenchs Forest Planned Precinct region:

- Sydney Water did not disclose any significant infrastructure improvements to the area in Section 3.1 of the report;
- Sydney Water's GSP did not identify any potential growth in Frenchs Forest as per Figure 5 of their report. Therefore, this study will inform growth in the Precinct to encourage Sydney Water to update their future GSP to include provisions for the Planned Precinct.

LGA	Major Site (>200 dwellings)	Total Potential Dwellings to 2025	Short term (to 2015)	Long term (to 2025)
Warringah	War Veterans	229	229	0
Warringah	Dee Why Town Centre	500	200	300
Pittwater	Warriewood Valley	1,334	958	376
Pittwater	Ingleside	4,400	0	4,400
Warringah	Belrose	60	60	0
TOTAL		6,523	1,447	5,076

#### Table 4: Sydney Water 2014-2019 Growth Servicing Plan – Warringah & Pittwater LGA's

Source: Sydney Water 2014-2019 Growth Servicing Plan



Figure 7: North East Subregion from Sydney Water Growth Servicing Plan and approximate locations in relation to the Precinct

Source: Sydney Water 2014-2019 Growth Servicing Plan

### 2.1.3.2 Forecast Growth

Due to the presence of water mains within and surrounding the site, it is likely that there is some residual capacity in the existing system to service the Precinct in isolation. However, given downstream areas are also serviced by these trunk pipes, upgrades are likely to be required to service the combination of existing and proposed development.

Mott MacDonald have undertaken a high-level assessment to determine the increase in demand for the precinct. The results of this assessment can be found in Section 3.1.

### 2.1.4 Key Constraints and Opportunities

- Pipe upgrades may be required as there is likely to be limited capacity in the existing water mains to service the increased density in the Precinct;
- Upgrading the 450-500mm water main along Warringah Road from the intersection with Fitzpatrick Avenue to Frenchs Forest Road and its continuation along Frenchs Forest Road could incur a significant cost. The extent of required works will be confirmed by Sydney Water in their feasibility assessment. There is a risk that that such works would incur significant cost given the need to work under major regional roads;
- Risk there may need to be upgrade to Frenchs Forest Reservoir. There may be difficulties in increasing supply without building an extra reservoir given the reservoir site appears to have limited space to expand. Should a reservoir upgrade be required, this is expected to be provided and funded by Sydney Water;
- Existing minor reticulation within the site boundary may require removal/relocation to suit the proposed new layout.

# 2.2 Sewer

Sydney Water currently drain and treat wastewater from the existing dwellings in the Planned Precinct. It is common practice for Sydney Water to continue to service urban development projects either:

- With their existing network if there is sufficient unused network capacity; or
- To upgrade their assets (i.e. Sewer Pump Stations (SPS), pipes, etc) as development proceeds if there is a capacity shortfall.

For the purpose of this study, we will focus on the SPS, trunk mains (>300mm diameter) and major reticulation mains (225-300mm diameter) servicing the Precinct. Generally speaking these are Sydney Water's assets that (if there is a capacity shortfall) have the potential to delay or prohibit development in a Precinct. Smaller reticulation mains (<225mm) may require upgrades but are generally manageable by developers and not prohibitive to development. This approach assumes that:

- Sydney Water's network critical trunk mains (around 600mm diameter and larger) and Wastewater Treatment Plants (WWTP) will have sufficient capacity to cater for developments of up to 10,000 dwellings; and
- Minor reticulation mains will be provided for specific developments within the Precinct as needed without delaying development.

# 2.2.1 Sewer Catchments

We have considered the Planned Precinct to be divided into six sewer servicing catchments given their topography and the existing sewer network. These six catchments can be divided into two main ultimate catchments as follows:

- Planned Precinct areas north of Warringah Road generally grade to the north (see Catchments 1, 2 and 3 in Figure 8);
- Planned Precinct areas south of Warringah Road generally grade to the south (see Catchments 4, 5, 6 in Figure 8).

It is noted that of the NBHSP areas outside the Planned Precinct:

- The areas east of Forest Way would also drain into Catchment 1;
- The areas west of Forest Way drain west away from Planned Precinct Catchments.

**Figure 8: Planned Precinct Sewer Catchments** 



Source: Sydney Water Hydra

#### 2.2.2 Sewer Trunk Mains and Major Reticulation Mains

Figure 9 simplifies the network shown in Figure 8 into the key mains draining the Catchments. This is explained in two parts:

- The Northern Catchments 1-3 which drain to the Warriewood Sewer Treatment Plant (ST0026), and;
- The Southern Catchments 4-6 which drain to the North Head Sewer Treatment Plant (ST0020).





Source: Sydney Water Hydra

#### Northern Catchments 1-3

- 1. P1a is a 150mm reticulation pipe. It drains Catchment 1 west into P1b. *This pipe has not been considered in this study but is likely to require upsizing*;
- 2. P1b is a 225mm reticulation pipe. It drains Catchment 1 northwards into P1,2;
- 3. P2a is a 150mm reticulation pipe. It drains Catchment 2 north into P1,2. *This pipe has not been considered in this study but is likely to require upsizing*;
- 4. P1,2 is a 225mm reticulation pipe. It is the downstream continuation of P1b and P2a and drains into P1,2,3a;
- 5. P3a is a 150mm reticulation pipe. It drains Catchment 3 northerly into P3b. *This pipe has not been considered in this study but is likely to require upsizing*;
- P3b is the continuation of P3a which is upgraded to a 225mm reticulation pipe. It drains Catchment 3 westerly into P1,2,3a;
- 7. P1,2,3a is a 225mm reticulation pipe which commences at the confluence the of P1,2 and P3b. It drains northerly into P1,2,3b;
- P1,2,3b is a 375mm trunk pipe which commences at the confluence the of P1,2,3a and a separate main servicing catchments outside of the Precinct. It is known as the Middle Creek Carrier Section 4 and drains north-easterly into P1,2,3c;
- P1,2,3c is a 525mm trunk pipe which commences at the confluence the of P1,2,3a and separate mains servicing catchments outside of the Precinct. It is also known as the Middle Creek Carrier Section 4 and drains north-easterly until reaching the Warriewood Sewer Treatment Plant (ST0026) via the Parkway Carrier;
- 10. It is assumed Sydney Water will provide commentary on any capacity shortage in the downstream portions of the Middle Creek Carrier and beyond given this includes sewer from several other Catchments.

#### Southern Catchments 4-6

- 1. P4a is a 200-225mm reticulation pipe. It drains Catchment 4 south into P4b. It is noted that this pipe also drains sewer from the new NBH which has been planned to be diverted east via a new main along Aquatic Drive as per Section 1.7.1. It is assumed for the purposes of this study that the sewer from Catchment 4 will continue to drain south and not be diverted in the new main. If Sydney Water provide advice that the new main has comparatively more remaining capacity. *This pipe has not been considered in this study but is likely to require upsizing*;
- 2. P4b is a 300mm reticulation pipe. It is the downstream continuation of P4a. It drains Catchment 4 west into P4,5;
- 3. P5a is a 150mm reticulation pipe. It drains Catchment 5 south east into P5b. *This pipe has not been considered in this study but is likely to require upsizing*;
- 4. P5b is a 225mm reticulation pipe. It is the downstream continuation of P5a and drains into P4,5;
- 5. P4,5 is a 300mm reticulation pipe. It is the downstream continuation of P4b and P5a and drains into P4,5,6a;
- 6. P6a is a 150mm reticulation pipe. It drains Catchment 6 south into P6b. *This pipe has not been considered in this study but is likely to require upsizing;*
- 7. P6b is a 225mm reticulation pipe. It is the downstream continuation of P6a and drains into P4,5,6a;
- 8. P4,5,6a is a 300mm reticulation pipe which commences at the confluence the of P4,5 and P6b. It is also known as the Bantry Bay Carrier Section 4B and drains into P4,5,6b;
- 9. P4,5,6b is a 400mm trunk pipe which commences at the confluence the of P4,5 and P6a and pipes from other Catchments. It is also known as the Bantry Bay Carrier Section 4A. It drains south until reaching the North Head Sewer Treatment Plant (ST0020);
- 10. It is assumed Sydney Water will provide commentary on any capacity shortage in the downstream portions of the Bantry Bay Carrier and beyond given this includes sewer from several other Catchments.

#### 2.2.3 Key Constraints and Opportunities

- The site generally falls into two drainage catchments, the northern catchment drains to the Warriewood STP while the southern catchment drains to the North Head STP;
- As the study area is generally at the top of a hill, no sewer pumping stations are required to drain the site;
- Existing minor sewer reticulation that passes through private properties may require removal/relocation to suit new building footprints should sites be consolidated;
- No trunk sewer mains pass through the existing site boundaries. Therefore, development footprints are not expected to be constrained due to the presence of sewer mains.
## 2.3 Electricity

Ausgrid currently transmit electricity to the existing dwellings in the Planned Precinct. It is common practice for Ausgrid to continue to service urban development projects either:

- · With their existing network if there is sufficient unused network capacity; or
- To upgrade their high voltage assets (i.e. Zone Substations (ZS), 33kV transmission lines, 11kV feeders, etc) as development proceeds if there is a capacity shortfall.

For the purpose of this study, we will focus on high voltage infrastructure (substations, transmission lines and 11kV feeders) servicing the Precinct. Generally speaking these are Ausgrid's assets that (if there is a capacity shortfall) have the potential to delay or prohibit development in a Precinct. This approach assumes that:

- TransGrid's network critical Bulk Supply Points (BSP) and major transmission lines (132kV and higher) can supply sufficient bulk power to Ausgrid to cater for developments of up to 10,000 dwellings;
- Ausgrid's network critical Transmission Stations (TS), Switching Stations (SS) and major transmission lines (from around 66kV-132kV) have sufficient capacity to cater for developments in the <10,000 dwelling range; and</li>
- Minor low voltage (LV) cables and padmount substations will be provided for specific developments within the Precinct as needed without delaying development.

## 2.3.1 Regional Network

The Precinct and surrounding area receives electricity from Ausgrid. The approximate locations of substations and transmission lines in the vicinity of the Precinct are illustrated in Figure 10.

We note that the 33kV cable along Bantry Bay Road which passes through the NBH has been relocated.

To gain an understanding of the existing capacity in the trunk electricity network, we have:

- Undertaken a review of Ausgrid's publicly available information; and
- Lodged a feasibility application with Ausgrid to determine the servicing requirements for the site.

These are detailed in Section 3.3.



Figure 10: Approximate Surrounding Substation Locations

Source: Ausgrid – Supply and Demand 2012-2013 Update, <u>http://data.environment.nsw.gov.au/dataset/state-heritage-register-centroids9b5f6</u>

## 2.3.1.1 Ausgrid Capacity from Publicly Available Information

In December 2017, Ausgrid released information regarding the planned upgrades and capacity and predicted demand for its substations in NSW, which includes the Northern Beaches region. The information relevant to the substations in the vicinity of the Precinct have been summarised in Table 5. It is noted that:

- Total and firm capacities have been taken as the minimum of winter and summer capacities;
- Actual Load for 2016/17 and Forecast Load for 2021/22 have been taken as the maxima of winter and summer;

To be conservative, it is assumed the electricity demand from the NBH has not been taken into account by Ausgrid's forecast rises in load on the Beacon Hill ZS of 5.3MVa<sup>1</sup>.

#### Table 5: Capacities of Surrounding Electricity Substations (MVA)

Substation	Known Recent Upgrades	Total Capacity	Firm Capacity	Actual Load 16/17	Forecast Load 21/22	NBH Demand	Forecast Available Firm Capacity 21/22
Sub-Transmiss	ion Stations						
Sydney East 132/33kV		233.2	141	76.9	72.5		68.5
Warringah 132/33kV		273.7	217.4	169.8	162.5		54.9
Zone Stations							
Beacon Hill 33/11kV	Upgraded in 2014: additional transformer, renewal of 11kV switchgear, and a new 33kV feeder to increase substation capacity.	54.1	26.7	22.3	20.1	5.3	1.3
Belrose 33/11kV	Transformer upgrade in 2010	70.5	40.3	29.6	27		13.3
Killarney 33/11kV		21.1	21.1	15.6	14.6		6.5

Source: Distribution and Transmission Annual Planning Report - Ausgrid - December 2017

<sup>&</sup>lt;sup>1</sup> Stage 2: Hospital Design and Construction - Appendix L Infrastructure Management Plan – Thiess – November 2014

Ausgrid also assessed feeders connecting zone substations to confirm available forecast spare capacity up to the summer of 2021/2022. As indicated in.

Table 6, generally these bulk distribution feeders are forecast in 2021/2022 to be operating at approximately 40-70% capacity. This indicates additional supply could be diverted from the zone substations if required.

It should be noted:

- We have not considered 132kV transmission lines between BSP and STS given these are a network capacity issue, not for a Precinct such as Frenchs Forest;
- We have not considered STS transmission lines to ZS other than Beacon Hill, Belrose and Killarney as these are not directly relevant to the Frenchs Forest Precinct;
- Actual Load for 2016/17 and Forecast Load for 2021/22 have been taken as the maxima of winter and summer;
- Total and firm capacities have been taken as the minimum of winter and summer capacities;

To be conservative, it is assumed the 5.3MVA electricity demand from the NBH has not been taken into account by Ausgrid's forecast rises in load on the Beacon Hill ZS<sup>2</sup>.

#### Table 6: Capacities of Surrounding 33kV Electricity Feeders (MVA)

Feeder name	17/18 Load	17/18 Rating	21/22 Load	21/22 Rating	NBH Demand	Forecast Available Firm Capacity 21/22
Feeder S02(1) Warringah STS to tee Killarney/Belrose ZS	28.6	51.4	29.7	51.4		21.7
Feeder S02(2) Tee Warringah STS/Killarney/Belrose ZS to Killarney ZS	13.9	34.3	14.5	34.3		19.8
Feeder S02(3) Tee Warringah STS /Killarney/Belrose ZS to Belrose ZS	25	51.4	25.9	51.4		25.5
Feeder S03(1) Warringah STS to tee CP Oxford Falls/Belrose ZS	25.3	37.4	26.1	37.4		11.3
Feeder S03(2) Tee Warringah/CP/Belrose ZS to Belrose ZS	25.1	51.4	25.9	51.4		25.5
Feeder S09 Warringah STS to Beacon Hill ZS	18.5	41	19.3	41		21.7
Feeder S12 Warringah STS to Beacon Hill ZS	18.4	40.47	19.3	40.47	5.3	21.2
Feeder S14 Warringah STS to Killarney ZS	13.9	25.7	14.5	25.7		11.2

Source: Distribution and Transmission Annual Planning Report – Ausgrid – December 2017

<sup>&</sup>lt;sup>2</sup> Stage 2: Hospital Design and Construction - Appendix L Infrastructure Management Plan – Thiess – November 2014

## 2.3.2 Key Constraints and Opportunities

- Based on Ausgrid's data regarding spare capacity, the Belrose and Killarney ZS and their feeders are likely to have some spare capacity to service the initial increases in population;
- The existing substations will have limited space for upgrades. Once the upgrade potential of these substations is exhausted a new zone substation site would be required. Given the proximity to transmission lines, creation of a new zone substation is not expected to be a key constraint, however the acquisition of a site may raise challenges;
- The presence of the 33kV overhead feeder along Frenchs Forest Road is a constraint to development despite not having an easement in place. Options for it are discussed in Section 4. It is noted that there is a right of way easement in the north east of the Planned Precinct. This is shown on Figure 11.



## Figure 11: Existing Easements

Source: NSW Clip & Ship Easements

## 2.4 Gas

Gas is supplied to the Precinct and surrounding area by Jemena. 1050kPa secondary mains are located along Fitzpatrick Avenue and Bantry Bay Road in the south of the Precinct and Warringah Road and Rabbett Street in the north. The NBH also appears to be supplied with gas via a secondary main bisecting the NBH and school sites. The existing dwellings are supplied gas via 210kPa network mains located in most streets. The existing gas network is shown on Figure 12 below.

## Figure 12: Existing Gas Network



Source: Dial Before You Dig

## 2.4.1 Key Constraints and Opportunities

- The site is serviced by Jemena and some supply may be available for initial developments without network augmentation; and
- It is not expected that provision of gas to the Precinct will pose a constraint to future development. However, the provision of gas may not be feasible for isolated sites, particularly where neighbouring properties choose not to service their development with gas and lengthy lead in works would therefore need to be provided by a sole developer.

## 2.5 Telecommunications

A number of companies provide telecommunications services throughout the Precinct. Our desktop review of the DBYD information is summarised in Table 7 which indicates the providers who currently service the streets within the Precinct:

## **Table 7: Telecommunications Providers**

Street	Serviced by Telstra	Serviced by NBN	Serviced by Optus	Serviced by Verizon
Gladys Ave	Yes	Yes	No	Not shown on DBYD
Bluegum Cres	Yes	Yes	Not shown on DBYD	Not shown on DBYD
Hilmer St	Yes	Yes	Yes	No
Bantry Bay Rd	Yes	Yes	Yes	No
Primrose Ave	Yes	Yes	No	No
Sylvia Pl	Yes	No	No	Not shown on DBYD
Cobb St	Yes	Yes	No	Not shown on DBYD
Wakehurst Pkwy	No	No	Yes	No
Rabbett St	Yes	Yes	Not shown on DBYD	No
Warringah Rd	No	Yes	Yes	Yes
Holland Cres	Yes	Yes	Not shown on DBYD	Not shown on DBYD
Frenchs Forest Rd West	Yes	Yes	Yes	No

Source: Dial Before You Dig

An Optus mobile tower is located in the south east corner of the FHS site. The approximate location of the tower is shown in Figure 13. If the tower needs to be relocated to accommodate development, the developer will be responsible for the relocation costs unless Optus agree to other arrangements.

The approximate total relocation costs including acquisition, design and construction has been in the order of \$500,000 for similar works in the past. Telecommunications providers generally prefer towers to be positioned atop new apartment buildings to ensure adequate coverage can be maintained.





Source: Site Visit

## 2.5.1 Key Constraints and Opportunities

- The region is well serviced by phone, mobile and high-speed fibre. It is expected that NBN Co. will service the area in the future. The provision of telecommunications services is not expected to limit or constrain development;
- If development is proposed on sites with existing mobile towers these will need to be relocated to ensure network coverage is maintained. Additional towers may be required to ensure that there is no loss in coverage due to the increase in high rise towers; and
- Sites impacted by trunk telecommunications infrastructure may require further studies before development can occur.

## **3 Proposed Services Infrastructure**

## 3.1 Water

A feasibility application has been lodged with Sydney Water to determine the servicing requirements for the Precinct. At this stage, Sydney Water are unable to provide servicing information for the development and have advised an integrated servicing strategy would be required. This would involve water balance and network modelling to determine a suitable strategy to support the staged development of the Precinct. Sydney Water were unable at this time to comment on existing spare capacities in the network.

In lieu of advice from Sydney Water, Mott MacDonald have undertaken a high-level assessment to determine the servicing requirements for the site. This assessment assumes there is no available capacity in the existing infrastructure to support the development. This provides a worst-case estimate of the upgrade works required to service the Precinct.

The recommendations listed in this report have been shown as 'additional infrastructure' required. Should the existing infrastructure have residual capacity then the quantum of upgrades could be reduced or eliminated. Once network modelling is undertaken in the future and formal applications are made to Sydney Water, detailed servicing requirements can be estimated. Where appropriate, some of these upgrades could be included in Sydney Water's capital works program with the exception of out of sequence development.

## 3.1.1 Water Servicing Strategy

Given the presence of existing water mains throughout Precinct as outlined in Section 2.1, it is likely that there will be some spare water capacity in the network for the initial stages of development. Where there is insufficient capacity in key trunk mains, these mains will be upsized or a duplicate main will be constructed adjacent the existing main to cater for the increased demand.

In lieu of more detailed information, we have provided a "worst-case" assessment below which would occur in the event there is no remaining capacity in the existing network. This provides DPIE with an understanding of the upper end of infrastructure augmentations that could be required for the Precinct.

## 3.1.1 Capacity Assessment

Potable water is currently supplied to much of the site primarily from the Frenchs Forest Reservoir. To determine the water supply requirements to service the additional demand for the Priority Precinct, a high-level assessment was undertaken using the Water Supply Code of Australia (WSA). This involved calculating the peak hourly demand for the proposed development to determine the required trunk water main size.

The Precinct was divided into three areas for the assessment:

- Green area Covering the North, North East and Central blocks within the Planned Precinct;
- Pink area Covering the South and South Neighbourhood blocks within the Planned Precinct; and
- Orange area Covering the balance of the NBHSP area (excluded from this assessment).

The maximum water demand rates for each land use were extracted from Table 2.1 of the WSA. The following demand rates have been adopted for this assessment:

## **Table 8: Potable Water Demand Rates**

Land Use	Max Day Demand Rate (kL/net Ha)
Suburban Detached Dwellings	41
61 – 100 dwellings/net Ha	80
101 – 140 dwellings/net Ha	100
Suburban Commercial	41

Source: Water Supply Code of Australia

The average daily demands were then calculated for each area by multiplying the above demand rates by the net areas for residential and commercial land uses. The average demand was then multiplied by the peak day factor to determine the peak daily demand. A peak day factor of 1.9 and 2.0 were adopted for residential and commercial areas respectively.

The peak hourly demand was then calculated using the average hourly demand from the peak day, multiplied by a peak hour factor of 2.0. The results of this assessment are provided in Table 9.

Land Use Zone (Ref Figure 14)	Area (Ha)	Demand Rate Adopted	Average Day Demand (L/s)	Peak Day Demand (L/s)	Peak Hourly Demand (L/s)
Green Region					
Commercial	7.95	41kL/Ha	3.77	7.55	15.10
Residential	16.16	100kL/Ha	18.70	35.53	56.1
Pink Region					
Commercial	0.32	41kL/Ha	0.15	0.30	0.61
Residential	2.81	80kL/Ha	2.60	4.94	9.89
		Total	25.23	48.32	96.64

#### Table 9: Proposed Demand Calculations

To determine the net increase in water demand resulting from the proposed development, the existing load was estimated and subtracted from the results above. The estimated existing loads are provided below:

Land Use Zone (Ref Figure 14)	Area (Ha)	Dwellings	Demand Rate Adopted	Average Day Demand (L/s)	Peak Day Demand (L/s)	Peak Hourly Demand (L/s)
Green Region						
Residential	5.08	52	41kL/Ha	2.41	5.55	12.21
School	6.31		180kL/day	2.08	4.17	8.33
Pink Region						
Residential	3.02	53	41kL/Ha	1.43	3.29	7.25
			Total	5.93	13.01	27.79

Therefore, the net overall increase in peak hourly demand for the green and pink regions is 50.66L/s and 3.25L/s respectively.

Assuming a target design velocity of 0.8-1.4m/s for the pipe, the minimum pipe size required to meet the total demand in the green region is 225mm. This could be achieved through one of the following options:

- Construction of a new 225mm main parallel to the existing 450mm watermain servicing the existing dwellings. This pipe covers a total length of 2150m. Should there be some residual available spare capacity in the existing main, then the new main could be constructed at a smaller size.
- Flows from the proposed development could be serviced from the existing infrastructure. To accommodate the proposed flows in the existing pipe, the 450mm main would need to have 25% available spare capacity.

Given the net increase in peak hourly demand in the pink region is 3.25L/s, it is likely that the increased demand could be accommodated within the existing pipe network without augmentation. The existing pipe would require 7% available spare capacity to accommodate flows from the proposed development. If there is no available capacity in this pipe, an additional 150mm main could be constructed along the same alignment to meet the shortfall.

It should be noted that the town centre has been included in the green service region (i.e. serviced via Frenchs Forest Road) for the purposes of this assessment, however there is potential for this area to be serviced in the Southern Pink service region.

A summary of the potential upgrade requirements is illustrated in Figure 14.



## Figure 14: Possible Trunk Water Upgrades

Source: Sydney Water Hydra

## 3.1.2 Notes Regarding Amplification and Staging Works

Larger development sites could consider the use of onsite packaged water treatment and reuse systems to reduce their consumption of potable water and therefore their impacts on the external network.

As the Precinct is likely to be developed incrementally over a 20-year period, it is understood that there is sufficient lead in time for Sydney Water to include any trunk infrastructure upgrades required for the study area in their Capital Works Program.

Negotiations will be required between individual proponents and Sydney Water to confirm funding arrangements and reimbursement schemes should major network augmentations be required to service a development.

It should be noted that Phases 2 and 3 of the structure plan have not been included in the above assessment. To avoid future duplication works, the upgrades proposed above could be amplified to include the requirements for Phases 2 and 3.

To support an additional 2,430 dwellings in Phases 2 and 3 and assuming a max day demand rate of 100kL/Ha, the equivalent of a 300mm main would be required to support the proposed development. If the infrastructure for the Planned Precinct and the balance of the structure plan are provided concurrently, a single 400mm trunk main or equivalent could be constructed on Forest Way, tapering down to a 225mm main on Frenchs Forest Road West. This requirement will be refined as a master plan for Phases 2 and 3 becomes available.

## 3.1.3 Sydney Water Feasibility Investigation

A feasibility application has been lodged with Sydney Water to determine the servicing requirements for the Precinct.

This section will be updated upon receipt of their advice.

## 3.2 Sewer

A feasibility application has been lodged with Sydney Water to determine the servicing requirements for the Precinct. At this stage, Sydney Water are unable to provide servicing information for the development and have advised an integrated servicing strategy would be required. This would involve water balance and network modelling to determine a suitable strategy to support the staged development of the Precinct. Sydney Water were unable at this time to comment on existing spare capacities in the network.

In lieu of advice from Sydney Water, Mott MacDonald have undertaken a high-level assessment to determine the servicing requirements for the site. This assessment assumes there is no available capacity in the existing infrastructure to support the development. This provides a worst-case estimate of the upgrade works required to service the Precinct.

The recommendations listed in this report have been shown as 'additional infrastructure' required. Should the existing infrastructure have residual capacity then the quantum of upgrades could be reduced or eliminated. Once network modelling is undertaken in the future and formal applications are made to Sydney Water, detailed servicing requirements can be estimated. Where appropriate, some of these upgrades could be included in Sydney Water's capital works program with the exception of out of sequence development.

## 3.2.1 Introduction

The proposed sewer network strategy will be delivered in the same manner as the water supply. This means as development progresses and existing mains reach capacity, the existing mains will be upgraded or duplicated along existing routes to accommodate the increased load.

The advice provided by Mott MacDonald in this study is based on the assumption that there is limited spare sewer capacity available. This approach is seen as an upper limiting scenario for the purpose of testing development feasibility.

It is expected that Sydney Water will ultimately provide the rollout of these services and as such, sequence upgrade works to match demand. The results of their own internal study will support or supersede the results of this assessment.

The Phase 1 development (i.e. the Planned Precinct region) has been used to determine the proposed ultimate state sewer network.

## 3.2.2 Proposed Sewer Loads

The Sewerage Code of Australia (SCA) was used to determine the proposed sewer loads for the Frenchs Forest Planned Precinct. Table 11 outlines the equivalent population (EP) rates adopted for each land use. These rates were used to determine the population increase and associated sewer demand related to the Precinct.

## **Table 11: Equivalent Population Rates**

Land Use	Unit	EP/Unit
Single occupancy medium density dwelling units	Dwelling	3.0
Single occupancy high density dwelling units (>70 dwellings/Ha)	Dwelling	2.5
Local commercial	Hectare	75

Source: Sewerage Code of Australia

The increase in EP has been determined for each sewer catchment based on the rates provided in Table 11. The increase in population was used to assess the potential upgrade requirements to key sewer mains servicing the Precinct.

Catchment	Block	Commercial GFA (m <sup>2</sup> )	Additional Dwellings	Assumed Residential Classification	Increase in EP
1	Central	74,395	999	High density	3,018
2	North	3,292	311	High density	801
3	North East	1,839	540	High density	1,363
4	South Neighbourhood Centre	3,196	104	High density	282
5	South (assumed 2/3)	-	36	Medium density	108
6	South (assumed 1/3)	-	18	Medium density	54
	Total	82,722	2,008		5,626

## Table 12: Sewer Design Summary

## 3.2.3 Proposed Sewer Upgrades

To provide a worst-case scenario, this assessment assumes there is no available spare capacity within the existing sewer network. Should Sydney Water indicate that there is additional spare capacity in the network, these upgrades may be reduced or eliminated.

Table 13 estimates the required upgrades for each trunk pipe as a result of the proposed increase in sewer load. If the existing corresponding pipe along each route has remaining capacity, the magnitudes of upgrades could be reduced.

The upgrades could be achieved by constructing a new pipe at the size indicated in Table 13 adjacent the existing sewer main, or by upsizing the existing main. These upgrades cater for the ultimate development build out and would need to be incrementally be provided as development occurs.

Trunk Pipe	Existing Size (mm)	Catchments Serviced	Average Grade	Proposed Increased Load (EP)	Approx. Length (m)	Equivalent New Pipe Required (mm)	Recommend Upgrade
P1	225	1	4.30%	3,018	335	225	Yes
P1,2	225	1, 2	7.37%	3,819	215	225	Yes
P1,2,3	225	1, 2, 3	9.35%	5,182	60	300	Yes
P1,2,3b	316	1, 2, 3	1.16%	5,182	265	300	Yes
P1,2,3c	451	1, 2, 3	1.11%	5,182	665	300	Existing Pipe Size Likely to be Sufficient
P3b	225	3	3.46%	1,363	615	225	May Require Amplification
P4	225	4	4.98%	282	595	150	May Require Amplification
P4,5	225	4, 5	1.09%	390	85	150	Existing Pipe Size Likely to be Sufficient
P4,5,6a	225	4, 5, 6	1.25%	444	110	150	May Require Amplification

## **Table 13: Trunk Sewer Mains**

Trunk Pipe	Existing Size (mm)	Catchments Serviced	Average Grade	Proposed Increased Load (EP)	Approx. Length (m)	Equivalent New Pipe Required (mm)	Recommend Upgrade
P4,5,6b	316	4, 5, 6	0.30%	444	185	150	Existing Pipe Size Likely to be Sufficient
P5	225	5	5.66%	108	675	150	Existing Pipe Size Likely to be Sufficient
P6	225	6	2.99%	54	265	150	Existing Pipe Size Likely to be Sufficient

Given the increase in demand within catchments 4, 5, and 6 is relatively small, the upgrades to the trunk sewer mains servicing this catchment may not be required. Should there be approximately 44% spare capacity in the existing mains this would eliminate the need for a duplicate main to be constructed. It is expected that the Middle Creek Carrier should have some residual capacity and has not been recommended for upgrading however, this would need to be confirmed as detailed modelling is undertaken for the precinct the pipes referenced for upgrade in Table 13 are identified in Figure 15.

Figure 15: Possible Sewer Network Upgrades



The following summary of pipe upgrades are proposed for the Planned Precinct. Minor Reticulation pipes may also be required to suit individual developments as they occur. It should also be noted that the below recommendations are for new additional pipes, in some instances it may be more efficient to upgrade the existing pipe as opposed to providing duplicate pipes. Modelling of the wider region would need to be undertaken to confirm the potential for upgrades over duplication.

## **Table 14: Summary of Proposed Pipe Upgrades**

	Proposed Pipe Diameter (mm)	Estimated Proposed Pipe Length (m)
Drenseed Additional Direct	225	550
Proposed Additional Pipes	300	325
Potential Upgrades (Subject to detailed	225	615
modelling)	150	705

## 3.2.4 Notes Regarding Amplification and Staging Works

As the Precinct is likely to be developed incrementally over a 20-year period, it is understood that there is sufficient lead in time for Sydney Water to include any trunk infrastructure upgrades required for the study area in their Capital Works Program.

Negotiations will be required between individual proponents and Sydney Water to confirm funding arrangements and reimbursement schemes should major network augmentations be required to service a development.

It should be noted that Phases 2 and 3 of the structure plan have not been included in the above assessment. The above upgrades are required for the Planned Precinct. However to reduce the risk of further upgrades as Phases 2 and 3 of the NBHSP occur, the Planned Precinct recommended upgrades could be further increased to accommodate the future growth.

Approximately 50% of the site area drains to pipe P1, 25% drains to pipe P6 and 45% drains away from the Planned Precinct. The increased load draining to P1 equates to an extra 3,150 EP, which may increase the 550m of 225mm main on Epping Drive to a 300mm main. These requirements will be refined as a master plan for Phases 2 and 3 becomes available.

## 3.3 Electricity

A feasibility application was lodged with Ausgrid to determine the servicing requirements for the Precinct. Ausgrid are unable to provide advice regarding the servicing of the development at this stage. In lieu of advice from Ausgrid, Mott MacDonald have undertaken a high-level assessment to determine if there is sufficient available capacity in the existing trunk network to support the Precinct.

#### 3.3.1 Anticipated Demand

To determine the servicing requirements for the Precinct, the anticipated demand generated by the development was calculated using rates provided in AS/NZS3000 and Endeavour Energy Technical Bulletin TB0188. The assumed electrical loads for each land use are tabulated in Table 15. The residential rates assume that dwellings utilise gas for cooking. Should developers decide not to provide a gas connection to new dwellings, a higher electrical demand rate would be required.

#### **Table 15: Electricity Load Assumptions**

Land Use	Unit Load (VA/m² or VA/dwelling)	Source
Commercial/Retail (retail shops – lights, power & air-conditioning)	100/m <sup>2</sup>	AS/NZS3000-2007 Table C3
Residential (high density)	4,500/dwelling	Endeavour Energy Technical Bulletin TB0188
Residential (medium density)	5,500/dwelling	Endeavour Energy Technical Bulletin TB0188

The existing electrical demand was also calculated using the assumed demand for medium density dwellings. The overall increased demand expected from each blow is summarized in Table 16 below. These demands are indicative only and will be further refined as more information becomes available regarding final built forms.

## Table 16: Increases in electrical loads

Block	Assumed Residential Type	Increase in Load (MVA)
North	High Density	1.70
North East	High Density	2.59
South	Medium Density	0.30
South Neighbourhood Centre	High Density	0.77
Central	High Density	11.93
	TOTAL	17.29

#### 3.3.2 Capacity Assessment

As discussed in Section 2.3.1, there are three zone substations located within the vicinity of the Precinct. Given there is minimal residual capacity in the Beacon Hill ZS, the development will likely be serviced from the Belrose and Killarney substations. The assumed servicing arrangement for each block is tabulated below.

#### **Table 17: Assumed Servicing Arrangement**

Block	Serviced By
North	Killarney
North East	Killarney
South	Killarney
South Neighbourhood Centre	Killarney
Central	Belrose

Given the size and large demand generated by the Central block, it is likely that the proposed development would be serviced by both the Belrose and Killarney substations. For the purpose of this assessment it has been assumed that all demand generated by the Central block will be serviced by the Belrose ZS, and the balance of the Precinct will be serviced by the Killarney ZS.

The existing available capacity for each ZS and the overall increase in demand generated by the Precinct are summarised below. Table 18 indicates that there is sufficient spare capacity within the existing zone substations to service the development.

It should be noted that capacity cannot be reserved for specific developments. Should external developments proceed ahead of the Precinct, the available supply will be used to service these projects first. The indicative servicing arrangement is illustrated in Figure 16.

#### **Table 18: Zone Substation Anticipated Demand**

Zone Substation	Existing Spare Capacity (MVA)	Demand (MVA)
Belrose	13	11.93
Beacon Hill	1	-
Killarney	6	5.36
TOTAL	20	17.29

Source: Distribution and Transmission Annual Planning Report – Ausgrid – December 2017



Figure 16: Illustration of assumed servicing arrangement

While there is currently sufficient capacity to service the Planned Precinct, the additional demand generated by the balance of the NBHSP area cannot be serviced by the existing network. Using the demand rates in Table 15, an additional 10.6MVA of electrical capacity will be required to service the 2,430 dwellings delivered in Phases 2 & 3 of the NBHSP.

Upgrades to the trunk electrical network will be required to support the balance of the NBHSP to meet the shortfall in available capacity. This could be achieved through augmentation to an existing substation or via construction of a new substation.

Further engagement with Ausgrid should be prioritized to ensure future planning takes into account the density and growth projections of the Frenchs Forest Planned Precinct and the NBHSP.

## 3.3.2.1 Feeder Analysis

An assessment of the transmission lines providing electricity to the substations was undertaken to determine whether the proposed additional electrical load can be delivered to the ZS's by the surrounding network. Table 19 compares the feeder capacities published by Ausgrid with the anticipated demand from the Precinct. Note this does not include demands from any new developments outside the Planned Precinct (such as the rest of the NBHSP).

#### Table 19: Feeder capacities and anticipated demands

Zone Substation	Feeder	Spare Feeder Capacity (MVA)	Demand (MVA)
Belrose	S03(2)	25.5	11.93
Beacon Hill	S09, S12	42.9	-
Killarney	S02(2), S14	31.0	5.36
TOTAL		99.4	17.29

Source: Distribution and Transmission Annual Planning Report – Ausgrid – December 2017

Table 19 shows that there appears to be sufficient total supply in the surrounding network to cater for the proposed development.

## 3.3.3 Recommended Strategy

An 11kV feeder can generally supply between 1,000 – 1,500 dwellings. Therefore, two feeders would be required to supply the Frenchs Forest Planned Precinct, and an additional two feeders would be required to supply Phases 2 & 3 of the NBHSP area. It is expected that these feeders will be split between the Killarney and Belrose substations, subject to available capacity.

Feeders can be delivered in a staged fashion as development progresses. Depending on available capacity in the existing network, there is potential for initial dwellings to be serviced via existing infrastructure before a high voltage feeder is required. Should there be no available capacity, a single feeder would be required to initiate development. After the first 1,500 dwellings are delivered, a second feeder would be required.

## 3.4 Gas

The Precinct is generally well serviced by existing gas infrastructure. Several 1050kPa secondary gas mains run through Precinct while most streets are serviced by 210kPa mains.

Under NSW regulation, Jemena is required to ensure that any connection to the natural gas distribution system is commercially viable and therefore must assess each request for supply on an individual basis (as gas supply is a non-essential service). Mott MacDonald's experience is that Jemena will be able to assess individual lots once a final layout is prepared and a connection application is made.

As there is already gas infrastructure in the vicinity of the study area, it is likely that Jemena will be able to facilitate the upgrade of infrastructure if required to support the increased demand generated by the development.

## 3.5 Telecommunications

While a number of companies provide telecommunications services to the existing dwellings within the study area, all future development will be serviced by NBN Co. The construction of the NBN has commenced across the Precinct and is expected to be completed by December 2018.

NBN Co. will utilise existing ducts within the shared trench of existing roads to install new telecommunications infrastructure. Developers will be expected to provide pit and pipe infrastructure, and any other required infrastructure within the site boundary. This includes providing ducts for any new roads.

New connections to the NBN network incur a charge of \$600 per single dwelling unit and \$400 for each multi dwelling unit. It is not anticipated that any backhaul charges will be applicable for the development.

# 4 Relocation of 33kV Feeder

An existing overhead 33kV powerline bisects the Precinct and its location poses a constraint to development. The powerline connects the Belrose ZS and Warringah STS via Frenchs Forest Road. If the powerline remains in its current location, development cannot occur within 3m of the existing property boundaries.

Mott MacDonald have undertaken an assessment to determine the urban planning implications of the overhead powerline remaining in place and being diverted underground.

Ausgrid have advised there are two options available for the relocation of the powerline:

- The transmission line could be undergrounded along the existing alignment. Ausgrid noted that as the road corridor is currently congested with services the transmission line would likely be routed down the centre of the road corridor. Rabbett Reserve and the intersection of the Wakehurst Parkway and Frenchs Forest Road East have been flagged as potential transition points for the works. This route would require approximately 1.2km of cable be undergrounded.
- 2. Alternatively, the transmission line could be re-aligned to the north. No appropriate path has been identified at this stage.

## 4.1 Regulations and Procedures

There are generally two options to transmit HV electricity from a regional source (i.e. transmission substation) to a local distribution point (i.e. zone substation); that being via overhead transmission lines or underground cables. When installing overhead electricity mains or underground cables, Ausgrid requires easements to be provided in the surrounding space for the following reasons:

- For overhead lines to ensure that the cables are safe, conductor blowout is appropriately managed and future maintenance is safely accessed;
- For underground cables, easements are mostly put in place to allow for maintenance access or width of pits.

To satisfy the issues noted above, Ausgrid have limitations on what activities can be carried out within overhead powerline easements including but not limited to:

- Mobile plant and equipment as well as vehicles must have a maximum height of 4m;
- · Fixed plant or equipment cannot be installed;
- Large structures like houses, sheds and garages are not permitted;
- Clothes hoists must have a maximum height of 2.5m;
- Obstructions cannot be placed within 5m of any power pole, equipment or support wire or within 10m of a steel structure;
- No fence posts or stakes are to be installed where there is underground cabling;
- Plants must have a maximum growth height of 4m; and
- Explosives, garbage or fallen timber cannot be stored.

Each of the two have different easement requirements, detailed in Table 20. In comparing the differing requirements, it should be noted that for urban areas, Ausgrid's policy is to generally only install new underground mains.

## Table 20: Typical easement widths

Situation	Typical Easement Width (m)	Source
33kV Overhead Transmission	10m to 20m	<ul> <li>Ausgrid NS143 Easements, Leases and Rights of Way 2018, Table 2;</li> <li>AS/NZS 7000:2016 Table CC1</li> </ul>
33kV Underground Cables	Minimum 4.5m	<ul> <li>Ausgrid NS143 Easements, Leases and Rights of Way 2018, Table 2A</li> </ul>

Source: Ausgrid NS143 Easements, Leases and Rights of Way 2018

In addition to the above requirements, if not all assets are able to be accessed through the easement, a right of way also needs to be provided. The right of way should be a minimum of 4.5m wide and must be able to accommodate construction and maintenance vehicles, which may exceed 26 tons in total.

## 4.2 Existing Easement

Despite the presence of the existing overhead 33kV transmission line along Frenchs Forest Road, the following did not indicate an easement is currently in place:

- NSW Lands Deposited Plan Search of Frenchs Forest High School (DP1214811) on 14/02/2018;
- NSW Six Maps Clip & Ship Cadastre on 07/02/2017.

## 4.3 Consultation with Ausgrid

Mott MacDonald met with an Ausgrid representative on the 19<sup>th</sup> of February 2018 to discuss the constraints and options regarding the 33kV transmission line along Frenchs Forest Road.

## 4.3.1 Implications of retaining overhead transmission line

Ausgrid confirmed an easement is not in place for the existing transmission lines. This is because an easement typically does not get created over an existing road corridor.

However, Ausgrid confirmed development on the northern side of the 33kV feeders cannot occur within 3m of the current property boundaries. 3m is the Safety Margin generally required as per Table 1 of "*Workcover NSW – Work Near Overhead Power Lines*" for 33kV transmission lines. This applies to all development, regardless of height.

Special care should be taken for buildings with balconies and other overhangs, as these structures must also be placed outside the protected 3m set-back. Ausgrid noted that detailed modelling may marginally reduce this in detailed design but would not recommend relying upon this. It is worth noting that the 3m set-back is only part of the controlled area. The remainder of the controlled area is in the existing road corridor.

While technically possible, Ausgrid advises against a "variable aerial easement" given the difficulty in enforcing (especially for apartment balconies).

Figure 17: Offset Along Frenchs Forest Road



## 4.3.2 Diversion Options

Frenchs Forest Road is a key thoroughfare for the Planned Precinct and the NBHSP has recommended increasing allowable building heights along the road. Therefore, if DPIE would like to maximise development potential along Frenchs Forest Road, Ausgrid confirmed the following changes are possible:

- The transmission line could be undergrounded along Frenchs Forest Road. Ausgrid noted the road corridor is currently congested with services but a path in the centre of the road corridor appears technically feasible. Possible overhead-underground transition points for investigation could be at Rabbett Reserve (near the corner Rabbett St & Epping Dr) and the North-East of the corner of Wakehurst Parkway & Frenchs Forest Road East, west of the existing 132kV easement. This route is approximately 1.2km of works. It is noted that the need to provide 24-hour access to the NBH will increase complexity of the construction phase in particular;
- The overhead powerline could be re-aligned probably to the north. However, there would be difficulty in determining an appropriate path. Conceptually this re-alignment would probably:

Commence from the corner of Wakehurst Parkway and Frenchs Forest Road to extend north along Wakehurst Parkway;

Be routed west from Wakehurst Parkway to Belrose ZS but would not be able to run along Weardon Road due to technical issues with aligning two transmission lines on similar paths.

Ausgrid noted RMS have previously been consulted in 2015 about undergrounding 33kV line as part of the road upgrades which have supported the NBH. RMS did not progress with this solution.

## 4.4 Next Steps

## 4.4.1 Undergrounding Process

From an urban planning and development perspective, it would be advantageous to minimise the development constraints where possible so that more flexibility is allowed for DPIE to achieve the desired yields. From our consultation with Ausgrid, it appears the most economical and easier method of re-aligning the transmission line would be to underground it along its existing route.

If DPIE decide to move the transmission lines, we envisage the next steps will be:

- DPIE will need to engage an Ausgrid Accredited Service Provider (ASP) to ascertain an appropriate feeder and conduit route. This would result in a concept design for the feeder route(s) with respect to available road cross section along the full re-aligned route;
- DPIE will need to consult with the owners and stakeholders of the two underground-overhead transition points.

## 4.4.2 Possible Funding Mechanisms

The process for relocating and funding existing Ausgrid assets are defined in detail in Ausgrid's *Network Relocation Policy* which is provided in Appendix E. A summary of how this applies for undergrounding the overhead line along Frenchs Forest Road is:

- 1. Ausgrid will not fund the upgrade seeing as "the benefits accrue solely to the proponent of the relocation works";
- 2. The proponent of the works will fund the undergrounding.

To assist DPIE in progressing undergrounding of the 33kV transmission lines, we consider the following to be the options of how the upgrade could be funded given the private and public funding mechanisms currently in operation in NSW:

- 1. One Developer could pay for the whole upgrade. As the school site makes up approximately 35% of the frontage to the transmission line, it would benefit from an aesthetic point of view and may have capacity to fund the works;
- 2. One Developer could pay for the whole upgrade and then be reimbursed by the other benefitting developers. This would take the form of a private agreement between each landowner to share the cost and reimburse the lead developer;
- 3. A consortium of developers could agree to share the cost. This would also be the form of a private agreement between the consortium and Ausgrid;
- 4. Section 94 (S94) contributions could be used. However, it is unclear if the undergrounding of the transmission line could be considered to provide the necessary public benefit. We would also envisage issues with timing seeing as S94 works/costs suffer cash flow issues given the undergrounding works precede the receipt of funds from development. Alternatively, an arrangement whereby a developer delivers as works in kind and reimbursed over time could be considered;
- 5. For similar reasons as per the issues with S94 contributions, we are unsure how SIC funding could be used;
- 6. We understand HAF funding may be possible for works other than road upgrades. Again, as per SIC, seeing as the benefits are concentrated to the individual land owners, it may be difficult to justify the wider benefits which HAF funding submitting require.

From the above options, it appears the most likely source of funding would be from a larger developer on the condition that the developer is able to generate sufficient yield such that the cost of undergrounding would not render their investment unfeasible. However, this carries the following risks:

- A large developer would need to enter into agreements with adjacent landowners if they wish to be reimbursed and they potentially run the risk of never being reimbursed;
- Smaller landowners may not be able to develop their sites in a timely manner if the undergrounding is dependent on seed funding and timelines of the larger developer responsible for undergrounding the transmission line. This may delay some of the smaller lots from being developed.

## **5** Sustainability Considerations

Strategies identified in this study have generally been based on traditional servicing principles. We have considered some potential sustainability initiatives that could be included in the Planned Precinct with regards to water, sewer, electrical, gas and telecommunications utilities as technologies change.

We note there are relatively limited sustainability opportunities on a Precinct wide scale given the Precinct its fragmented nature and that it is already developed and already serviced by all major utilities. Consequently, initiatives such as recycled water harvesting re-use schemes are less commercially viable than they are for large, single private developer owned greenfield developments.

Instead the greater opportunities for sustainability will tend to be driven by modern apartment building design replacing older residential dwellings. Some such sustainability improvements will include:

- Building designs that maximise natural light intake, reducing electrical demand in comparison to older buildings for lighting;
- Building designs that optimise natural ventilation for thermal comfort to reduce electricity demand for heating and air-conditioning;
- Building designs that optimise façade designs and material choices for thermal comfort to reduce electricity demand for heating and air-conditioning;
- Modern tap fixtures, washing machines, toilets and other household appliances that operate more water efficiently reducing potable water demands.

However, opportunities exist for Government Leadership to enforce better than industry standard practice, some of the following measures could be undertaken:

- Encourage councils to modify their Development Control Plan (DCP) to force developers to provide "green roofs" (gardens, lawn, etc spaces) on building roofs. These have several sustainability and climate change adaptation benefits including reducing stormwater runoff and reducing solar heat absorption in comparison with concrete roofs;
- Encourage councils to modify their DCP to force developers to provide rainwater tanks in new buildings for re-use of water. This is a common method for developers to achieve BASIX compliance in Sydney;
- Encourage developers to provide solar panels on the roofs of new developments. We note that over time however, the National Electricity Market (NEM) grid will increase its portion of renewable energy use and reduce the advantage of isolated solar panel systems.
- Precinct wide Climate Change Adaptation (CCA) and Ecologically Sustainable Development (ESD) studies could be undertaken to identify further opportunities with regard to climate resilience sustainable best practice.

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# A. Existing Services Plans



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## **B. Proposed Services Plans**

To be provided in a later revision



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# **C.** Authority Correspondence

#### C.1 Sydney Water Correspondence

To be provided once Sydney Water correspondence is provided.



14th September 2018 173373 Our Ref: Case

Mott Macdonald PO Box Q1678, QVB Sydney, NSW 1230

#### **RE: Frenchs Forest Precinct**

Dear Rachel Higgisson,

Thank you for notifying Sydney Water of the Frenchs Forest Precinct. We have reviewed the application and provide the following information to assist in planning the servicing needs of the proposal, based on the information supplied.

#### Precinct

- An integrated servicing strategy is required to provide a staged servicing for the proposed staged 5,360 dwellings and 83,185 m2 commercial area will need to be investigated to consider:
  - Develop a total water balance of the precinct
  - details of any amplifications to the existing water supply system that are required to service the predicted growth, and
  - to identify the preferred source and any solutions for alternative water product opportunities (eg. recycled water) to service the area.

This advice is not a formal approval of our servicing requirements. Detailed requirements, including any potential extensions or amplifications, will be provided once the development is referred to Sydney Water for a Section 73 application. More information about the Section 73 application process is available on our web page in the Land Development Manual.

Further advice and requirements for this proposal are in the attachments. If you require any further information, please contact Growth Planning and Development team on 02 8849 4269 or email urbangrowth@sydneywater.com.au.

Yours sincerely

### Fernando Ortega A/C Manager, Growth Planning and Development

#### Attachment 1

#### Sydney Water Servicing

A Section 73 Compliance Certificate under the Sydney Water Act 1994 must be obtained from Sydney Water prior to development commencement. It is recommended that the Council includes this term as a Condition of the DA approval.

The proponent is advised to make an early application for the certificate, as there may be water and wastewater pipes to be built that can take some time. This can also impact on other services and buildings, driveways or landscape designs.

Applications must be made through an authorised Water Servicing Coordinator. For help either visit www.sydneywater.com.au > Plumbing, building and developing > Developing > Land development or telephone 13 20 92.

#### **Building Plan Approval**

The approved plans must be submitted to the Sydney Water Tap in<sup>™</sup> online service to determine whether the development will affect any Sydney Water sewer or water main, stormwater drains and/or easement, and if further requirements need to be met.

The Sydney Water Tap in<sup>™</sup> online self-service replaces our Quick Check Agents as of 30 November 2015.

The Tap in<sup>™</sup> service provides 24/7 access to a range of services, including:

- building plan approvals
- connection and disconnection approvals
- diagrams
- trade waste approvals
- pressure information

3

- water meter installations
- pressure boosting and pump approvals
- changes to an existing service or asset, e.g. relocating or moving an asset.

Sydney Water's Tap in<sup>™</sup> online service is available at: https://www.sydneywater.com.au/ SW/plumbing-building-developing/building/sydney-water-tap-in/index.htm

#### Attachment 2

Requirements for Business Customers for Commercial and Industrial Property Developments

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

#### **Trade Wastewater Requirements**

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

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

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

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

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

#### **Backflow Prevention Requirements**

Backflow is when there is unintentional flow of water in the wrong direction from a potentially polluted source into the drinking water supply.

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

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

Before you install a backflow prevention device:

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

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

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

#### Water Efficiency Recommendations

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

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

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

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

#### **Contingency Plan Recommendations**

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

4

usage needs.

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

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

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

For further information please visit the Sydney Water website at: http:// www.sydneywater.com.au/OurSystemsandOperations/TradeWaste/ or contact Business Customer Services on 1300 985 227 or businesscustomers@sydneywater.com.au. 22 December 2017



570 George Street Sydney NSW 2000 All mail to GPO Box 4009 Sydney NSW 2001 T +61 2 131 525 F +61 2 9269 2830 www.ausgrid.com.au

Lauren Templeman Department of Planning & Environment

#### Re: Ausgrid asset relocation – Frenchs Forest Way

Dear Lauren

Ausgrid, Northern beaches Council and Planning NSW have at various times in the past three months discussed the possibilities of relocating existing Ausgrid overhead power line assets along Frenchs Forest Way west (indicatively, between Rabbett Street and Wakehurst Parkway).

Ausgrid has noted the following:

- Any increase in building heights along Frenchs Forest Way as proposed by the Northern Beaches Precinct Strategic Plan would lead to an encroachment on the safe clearance required from live mains. Without the relocation, an increase of allowable building heights along Frenchs Forest Way, is not possible.
- One solution is to underground the overhead transmission (33kV) and distribution (11kV) assets.
- The most obvious location for the undergrounded assets is Frenchs Forest Road however, the presence of existing services within this corridor and the need to ensure 24 hour emergency access to the Northern Beaches Hospital means this presents significant challenges to its delivery.
- A brief desktop assessment has identified potential alternate routes to the Frenchs Forest Road option to the north and south and west of Frenchs Forest Road.
- This relocation would be classed as contestable, meaning that Ausgrid would not carry out the works, but would be required to approve any design submitted by and accredited service provider (ASP). The cost for the relocation would need to be borne by the proponent of the relocation.
- The newly constructed relocated mains would become Ausgrid assets.
- The 33kV mains would need to be relocated in one stage. Ausgrid is prepared to accept the staged relocation of the 11kV and low voltage netork in the vicinity of the proposed development corridor. as various lots are redeveloped to the proposed new height limit

Ausgrid is prepared to conduct a feasibility study of the options for the relocation of these assets. The fee for this study would be approximately \$50k. This will be confirmed post our proposed discussion in January 2018 and by further correspondence on a direction to proceed.

Until such time that a route option is determined, it is not possible to provide an accurate assessment of the likely cost.

Please email me at <u>kevin.smith@ausgrid.com.au</u>, if you require any further information or clarification of this proposal.

Yours sincerely

K-5Sitl

Kevin Smith Senior Engineer – Major Customer Connections

Cc: Maxine Szeto Principal Planner Strategic & Place Planning Northern Beaches Council 22 December 2017



570 George Street Sydney NSW 2000 All mail to GPO Box 4009 Sydney NSW 2001 T +61 2 131 525 F +61 2 9269 2830 www.ausgrid.com.au

Lucy Chen Senior Asset Planner, Planning and Strategy North School Infrastructure

Dear Lucy

Further to our meeting on Friday 8 December to discuss the possibility of relocating Ausgrid's Transmission assets in the Aquatic Reserve precinct (Frenchs Forest) to facilitate the development of an educational facility off Aquatic Drive, as requested, Ausgrid provides the following information.

- 1. The power lines in question provide 132kV supply to Ausgrid's Warringah STS. There are two dual-circuit 132kV tower lines that traverse the land parcel proposed for the development of the above-noted educational facility.
- 2. Ausgrid is prepared to investigate the feasibility of relocating these power lines underground between Warringah STS (corner of Allambie Road and Rodborough Road, Frenchs Forest) and a position yet to be determined/agreed in the vicinity of the intersection of Wakehurst Parkway and Fitzpatrick Avenue East. The presence of an early childhood centre on the northern side of Fitzpatrick Avenue East at 2 Tilley Lane) means that southern side of Fitzpatrick Avenue East (Lot 7349/DP1167548) is a potentially suitable location for the underground to overhead transition point.
- 3. This transition point would need to be of significant area, and fully fenced to ensure it was secure and not accessible by the general public.
- 4. A cursory inspection of the area and desktop study suggests there are two possible routes i) Use Aquatic Drive Constraints include the presence of an existing 33kV assets in Aquatic Drive which would require relocation, existing services in Aquatic Drive and the available width recognising that four x 132kV circuits (one circuit = 6 x 200mm conduits) would need to be installed and suitable separation of these circuits is required to ensure that their performance ratings are able to be maintained. Ii) use the baseball field area this would be dependent on the latent conditions of the land after its use as a landfill site. The footprint of the proposed educational facility would also need to be considered in this route option.
- 5. Besides a suitable and available corridor, Ausgrid also needs to investigate the feasibility of converting the connection to Warringah STS from overhead to underground.
- 6. Because Warringah STS is the primary supply point for all of the zone substations (and hence all customers in the Northern Beaches area), Ausgrid would deem the relocation work to be 'network critical' and would undertake any relocation using its own and contracted resources.
- 7. Delivery and approvals for the project would be managed by Ausgrid. In the event that the route via the baseball fields is selected, Ausgrid may require easements to be established to protect its relocated assets. This would not be necessary if those assets were located in Aquatic Drive provided this remained as a public road.
- 8. Ausgrid notes that the proposed Beaches Link corridor has the potential to interface with the 132kV route. Any information regarding this alignment for the Beaches Link would need to be considered as part of the feasibility study, and in particular, as part of the route assessment.

As we advised at our recent meeting, based on the scale and complexity of the work required, and using recent similar 132kV relocation works carried out by Ausgrid, a likely cost of the project would be in the region of \$50 million.

This cost assumes the parcel of land for the noted underground to overhead transition point is made available to Ausgrid at no cost, and that the proponents of the relocation are responsible for all necessary community engagement activities associated with the cable installation and operation. An easement in favour of Ausgrid would also be required over this land parcel.

Ausgrid is prepared to carry out a detailed feasibility study in order to determine whether the project can be delivered, and to provide a more specific indication of the likely cost. The price to conduct this study is \$250,000 and Ausgrid would require payment in advance.

To assist in this feasibility study, Ausgrid would require:

- Any geotechnical and/or engineering information available covering the entire land parcel that was formerly used as landfill.
- Any information about the way in which the landfill cells/site was sealed prior to capping.
- The footprint of the proposed educational facility including any proposed utility installations and/or road upgrades that would be required.

We note the Department of Education's requirement for a short turnaround of the proposed feasibility study. Ausgrid will undertake to have this work completed within 16 weeks of the Department's approval to proceed.

I note that the relocation of overhead 33kV assets in Frenchs Forest Road West was also raised at the meeting. As this is not specific to the Department of Education's development, Ausgrid will provide a separate response detailing the requirements and feasibility of this relocation.

Please contact me by email (kevin.smith@ausgrid.com.au) if you require clarification of the information contained in this letter, or any further information.

Yours sincerely

151.4

Kevin Smith Senior Engineer – Major Customer Connections

Cc: Lauren Templeman Department of Planning Maxine Szeto Principal Planner Strategic & Place Planning Northern Beaches Council

## **D. Land Titles Search**

See attached the Land Titles Search for DP1214811 (Frenchs Forest High School) on 14<sup>th</sup> of February 2018.





### **NSW Lands**

#### DOCUMENT STATUS AND IMAGE COVER NOTE - DP/1214811

Document Type:	DP
Document Description:	Deposited Plan
Document Number:	1214811
Document Sub Type:	Р
Document Subtype Description:	Plan
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Status:	AVAILABLE
Paper Sizes:	A2, A3, A4
No. of Pages:	4
Scan Date:	30/11/2015

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PLAN FORM 6 (2012) WARNING: Creasing or folding will lead to rejection ePlan						
DEPOSITED PLAN AI	OMINISTRATION SHEET         Sheet 1 of 2 sheets					
Office Use Only Registered: 27.11.2015 Title System: TORRENS Purpose: ROADS ACT, 1993	Office Use Only DP1214811					
PLAN OF LAND TO BE ACQUIRED FOR THE PURPOSES OF THE ROADS ACT, 1993.	LGA: WARRINGAH Locality: FRENCHS FOREST Parish: MANLY COVE County: CUMBERLAND					
Crown Lands NSW/Western Lands Office Approval I,	Survey Certificate I, MICHAEL BERNARD WAUD of ROADS AND MARITIME SERVICES a surveyor registered under the <i>Surveying and Spatial Information Act</i> 2002, certify that: *(a) The land shown in the plan was surveyed in accordance with the <i>Surveying and Spatial Information Regulation 2012</i> , is accurate and the survey was completed on *(b) The part of the land shown in the plan (*being/*excluding- LOT 501 AND CONNECTIONS was surveyed in accordance with					
Subdivision Certificate I*Authorised Person/*General Manager/*Accredited Certifier, certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed subdivision, new road or reserve set out herein. Signature: Accreditation number: Consent Authority: Date of endorsement: Subdivision Certificate number: File number:	<ul> <li>LOT SOT AND CONNECTIONS was surveyed in accordance with the Surveying and Spatial Information Regulation 2012, is accurate and the survey was completed on, 29-10-2015 the part no surveyed was compiled in accordance with that Regulation.</li> <li>*(c) The land shown in this plan was compiled in accordance with the Surveying and Spatial Information Regulation 2012.</li> <li>Signature:</li></ul>					
*Strike through if inapplicable.	^Specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey.					
Statements of intention to dedicate public roads, public reserves and drainage reserves. LOT 502 IS REQUIRED FOR ROAD AND AFTER CONSTRUCTION WILL BE DEDICATED AS A PUBLIC ROAD UNDER SECTION 10 OF THE ROADS ACT, 1993. LOT 501 IS A ROAD IN USE WHICH WILL BECOME UNNECESSARY WHEN IT WILL BE ACQUIRED BY ROADS AND MARITIME SERVICES AND TRANSFERRED TO DEPARTMENT OF EDUCATION.	Plans used in the preparation of survey/compilation. DP 1210050 DP 1179362 DP 1092595 DP 778188 DP746670 DP 535422 DP 534761 If space is insufficient continue on PLAN FORM 6A					
Signatures, Seals and Section 88B Statements should appear on PLAN FORM 6A	Surveyor's Reference: SP3775(CI1177),CHECKLIST,LASRA.					

Req:R114474 /Doc:DP 1214811 P /Rev:30-Nov-2015 /Sts:SC.OK /Pgs:ALL /Prt:14-Feb-2018 11:31 /Seq:4 of 4 Ref:Frenchs Forest /Src:C UF1214011

PLAN FORM 6A (2012) WARNING: Creasing or fo	olding will lead to rejection ePlan
DEPOSITED PLAN AD	MINISTRATION SHEET Sheet 2 of 2 sheets
Office Use Only Registered: 27.11.2015 PLAN OF LAND TO BE ACQUIRED FOR THE	Office Use Only DP1214811
PURPOSES OF THE ROADS ACT, 1993.	
Subdivision Certificate number:	<ul> <li>This sheet is for the provision of the following information as required:</li> <li>A schedule of lots and addresses - See 60(c) SSI Regulation 2012</li> <li>Statements of intention to create and release affecting interests in accordance with section 88B Conveyancing Act 1919</li> <li>Signatures and seals- see 195D Conveyancing Act 1919</li> <li>Anv information which cannot fit in the appropriate panel of sheet</li> </ul>
Date of Endorsement:	1 of the administration sheets.
LOTS 500, 501 & 502 – FRENCHS FOREST PUBLIC SCH FRENCHS FOREST.	iool, FRENCHS FOREST ROAD WEST,
If space is insufficient use	additional annexure sheet
Surveyor's Reference. SP3775(UTT77),UHEURLIST,LASRA	

## E. Ausgrid Network Relocation Policy

## **Policy – Asset Relocations**

Purpose	This policy establishes Ausgrid's approach to proponent requests to relocate or otherwise impact its network assets.								
Applies to	Requests by proponents to relocate Ausgrid assets for the convenience of the proponent, including requests for:								
	physical relocations of assets;								
	<ul> <li>changes to <i>assets</i>, such as converting bare wire overhead to aerial bundled conductor for aesthetic reasons; and</li> </ul>								
	• Ausgrid to allow works near the distribution system that could limit the Ausgrid's ability to fully utilise its assets. For example, raising the ground level under an overhead line that might prejudice clearances; or changing the cover over an underground cable that might affect ratings or reduce protection from damage.								
	Relocations that are essential for the provision of a customer connection are considered to be connection services and are covered under Ausgrid's Connection Policy. Where a relocation request can be clearly separated from associated connection works or is unrelated to a customer connection it is considered under this policy.								
Approval and Rule compliance	This is an Ausgrid policy and does not need to be approved by the Australian Energy Regulator (AER). It is developed to be consistent with the requirements of the National Electricity Rules and other regulatory requirements, and in keeping with the AER determined service classifications for Ausgrid in the current regulatory determination.								
Key Principles and Requirements	Ausgrid considers requests from proponents to relocate or otherwise impact its assets based on an assessment of risk and feasibility. While Ausgrid will endeavour to accommodate relocation requests, it is at Ausgrid's discretion whether or not to agree to a relocation request.								
	The safe and reliable operation of the network is a key obligation under Ausgrid's licence to operate as a Distribution Network Service Provider; consequently, any asset relocation proposal that conflicts with these obligations will be refused.								
	Ausgrid is a regulated business and there is no scope for it to subsidise or contribute financially to projects where the benefits accrue solely to the proponent of the relocation works. All costs associated with accommodating the request are at the proponent's cost. This includes assessment, design, option development and construction, as well as ensuring Ausgrid retains the value of its existing assets as provided in Section 2 of this policy.								
	Where Ausgrid agrees to a request to relocate network assets, the relocation works are delivered according to Sections 1 and 3 of this policy								

### **1** General Requirements

1.1 **Requests to relocate assets** Proponents seeking to relocate Ausgrid assets are required to submit an application via the Ausgrid website. If agreed then Ausgrid will enter an agreement with the proponent for these relocation works using either an Asset Relocation pro forma contract, or other suitable agreement endorsed according to Ausgrid's delegation policy.

1.2 AssetAusgrid assets that are decommissioned as part of the asset relocation remain<br/>the property of Ausgrid and must be:

returned to Ausgrid at a time and place agreeable to Ausgrid; or

• where Ausgrid decides that the distribution system asset is no longer required, disposed of at the proponent's cost and in accordance with the requirements of Ausgrid's lease agreement.

Distribution system assets constructed as a contestable service must be gifted to Ausgrid as a contributed asset and form part of Ausgrid's network when they are energised.

1.3 **Third party consultation** and **coordination** The proponent is responsible for consulting with all parties affected by the relocation to obtain their written agreement and notifying Ausgrid when this has been done.

It is the responsibility of the proponent to make suitable arrangements (including funding) with individual customers to organise alterations to their individual service connections if they are affected by the proposal.

Where third party asset are attached to Ausgrid assets (e.g. public lighting, telecommunications, signs, traffic lights), the proponent is responsible for arranging relocation of these assets, including any funding. i.e. there is to be no cost to Ausgrid.

In particular, If a telecommunications company's cables are present on Ausgrid's poles, legal and safety requirements make it essential that these cables are removed before overhead lines and poles are removed. Ausgrid has no specific authority to force telecommunications companies to agree to the removal of their cables. The proponent will need to negotiate with the relevant telecommunications company to gain their approval to remove their existing overhead construction and provide written confirmation of this approval to Ausgrid.

1.4 Third party<br/>disputeWhere a dispute arises with a third party, the proponent is responsible for<br/>resolving the dispute. Ausgrid will charge the cost of any time spent resolving<br/>the dispute to the proponent as part of its facilitation costs.

1.5 **Meeting** other network objectives Ausgrid may decide to expand the scope of proposed relocation works to meet other network objectives. In such cases, Ausgrid will fund the incremental cost of the increased scope, unless the customer has agreed to fund this incremental cost as part of negotiations for the relocation project (e.g. to compensate for a reduction in asset value under section 1).

## 2 Retaining asset value and function

2.1 Principle	Any relocation works must ensure that Ausgrid retains all existing and potential future value available from its existing assets. Alternatives to direct relocation that deliver additional benefit to Ausgrid customers and reduced costs to proponents are encouraged.								
	Exceptions to this requirement are possible and are covered in section 2.7.								
2.2 Ratings	Ratings of relocated sections of network are to be equal or better than the design rating for the original section of network, or the achieved installed throughput rating, whichever is the greater.								
	Where the network is comprised of sections of network with different ratings, and especially where a short section of a line or cable constrains the overall rating, the required rating for the relocated sections of the network will be based on the section of the original network with the predominant rating.								
	The relocated network will be installed with adequate clearances from other existing network infrastructure to ensure the ratings of that infrastructure are maintained.								
2.3 No impact on network	There will be no adverse impacts on adjacent customers (those customers who are not a party to the proposal) as a result of changes to supply arrangements.								
customers	Network connectivity and operability are to be maintained (e.g. interconnection and switchable points to facilitate configuration changes and parallel operation; provision for service connections etc.) This is particularly relevant when overhead lines are converted to underground.								
2.4 Network development	The relocation works will not affect the cost and feasibility of options for likely future network development. This includes access to future routes or substation sites that would be impacted as a result of the relocation.								
	For example, the ability to install future cable in ducts or equivalent rights to install future cables by other means is to be preserved.								
	Similarly, the proximity of assets to load centres is to be maintained.								
2.5 <b>Operational</b> costs	There is to be no material increase to network losses, maintenance costs or other operational expenses resulting from the relocation.								
	Access provisions to enable operation, maintenance, replacement and future development of assets are to be maintained. This includes access and easement rights over the relocated assets.								
2.6 Secondary systems	The functionality of secondary systems, such as protection systems, optic fibre and pilot cable network is to be maintained.								
2.7 Exceptions	Where the proponent can demonstrate that to retain all existing and potential future asset value would be technically impossible or disproportionately expensive, Ausgrid may enter negotiations to consider alternative options with								

the proponent.

In determining whether to accept an alternative option, Ausgrid will consider the costs, risks and benefits, and only agree to a proposed alternative where, on balance, the alternative is in Ausgrid and its customers' best interests compared to leaving the assets in place and unchanged.

In making this assessment, Ausgrid considers the system outcome that will be achieved by the alternative option compared to the future forecast load and network performance requirements. If Ausgrid determines that there is no expected future use for the assets, an acceptable alternative to relocation is to remove and dispose of the assets appropriately (at the proponents cost).

Recommendations to approve an alternative option where asset value is not retained are submitted to the Head of Asset Investment for endorsement, and are approved in accordance with Ausgrid's delegation policy.

## 3 Contestable vs Ausgrid works

3.1 Contestable framework	A framework for contestability exists to enable competitive provision of connection services pursuant to Division 4 of Part 3 of the Electricity Supply Act 1995. This framework includes the:								
	ASP accreditation and authorisation schemes;								
	<ul> <li>contestability management processes within Ausgrid; and</li> </ul>								
	• Australian Energy Regulator (AER) regulated prices for ancillary network services that Ausgrid provides to facilitate delivery of contestable works.								
	Except where section 3.2 applies, proponents contract directly with an appropriately authorised and accredited third party provider of their choice to deliver relocation works within this contestability framework.								
3.2 Work not available to third	Work classified as ancillary network services by the AER may only be provided by Ausgrid.								
party providers	For example, work that could impact the safety and security of the network can only be carried out by Ausgrid. This work is identified based on a risk assessment based on Ausgrid's risk management principles.								
3.3 Charging for Ausgrid works	Relocation works provided by Ausgrid are charged at the applicable ancillary service rate. For quoted services, the charges are determined as follows:								
	<ul> <li>labour is charged at the applicable hourly rate; and</li> </ul>								
	• material costs, contractor services and other direct costs incurred as part of providing the service (e.g. permits for road closure) are charged at cost.								
	Where Ausgrid is required to perform work outside of normal business hours then Ausgrid will charge its allowed out of hours overtime rate for the service.								
3.4 <b>Priority of</b> relocation works	Where Ausgrid will carry out the relocation works, priority is given to network planning, augmentation and maintenance activities to maintain system reliability. Ausgrid will endeavour to provide a realistic assessment of its capability to undertake relocation projects and whether it is feasible to meet the proponent's timeline.								

#### Dictionary 4 AER The Australian Energy Regulator Services provided to the proponent by Ausgrid on an as needed basis that involve work ancillary services on, or in relation to parts of the distribution system, and for which ancillary service fees are payable. authorisation The consent Ausgrid gives to an ASP to work on or near the distribution system. ASP An Accredited Service Provider, accredited under the Electricity Supply Act 1995 (NSW). ASP The Accredited Service Provider Scheme administered in accordance with the Electricity Accreditation Supply Act 1995 (NSW). Scheme asset relocation Relocation of Ausgrid network assets, including physical relocations; changes to assets for the convenience of the proponent; and including works near Ausgrid assets that could limit the Ausgrid's ability to fully utilise its assets. Electrical network distribution assets owned by Ausgrid, including directly associated nonassets electrical infrastructure (e.g. substation buildings, access tracks, fixtures) Ausgrid Network assets are owned by the Network Owner (Alpha Distribution Ministerial Holding Corporation ABN 607 505 337 385 ), leased to the Network Lessee (Ausgrid Asset Partnership (ABN 48 622 605 040) and operated and maintained by Ausgrid (Ausgrid Operator Partnership (ABN 78 508 211 731),) under a sub-lease arrangement. Where this document refers to assets owned by Ausgrid, it means assets owned by the Network Owner. Otherwise Ausgrid means the Ausgrid Operator Partnership. contestable A service that Ausgrid determines must be provided by an ASP service customer A person to who is connected to Ausgrid's distribution system. distribution Ausgrid's distribution network, including relocated assets. svstem The apparatus, equipment, plant and buildings used to convey, and control the network conveyance of, electricity to customers (whether wholesale or retail) excluding any connection assets. This includes public lighting assets owned by Ausgrid. proponent The person for whom the asset relocation is being carried out. rating The technical limit (e.g. voltage, capacity, fault level) of a network element, or system of elements, determined in accordance with Ausgrid's Network Standards. relocation works All work required for, or associated with an asset relocation, including Ausgrid work to process and assess a request for asset relocation. Works are considered to be relocation works and subject to this policy even if the relocation does not proceed. The review date displayed in the footer of the document is the future date for review of a review date document which is one year for documents requiring annual review, two years for fraud control documents or the default period of three years from the date of approval. A review may be mandated at any time where a need is identified due to changes in legislation, organisational changes, restructures, occurrence of an incident or changes in technology or work practice. third party Any third party engaged by the proponent to provide relocation works. For work on or provider near the distribution system, including design of the distribution system, the customer must engage a suitably qualified ASP that is authorised to work on or near Ausgrid's network. work on or near Work on any part of the distribution system where there is a reasonable possibility that: the distribution (a) a part of a person's body, or system any moveable object (not designed for safe use on live conductors of the same or (b) higher voltage) that the person might be wearing, touching, or carrying, may come closer to a live exposed conductor than the minimum safe working distance stipulated in Ausgrid's Electrical Safety Rules.

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