Infrastructure and Servicing Report

Brooks Point Road, Appin

Client
Appin Farmers Pty Ltd and
Auslands Developments Pty Ltd

Issued
7/08/2023

Campbelltown Office
32 Iolanthe Street
PO Box 625
Campbelltown NSW 2560
Tel: (02) 4625 5055

beveridgewilliams.com.au

Beveridge Williams

Client:	Appin Farmers Pty Ltd and Auslands Developments Pty Ltd
Issued:	7/08/2023
Version:	C
Prepared by:	Shane Gray
Checked by:	Terry Hams
Project Manager:	Kellie Hassab
Project Number:	19171

Surveying
Asset Recording
Civil Engineering
Infrastructure Engineering
Traffic & Transport Engineering
Environmental Consulting
Water Resource Engineering
Strata Certification (NSW)
Town Planning
Urban Design
Landscape Architecture
Project Management

Revision Table

REV	DESCRIPTION	DATE	AUTHORISED
A	ISSUED FOR REVIEW	16/12/2022	SG
B	FOR LODGMENT	20/12/2022	KH
C	AMENDED AS PER REVISED LAYOUT	7/08/2023	KH

Contents

Figures

Appendix

1 OVERVIEW

1.1 Introduction

Beveridge Williams have been engaged to prepare a high-level infrastructure and servicing report to address Roads, Stormwater Drainage, Wastewater, Potable Water, Electricity, and NBN in support of a proposed rezoning at 10 & 20 Brooks Point Road, Appin NSW 2560 (Lots 1, 3 & 4 in DP 249446 & Lot 1 in DP584515) – The Subject Site.

The Subject Site (Refer red outline in **Figure 1**) lies within the Wollondilly Shire Council LGA and is bounded by Appin Rd to the east and Brooks Point Road to the south and currently rural lands to the north and west. The site generally falls from east to west with Appin Road forming a catchment boundary on the eastern side of the site. Ousedale Creek defines the western boundary of the Subject Site.

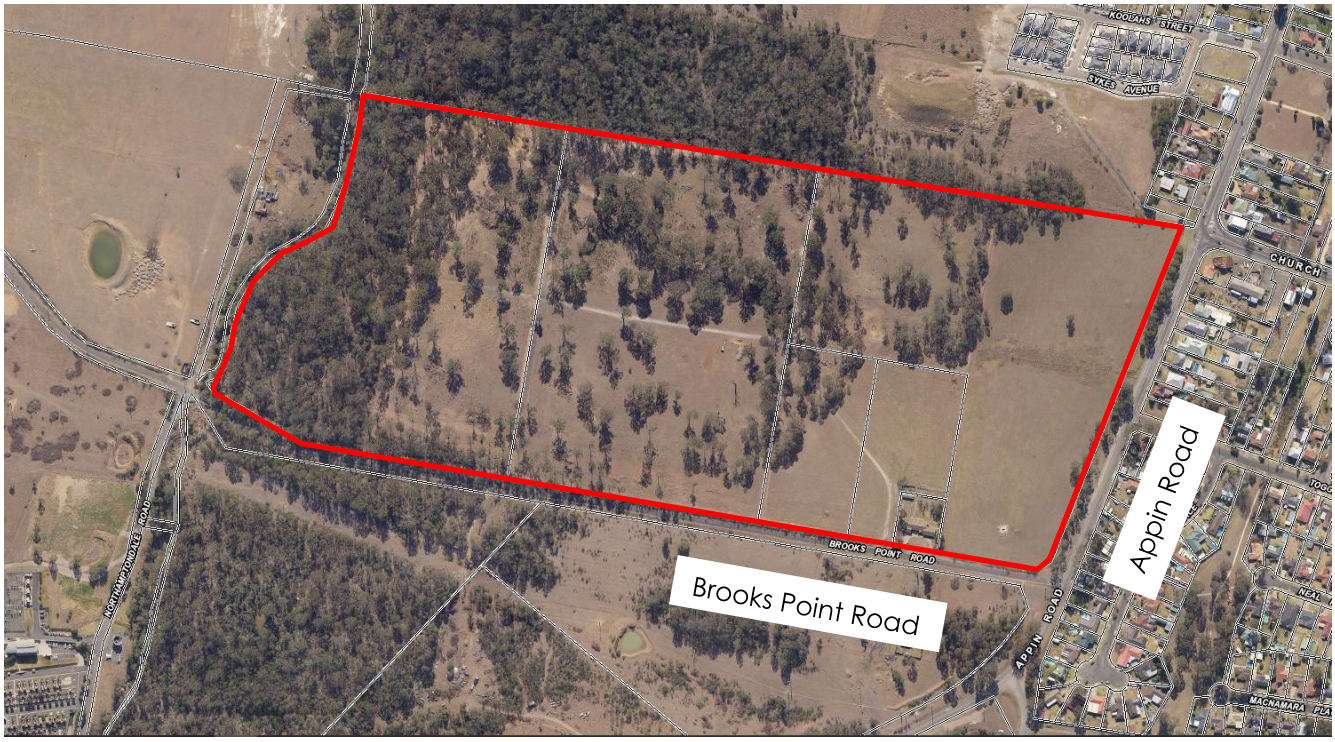


Figure 1: Site Image – The Extent of Site is Bounded in Red

A central gully traverses the site rising from the north-west corner and terminating in the south-east corner within the site. The gully is indicated by a blue line on Dept of Lands Topographical mapping. The eastern portion of the site proposed to be rezoned for residential development is substantially clear of trees and consists of grassed paddocks currently used for grazing. Tree cover increases towards the west.

Appin Road, adjacent to the site has a sealed central pavement with a sealed shoulder and kerb and gutter on the eastern side. The western gravel shoulder has no kerb and gutter. The road has been formed with a trapped low point located some 50m north of Toggerai St. Stormwater pit and pipe work has been constructed by Council at the Low point to drain the eastern side of the road to the western side but this drainage line has no formal or legal point of discharge, has become silted up and ineffective over time and results in hazardous ponding of water in the low point during rain periods and local flooding through the adjoining private land to the east.

Appin Road adjacent to the site also contains a number of services including gas (Jemena network), communications (Telstra network), overhead electricity (Endeavour Energy network), pressure wastewater (Sydney Water network) and a Potable water main (Sydney Water network).

Brooks Point Road adjoins the Subject Site to the south. The eastern end of Brooks Point Road falls to Appin Road with the remainder falling to the west. The northern side of Brooks Point Road is generally in cut and has a table drain which acts to divert stormwater flows off Brooks Point Road to the west away from the proposed development site.

Brooks Point Road along the southern boundary of the site currently includes gas (Jemena network), underground communications (Telstra network) and overhead electricity (Endeavour Energy network). Currently no Sydney Water services extend along Brooks Point Road.

The adjoining land to the north, Lot 1 in DP1267663, is currently undeveloped but has been rezoned from RU2 Rural Landscape to a combination of R2 Low Density Residential and C2 Environmental Conservation as per planning proposal PP-2020-2501. Walker Corporation are developing the land to the north for residential. For the purposes of this assessment, it has been assumed that the land to the north will be developed prior to the development of the Subject land and that wastewater from the Subject Development will be conveyed by the wastewater system to be installed in the Walker Corporation development. Other services should be able to be extended from existing services in Appin Road and Brooks Point Road.

The site is currently zoned RU2 Rural Landscape and it is proposed to rezone the site to a combination of R2 Low Density Residential in the east and C2 Environmental Conservation in the west. Associated servicing, including a stormwater management structure and local park are also proposed. An indicative subdivision layout is presented in **Figure 2.**

Figure 2: Indicative Road and Lot Layout Plan

The proposal has been discussed with Wollondilly Shire Council (Council) at a recent pre-lodgement meeting. In August 2022, Council issued a list of matters to be considered/investigated to support the proposal. Items relevant to servicing strategy referred to in the Council letter are:-

1.2 Assumptions and Limitations

The following assumptions and limitations are made:

- The owners of the subject planning proposal and the developer of the Walker development will negotiate the provision for services in particular the Sydney Water Waste Water infrastructure and ensure all upsizing is completed upfront.

2 SERVICES

2.1 Investigation

To prepare this Infrastructure Report the following information was used / sought:

- Indicative Road & Lot Layout by Beveridge Williams
- Water and Sewer Concept Design & Options Report for the Walker Development by Calibre
- Electrical Report by Powerline Design
- NBN advice by Communications Excavations
- Stormwater Management by Beveridge Williams

2.2 Roads and Transport

An indicative road and lot layout has been prepared to determine an approximate number of lots to allow services and stormwater to be assessed.

- Roads within the layout have been designed generally as access roads with a main collector extending down the centre and a new perimeter road on the western side.
- The collector road is currently illustrated as a boulevard with vegetated medians in the centre separating the two lanes of traffic.
- Appin Road is proposed to be access denied with a landscape buffer proposed to separate the new development from the existing development on the opposite side of Appin Road.
- Brooks Point Road is being utilized a perimeter road on the southern side
- As part of the works it is expected that at least half width of Brooks Point Road will be upgraded to provide new pavement for access to the new properties that gain access from Brooks Point Road.
- Multiple road connections are proposed to the Walker development on the northern boundary, the proposed road in the Walker development is also to be used as access to a number of the proposed lots in the subject development.

The layout illustrates that the roads can be located to allow the site to drain to the single discharge point being the gully running through the site. An indicative layout is included in Appendix A.

2.3 Sewer

Sydney Water is the water authority for sewer and potable water reticulation within the Wollondilly LGA. Under existing conditions, there are no wastewater sewer mains available to service the proposed development.

An existing low pressure sewer system does extend along Appin Road and carries effluent from the existing residential lots to the east of Appin Road opposite the Subject Land. It is understood however, that this system has not been designed to carry the additional flows from the subject development and diversion of any flows in that direction would require the upgrading of the existing system.

Sydney Water advice, obtained via Feasibility Letter dated 31 May 2022 (refer Appendix B) was that the Subject Site will need to be serviced by a gravity reticulation system draining to a sewage pump station to be located on the site which is to discharge to a sewer system being constructed by the Walker Corporation on the land to the north of the Site.

A review of the Walker development and supporting information confirmed that a number of servicing reports had been prepared. These include in the following order:

- "55 Macquariedale Rd, Appin - Water and sewer concept design & options report" prepared by Qalchek Pty. Ltd. for Walker subdivision draft report dated 2 December 2013,
- Assessment Of Long List of Options - Appin South, Water and Wastewater Servicing Options prepared by Calibre for Walker Corporation dated 17 September 2020
- Appin South Wastewater Servicing Preferred Option prepared by Calibre for Walker Corporation dated 15 June 2021,

Both the Calibre and Qalchek reports show the Walker Development to be built in three stages. The Calibre report reverses the stage numbers previously identified in the Qalchek report with slightly different lot numbers. In accordance with the most current report being the 2021 Calibre report the stage numbering is as follows:

- Stage 1 is immediately south of Maquariedale rd. Stage 1 is expected to consist of approximately 144 lots.
- Stage 2 is north of Maquariedale rd and south of the Gordon Lewis Oval. Stage 2 is expected to consist of approximately 68 lots.
- Stage 3 is north of the Gordon Lewis oval along Sports Ground parade. Stage 3 is expected to consist of approximately 47 lots.

A review of the reports found that all reports have considered the subject development in all sewer and water planning options. The original Qalchek report only considered the three stages of the Walker development and the subject development (Brooks Point Road). However, the Calibre reports considered two additional developments being 240 Appin Road (located in the northern end of the town) and a new K-12 school located along Appin Road south of Brooks Point Road. The Calibre report allowed for 288 lots from the subject site which is larger than the currently estimated 240+ lots currently proposed under the rezoning.

Various gravity and sewer pressure pipe options were initially proposed in the Qalchek Report and original Calibre report. Further assessment of the options outlined in the Calibre 2021 Report recommended that:

"*The preferred wastewater option to service the Appin South and Brooks Point Road development sites is Option 1a. This includes:*

- *Flows from Brooks Point Rd development site (still to be rezoned) to be serviced via a future pumping station to be located within the development site. Flows will be pumped to a DN225 sewer main that will be constructed as part of Stage 1 Appin South.*

- *Flows from Appin South (Stages 1, 2 and 3) to be transferred to the existing SP1175 via gravity. The Appin South site was rezoned to permit residential development in October 2020.*

- *The proposed school (865 Appin Rd, Appin) to connect to the new reticulation main which will be constructed as part of Stage 1 Appin South. Flows from the school will be transferred to this point via a pressure sewer system arrangement.*

Option 1a provides the least cost option at acceptable risk to Sydney Water and its stakeholders. The proposed scheme layout including reticulation is shown in Figure 10.1."

An excerpt of the Figure 10.1 from the Calibre Report referred to above is provided at Figure 3 below. A complete copy of the Calibre 2021 wastewater servicing report is provided at Appendix D.

Figure 3: Exhibit from Figure 10.1 from the Calibre Report

At the time of production of the Calibre Report, the extent of development on the Subject Site was assumed to extend into the western treed area and so the Calibre Report indicates the pump station being located further west than the current proposed extent of residential development. The current proposal will see the sewage pump station located in the vicinity of the proposed Stormwater Management Facility in the low point of the site. Figure 4 below illustrates a possible location for the pump station.

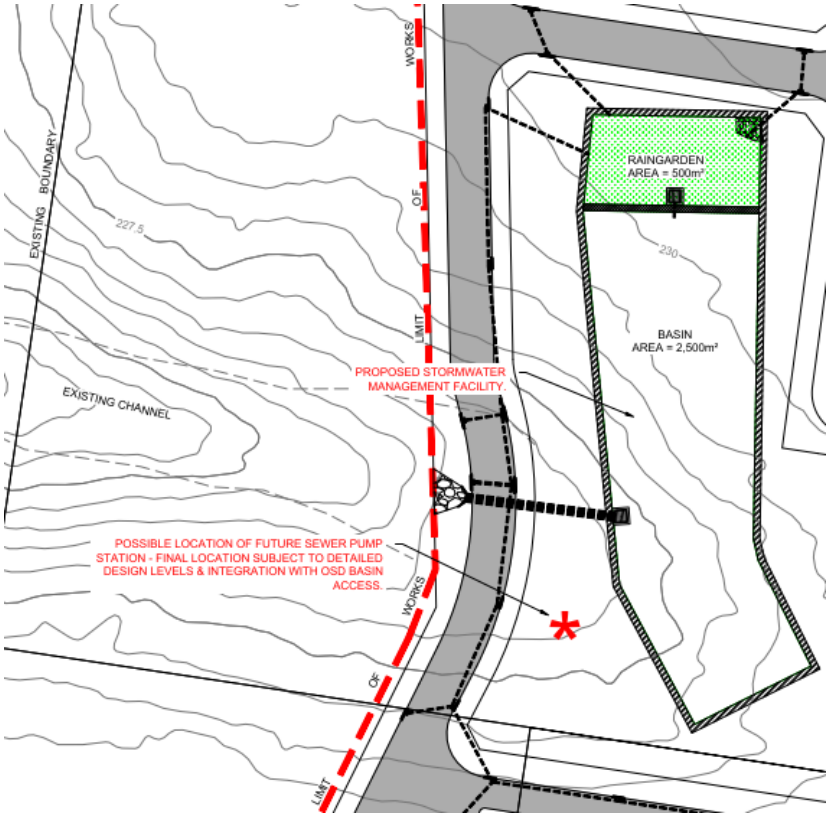


Figure 4: Exhibit of a possible Sewer Pump Station location

The change in location of the SPS does provide the possibility that a gravity main could be connected from the subject site through Stages 1 and 2 of the Walker development but it will depend on:

- Final levels of the subject site being filled (this is proposed as part of the stormwater management facility design),
- Deep sewer through Stages 1 and 2 of the Walker Development which has construction implications as well as zone of influence implications to home builders where the sewer is deep,
- Sydney Water acceptance.

However, for the purpose of this report it is assumed that the sewer pump station will be required, will be a Sydney Water Asset and as such will be located in a separate lot close to the stormwater management facility.

2.4 Water

Sydney Water is the water authority for sewer and potable water reticulation within the Wollondilly LGA. Sydney Water completed the Local Area Servicing Plan (LASP) for the Appin area in 2017. The preferred strategy for servicing both Appin South and Brooks Point Rd development sites is connect them to the existing Appin Water Supply System.

A review of the Walker development and supporting information confirmed that a number of servicing reports had been prepared. These include in the following order:

- "55 Macquariedale Rd, Appin - Water and sewer concept design & options report" prepared by Qalchek Pty. Ltd. for Walker subdivision draft report dated 2 December 2013,
- Assessment Of Long List of Options - Appin South, Water and Wastewater Servicing Options prepared by Calibre for Walker Corporation dated 17 September 2020
- Appin South Water Supply Servicing Preferred Option prepared by Calibre for Walker Corporation dated 6 September 2021 (refer Appendix D)

In accordance with the most current reports being the Calibre 2020 Options report by and the Calibre Sept 2021 Preferred Option report the stage numbering for the Walker Corporation development to the north of the Subject Site is as follows:

- Stage 1 is immediately south of Macquariedale rd. Stage 1 is expected to consist of approximately 144 lots.
- Stage 2 is north of Macquariedale rd and south of the Gordon Lewis Oval. Stage 2 is expected to consist of approximately 68 lots.
- Stage 3 is north of the Gordon Lewis oval along Sports Ground parade. Stage 3 is expected to consist of approximately 47 lots.

A review of the Calibre reports revealed that multiple options were considered to boost the existing water pressure and provide adequate water supply to all new sites within the Appin area including the subject site (Brooks Point Road), 240 Appin Road (located in the northern end of Appin) and a new K-12 school located along Appin Road south of Brooks Point Road. The Calibre reports allowed for 288 lots from the Subject Site which is larger than the currently estimated 240+ lots currently proposed under the rezoning.

Further assessment of the options outlined in the Calibre 2020 Report recommended that **Option 1 (No boosting)** and **Option 4b (Supply only ELEVATED areas (GL >= 243) from WP418 with construction of 675m of 150mm watermain extension)** be further assessed.

The Calibre 2021report further investigated Option 1 and Option 4b. This analysis confirmed that any lots with a ground level higher than RL241 could not be adequately serviced by the existing un-boosted DN150 water main in Appin Road and so a separate boosted water main would need to be extended into the proposed development site together with an upgrade to the existing pump units at WP302. These upgrade works will ensure that the existing reservoir will be maintained above the 55% level in order to maintain pressures above 15m to the unboosted elevated areas within Appin Village. In addition, the alignment of Option 4b was amended to extend along Appin Road.

Option 4b is the supply option recommended for adoption by Calibre. A schematic of the water works required to effect this option is detailed in Figure 10.1 of the 2021 Calibre Report which is reproduced below at Figure 5.

Option 4b proposed to provide water to proposed new lots at a level above RL241via a new DN150 boosted water main to be installed within the proposed road to be located along the northern boundary of The Subject Site. Lots which are below RL241 would be serviced off a new DN150 water main extending off the existing un-boosted DN150 water main in Appin Road.

The majority of Lots within the Subject site are located on land currently lower than RL241 and so will be serviced off the proposed DN150 un-boosted water main extension indicated by the magenta-coloured line in Figure 5.

A small portion of the Subject Site located in the north-east corner will be above RL241. Lots in this vicinity of the Subject Site will be serviced off the DN150 boosted water main extension indicated by the red coloured line in Figure 5.

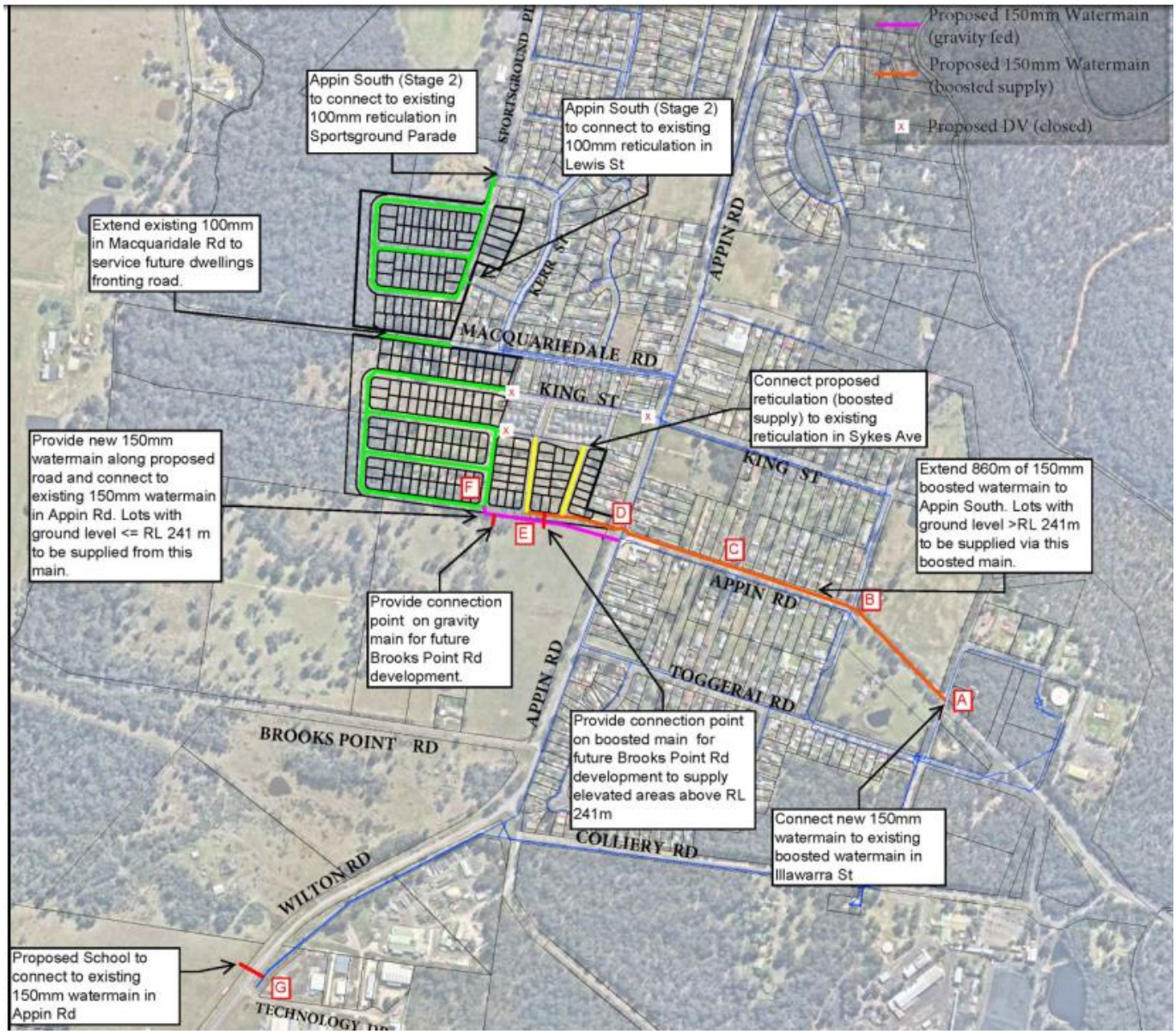


Figure 5: Reproduction of Figure 10.1 from the Calibre 2021 Report indicating the preferred water supply proposal

2.5 Gas

Subject to market demands, gas services may be reticulated through the proposed development on the subject site. The "Dial Before You Dig" (DBYD) investigation (refer Appendix C) revealed that there are existing gas mains in Appin Road (75mm and 110mm polyethylene (PE) 210kPA) and Brooks Point Road (110mm polyethylene (PE) 210kPA) along the frontages of the subject site.

Being rezoned to an R2 and RE1 zoning, it is expected that Jemena will make the appropriate infrastructure available in Appin as/if required to allow these future developments to be serviced.

It is noted that past practice by Jemena has been to charge the first developer in a new release area for the cost of installation of lead in infrastructure even though such costs would be recouped as the surrounding land is developed. However, in this case because Gas mains front both Appin Road and Brooks Point Road it is expected Jemena will serve the area at their cost.

2.6 Electricity

Powerline Design Pty Ltd. were engaged to prepare a report on the existing electrical infrastructure available to 10 Brooks Road Appin and the likely works involved to meet Endeavour Energy's requirements should the site be developed for residential development.

The report found that the centre of the site is approximately 1.2km from Endeavour Energy's Appin Zone Substation which is located along Brooks Point Road immediately west of the subdivision. In addition, Endeavour Energy's 3 phase 11kv Feeder No. W112 extends past both the Brooks Point Road and Appin Road frontages to the site.

The report concluded that "… The close proximity of this site to Endeavour Energy's Appin Zone Substation and nearby access to existing Endeavour Energy 11kv Feeders makes this site well situated in respect to the connection of Endeavour Energy's network to supply the 244 proposed residential building blocks."

The report noted that it is based on available data and Power Line Design's many years of experience in the electrical distribution Industry and acknowledged that the following preliminary advice is subject to feedback and confirmation from Endeavour Energy with the issuing of their Supply Offer.

A copy of the Powerline Design report is provided at Appendix E.

2.7 Telecommunications

A report outlining requirements for servicing the future residential development of the Subject site with adequate communications has been prepared by Communications Excavations (refer Appendix F).

TELSTRA

Under existing conditions, both Appin Road and Brooks Point Road contain existing Telstra infrastructure. The Communications Excavations report identifies that "*The underground telecommunications network along brooks point road is owned by Telstra and no evidence was found of any another Telecommunications infrastructure provider. The majority of this underground Telstra network was found to be buried and covered by long grass during the field inspection (The affected Telstra network is highlighted on the Telstra dial plans from figure 3 below)*."

A copy of the existing Telstra network in this area is included in Figure 3 of the Communications Excavations report reproduced below at Figure 6.

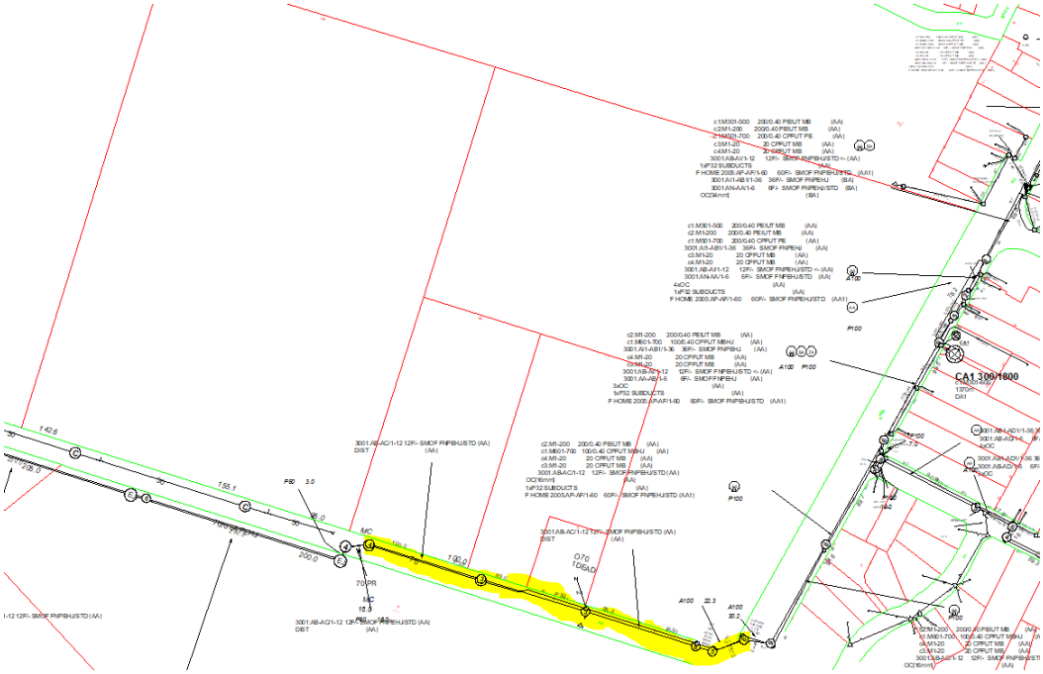


Figure 6: Plot of existing Telstra Services in the vicinity of The Subject Site

Current mapping indicates that the existing Telstra assets are contained within the road reserves surrounding the site. Should future investigations completed during the development of the site reveal the need for any Telstra relocations, Communications Excavations recommend that a minimum of 6 months is allowed to complete any relocation works.

NBN

Under existing conditions, the subject development site is sitting outside of the NBN fixed line footprint and sits within their Satellite & Wireless network footprint. The site is however it is directly adjacent to NBN's fixed line footprint on Appin Road as indicated in Figure 7 below.

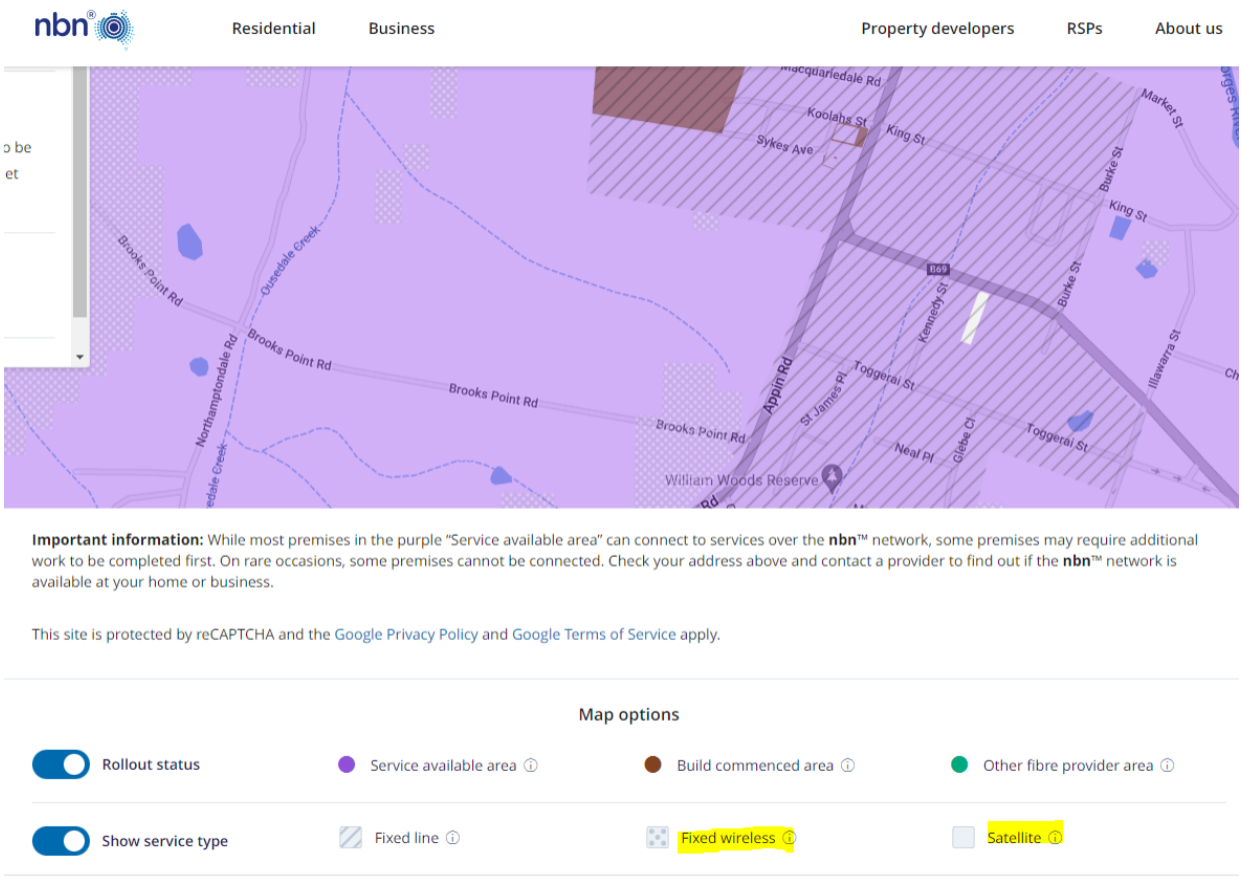


Figure 7: NBN Rollout Map included in the Communication Excavations Report (Not to scale)

The Communications Excavations report identified that NBN commercially reviews any development application outside of their fixed line footprint with their main deciding factors for approval being lot yield and the cost to bring fibre optic cables to the development. As the proposed development site is directly adjacent to NBN fixed line footprint and the lot yield is significant, it is expected that NBN will accept and approve a development application for Brooks Point Road Appin. The lot yield meets the minimum NBN requirements as its less than 1km from the NBN fixed line footprint.

Communications Excavations concluded that:

"*…NBN is extremely likely to provide Fibre Optic network capable of 1Gbps to this proposed development with reduced lot rates of $600 per lot. NBN will provide network with sufficient capacity to the development with little or no additional backhaul charges to the developer (subject to final lot yield).*"

2.8 Stormwater Drainage

A Water Cycle Management Plan (V4 dated 7/8/2023) for the site has been prepared by Beveridge Williams (and is lodged under separate cover) which has investigated the various options to address water quantity and quality impacts from the proposed development and what is required to improve them in accordance with Council Specifications.

It is proposed that the development of the land will create roads which will be dedicated to Council as public assets. It is also proposed that the detention basin, gross pollutant trap and bioretention facility required to address water quantity and quality management requirements will be constructed and contained within public open space or drainage reserve as determined by Council.

The Water Cycle Management Plan outlines an effective stormwater management strategy which if employed as described herein, will ensure that:-

- Wollondilly Shire Council stormwater quantity control requirements will be met for the proposed development site through the provision of a detention basin with approximately 3,850 m^3 of storage.

- Wollondilly Shire Council WSUD stormwater quality control requirements will be achieved by incorporating a treatment train consisting of individual rainwater reuse tanks on each lot, GPTs and bioretention filter.

The proposed stormwater management strategy retains as much of the existing natural gully drainage system as possible. The flows in the gully system in the existing and post development condition have been compared and shown to be commensurate for all storm events from 1EY AEP (1 in 1 year ARI) to 1% AEP (1 in 100 year ARI) thus ensuring that the maximum possible natural drainage infrastructure will be maintained.

The proposed stormwater management strategy complies with Council's Water Sensitive Urban design Guide and incorporates the reuse of rainwater within the homes to reduce the impact of the development of available resources.

The proposed stormwater management strategy results in peak stormwater discharges at the downstream discharge point of the central gully in the post development scenario being less than those under current conditions. Peak flows in all storm events including the 1 and 2 year ARI events have been shown to reasonably mimic the existing conditions.

With regard to a surface water flood study, the stormwater system within the proposed residential development will be managed in accordance with Council's development control plans and engineering guidelines such that stormwater flows are contained within a piped drainage system and road flow paths so that all residential lots are rendered flood free. The flows in the downstream gully remain below those under current conditions and so there are no additional flood impacts as a result of the proposal.

3 CONCLUSION

The development is constrained by a number of services that must be upgraded and / or extended. While the electrical NBN and Gas works are generally not dependent on the Walker subdivision to the north occurring, the subject development is reliant on the Sydney Water works that will be completed under the Walker Development.

The following is a summary of constraints and works that need to occur:

- A sewer pump station is to be located within the subject development. The Lots within the Subject Site will be serviced by standard gravity sewer reticulation which discharges to the proposed sewage pump station. The sewage pump station will pump sewage into the wastewater system that will be constructed as part of the Walker development.
- The Walker development wastewater system must therefore be commissioned before the subject site can be developed.
- A new Sydney Water potable watermain is to be extended from the existing boosted watermain in Illawarra Street along Appin Road to the subject site including connections to the existing reticulation in Sykes Avenue to boost the pressure for the portion of the subject site with an elevation above RL241.
- A new Sydney Water potable watermain is to be extended from the existing DN150mm water main in Appin Road to the subject site and the Walker Stage 1 development to service the portion of the subject site with an elevation below RL241.
- The centre of the subject site is approximately 1.2km from Endeavour Energy's Appin Zone Substation which is located along Brooks Point Road immediately west of the subdivision. Endeavour Energy's 3 phase 11kv Feeder No. W112 extends past both the Brooks Point Road and Appin Road frontages to the site. Adequate arrangements will need to be made to extend electrical services from the above existing assets into the proposed residential development.
- The proposed development site is directly adjacent to NBN fixed line footprint and the lot yield is significant, NBN is expected to accept and approve a development application for Brooks Point Road Appin. The lot yield meets the minimum NBN requirements as its less than 1km from the NBN fixed line footprint.
- Under existing conditions, both Appin Road and Brooks Point Road contain existing Telstra infrastructure. Some relocations may be required.
- There are 75mm and 110mm dia. Polyethylene (PE) 210kPA gas mains in Appin Road and Brooks Point Road along the frontage of the subject site. As such it is expected that Jemena will service the subject development by extending from the existing mains.

- A stormwater management facility to improve water quality and reduce peak flows to pre-development levels is required. Stormwater from the minor storm events will need to be captured and conveyed to a detention basin to be provided on the Subject Site the via a pipe system while additional flows from major storm events will be conveyed overland within the roadways to be constructed on the site. The pit and pipe system will need to be upgraded as necessary to ensure all overland flow paths are safe.

Shane Gray
Project Manager / Senior Civil Engineer
grays@bevwill.com.au

APPENDIX A: INDICATIVE MASTER PLAN BROOKS POINT ROAD, APPIN PREPARED BY BEVERIDGE WILLIAMS JOB NO. 19171 VERSION 11A

LEGEND

- Title boundary (approx.)
- Proposed cycleway
- 400m local park walkable catchment
- Top of bank
- Existing to be retained
- Existing to be removed
- Urban Capable Land (lots to be confirmed at DA stage)
- CPCP Land

Top of Bank

Water Course

Top of Bank

Drainage Reserve 0.7ha

Local Park 0.5ha

APPIN ROAD

Existing House Lot

BROOKS POINT ROAD

Notes:

- This plan was prepared as a PROPOSAL only and should not be used for any other purpose.
- This plan is subject to Council approval.
- This plan boundaries are based on cadastral boundaries only and are subject to a re establishment survey
- All dimensions and areas are subject to survey and final computations.
- The DRAINAGE RESERVE SHOWN has been preliminarily sized for the treatment and detention of stormwater to Council requirements. The layout and area required will be subject to engineering detail design and Council approval.
- Existing drainage directions shown are approximate only and subject to a detailed storm water management investigation.
- Further investigation may be required for fire buffers, vegetation retention and removal, site access and egress, and aboriginal and cultural heritage.
- All roads are 16m local access level 1 unless noted otherwise
- Road pavement is indicative only and subject to detailed engineering design.

Indicative Lot Yield - 200-250

- 200-250 lots ranging up to 725sqm
- 1 Residue Lot Containing the existing house
- 1 Residue Lot (proposed C2 Zone Environmental Conservation and CPCP area)

30 0 30 60 90 120 150 180m

Beveridge Williams

1 Glenferrie Road, Malvern, Victoria 3144
ph : 03 9524 8888 - www.beveridgewilliams.com.au

Master Plan

Brooks Point Road, Appin

FOR PLANNING PURPOSES ONLY

Version	Date	Description	Drafted	Approved
08	20.10.2022	Minor amendments	WEB	DRAFT
09	06.10.2022	Amendments as per the landcsape assessment	WEB	DRAFT
10	19.10.2022	Amended drainage reserve	WEB	DRAFT
11	22.05.2023	Amended layout based on comments	OX	WEB
11A	23.05.2023	Amended based on comments	OX	WEB

Date: 23.05.2023
Version No: 11A
Job No: 19171
Scale (A1): 1:1500
(A3): 1:3000

N

K:\JOBS DATA\19171 - BROOKS POINT ROAD APPIN_UD\CAD\19171_UD_BASE01.DWG

APPENDIX B: SYDNEY WATER FEASIBILITY LETTER DATED 31 MAY 2022

Case Number: 197001

May 31, 2022

Appin Farmers & Ausland Developments
c/- Beveridge Williams & Co. Pty Ltd

Feasibility Letter

Developer:	**Appin Farmers & Ausland Developments**
Your reference:	**19171**
Development:	**Lot 1 DP249446 10 BROOKS POINT RD, Appin**
Development Description:	**Creation of 299 lots**
Your application date:	**February 2, 2022**

Dear Applicant

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

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

We'll then send you either a:

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

These documents will be the definitive statement of our requirements.

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

- if you change your proposed development eg the development description or the plan/site layout, after today, the requirements in this Letter could change when you submit your new application

- if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.

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

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

To get a Section 73 Certificate you must do the following things. You can also find out about this process by visiting Plumbing, building & developing page on our website.

1. **Obtain Development Consent from the consent authority for your subdivision proposal.**

2. **Engage a Water Servicing Coordinator (WSC).**

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

   You'll find a list of WSC's at Listed providers on our website.

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

4. **Water and Sewer Works**

   4.1 Water

   Each lot in your subdivision must have:

   - a frontage to a drinking water main that is the right size and can be used for connection
   - its own connection to that water main and a property service (main to meter) that is available for the fitting of a meter.

   We've assessed your application and found that:

   - The proposed development is within The Appin Water Supply Zone System and the current trunk system suggests having the capacity to service the proposed 288 lot residential subdivision.
   - To service the development, the developer will need to construct a water lead-in main connecting to the existing DN300 at the corner of Toggerai Street and Burke Street and

provide a frontage to each lot within the proposed development. Further augmentation may be required subject to the topography and other constraints within the development. This will be revisited during S73 application stage.

- The proposed drinking infrastructure for this development shall be sized and configured according to the relevant WSAA code requirements and be provided to Sydney Water for review.

- **You must provide a water service connection and property service (also known as a "property service (main to meter)") at your cost for all lots off the water main construction required above and your WSC must manage the work. See section below for details.**

- **Property Service (Main to Meter) Installation Details**

The property service connection must be carried out by a Sydney Water listed Driller and the installation of the property service must either be carried out or supervised by a licensed plumber. They must meet the:

(a) Administrative requirements of the New South Wales Code of Practice for Plumbing and Drainage; and
(b) Our Property Service (Main to Meter) Installations Technical Requirements.

- **Before the Certificate can be issued, your WSC must give us certification that the property service works comply with our requirements.**

4.2 Sewer

Each lot in your subdivision must have a sewer main that is the right size and can be used for connection. That sewer must also have a connection point within each lot's boundaries.

We've assessed your application and found that:

- Options assessment for servicing of Appin South for Walker Corporation was completed in 2021 that includes the Brooks Point Rd development. As the flow from this development cannot gravitate, a pumping station needs to be constructed to pump flow to a DN225

sewer main that will be constructed as part of Stage 1 Appin South. Flow from the development to be transferred to the existing SP1175 via gravity.

- Servicing of this proposed residential development is dependent upon the construction of a pumping station and rising main being delivered by Walker Corporation and take over by Sydney Water as an asset. The pumping station and rising main is required to be constructed before this development can be served.
- Servicing of this proposed residential development is dependent upon the completion of sewer mains leading to SP1175. The applicant therefore needs to contact Walker Corporation and coordinate with them to meet its servicing timeline for this development.

5. Ancillary Matters

5.1 Asset adjustments

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

5.2 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use our **Permission to Enter** form(s) for this. You can get copies of these forms from your WSC or on our website. Your WSC can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

OTHER THINGS YOU MAY NEED TO DO

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

Approval of your building plans

Please note that the building plans must be approved when each lot is developed. This can be done at in our Tap in™ system Sydney Water Tap in ™.

This is not a requirement for the Certificate, but the approval is needed because the construction/building works may affect our assets (e.g. water, sewer, and stormwater mains).

If our stormwater channel, pipe, or culvert is located within ten (10) metres of your development site it must be referred to us for a detailed review.

Your Coordinator can tell you about the approval process including:

- Possible requirements
- Their costs
- Timeframes.

If your building plans need to be referred to us for detailed review you will be required to pay us for the costs associated with the detailed review.

Note: You must obtain our written approval before you do any work on our systems. We'll take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the *Sydney Water Act 1994.*

Backflow Prevention Water supply connections

A backflow prevention containment device appropriate to the property's hazard rating must be installed at the property boundary. The device is to be installed on all water supplies entering the property, regardless of the supply type or metering arrangements. It is needed to reduce the risk of contamination by backflow from these supplies.

A licensed plumber with backflow accreditation can advise you of the correct requirements for your property. To view a copy of our Backflow Prevention Policy and a list of backflow accredited plumbers Plumbing, building & developing.

The water service for your development

We don't consider whether the existing water main(s) talked about above is adequate for fire fighting purposes for your development. We cannot guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

You must make sure that each home/lot has its own 20mm meter.

When access to the water supply is required, the property owner or agent must apply to with us online. A meter must be installed before any water is used. It is illegal for anyone other than us to remove the locking mechanism on the water meter.

The online application can be found by visiting our website Plumbing, building & developing. You'll need to have the:

- account (Property) Number which can be obtained from the WSC
- serial Number which can be found on the metal tag on your property service.

You can find more information by using the "Ask Sydney Water" section of our website.

Fire Fighting

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

Soffit Requirements

Please be aware that floor levels must be able to meet our soffit requirements for property connection and drainage.

Other fees and requirements

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

- plumbing and drainage inspection costs
- the installation of backflow prevention devices; and
- council fire fighting requirements. (It will help you to know what the fire fighting requirements are for your subdivision as soon as possible. Your hydraulic consultant can help you here.)

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

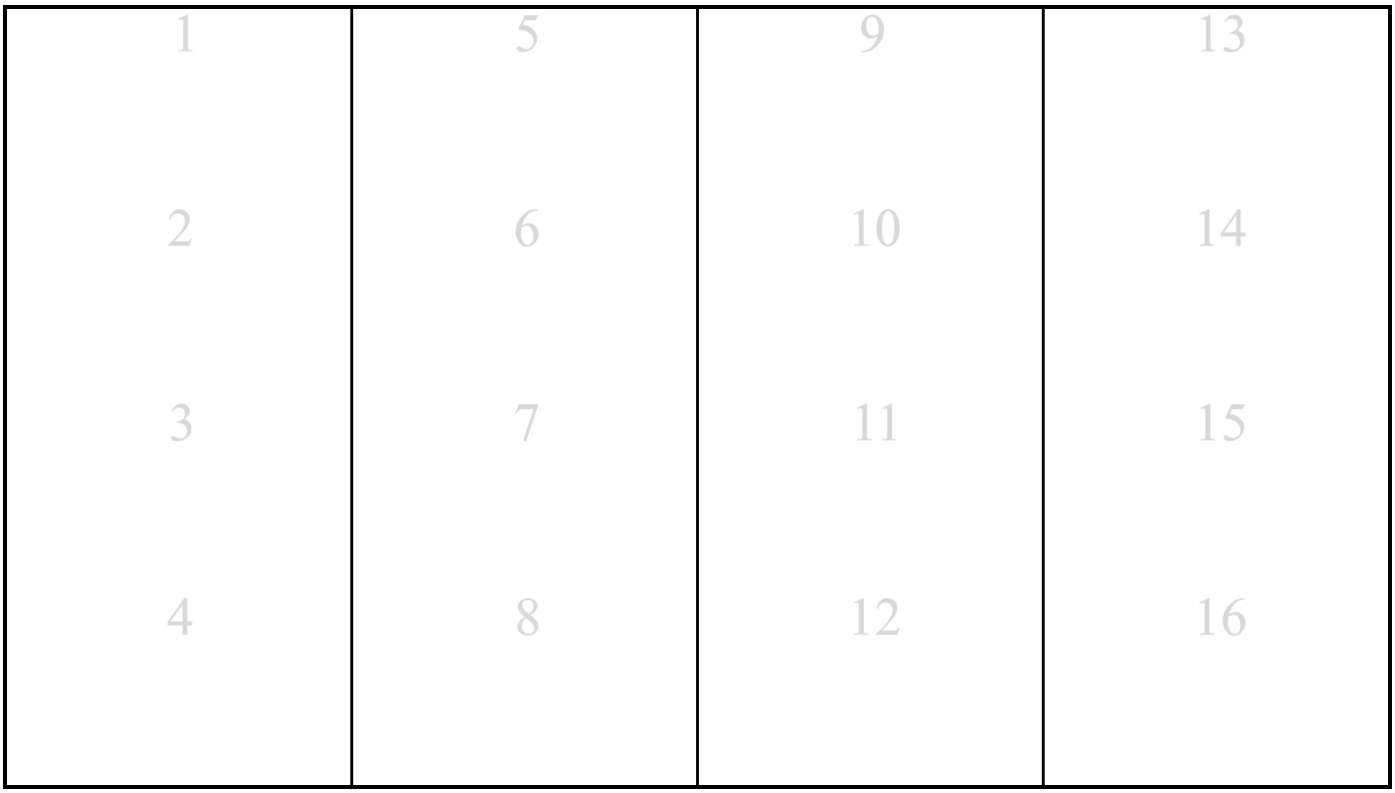
END

APPENDIX C: DIAL BEFORE YOU DIG DOCUMENTATION

To:	Belinda Wafer
Phone:	Not Supplied
Fax:	Not Supplied
Email:	waferb@bevwill.com.au

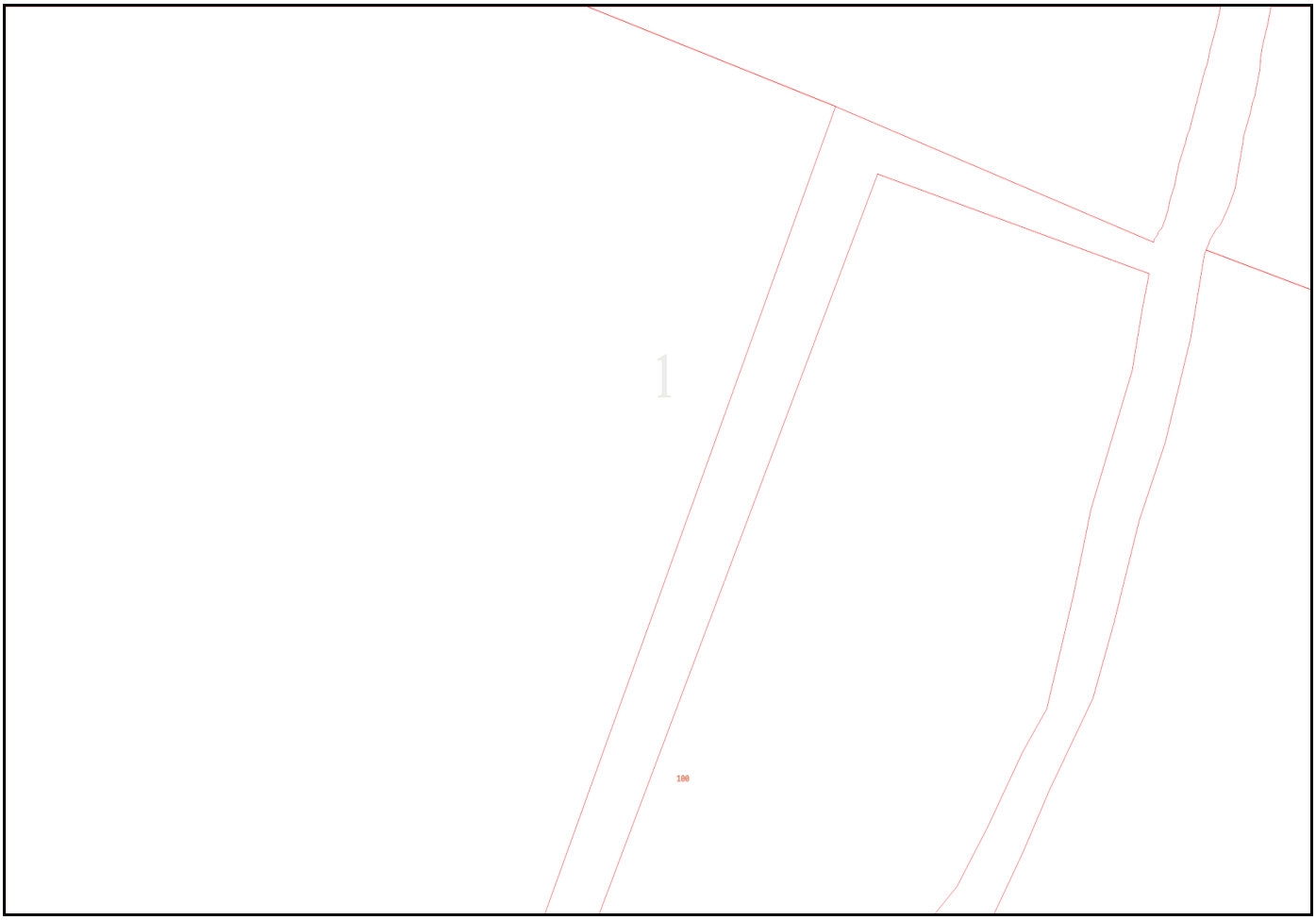
Dial before you dig Job #:	33310642
Sequence #	219401303
Issue Date:	16/12/2022
Location:	10 Brooks Point Road , Appin , NSW , 2560

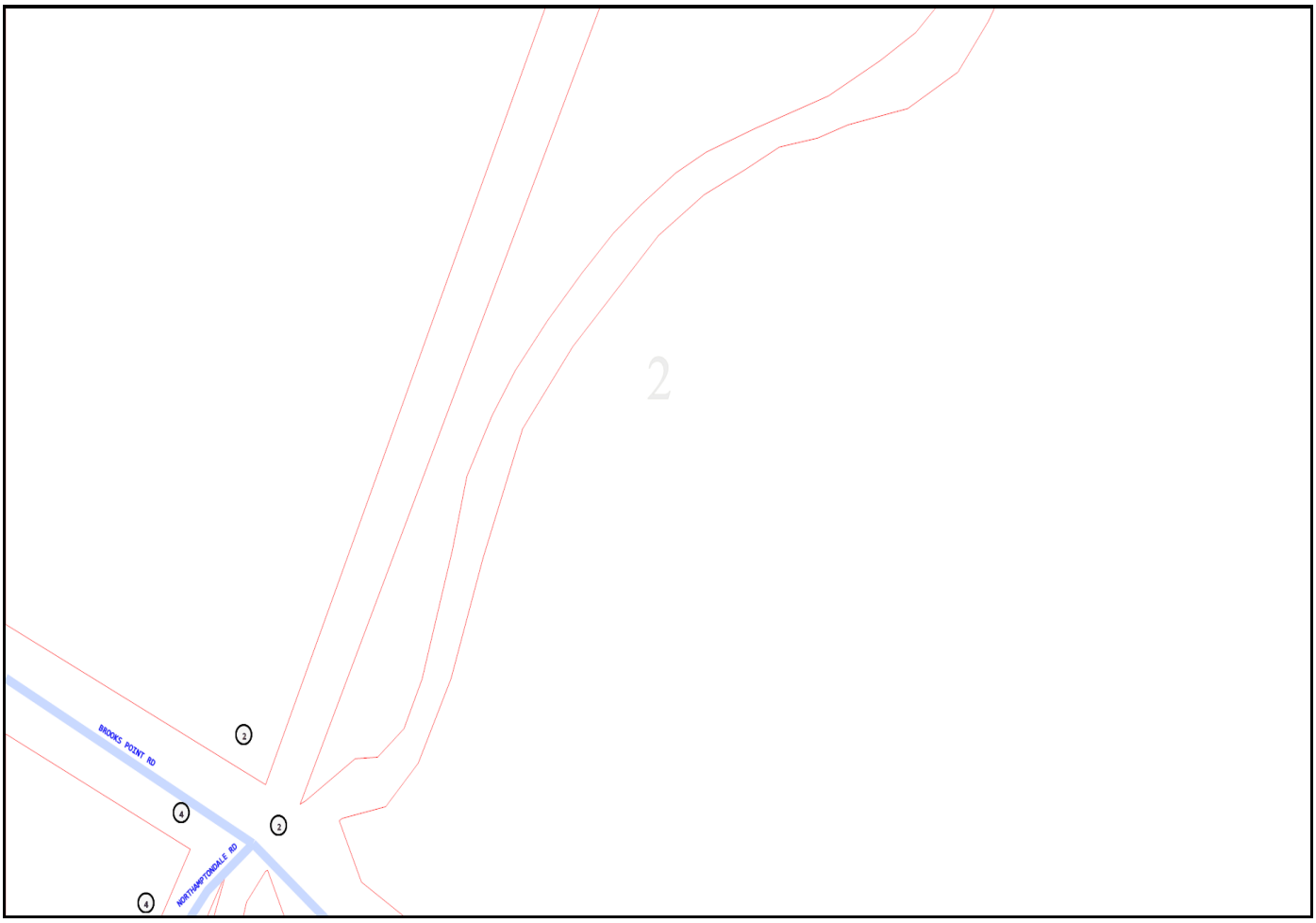
Indicative Plans

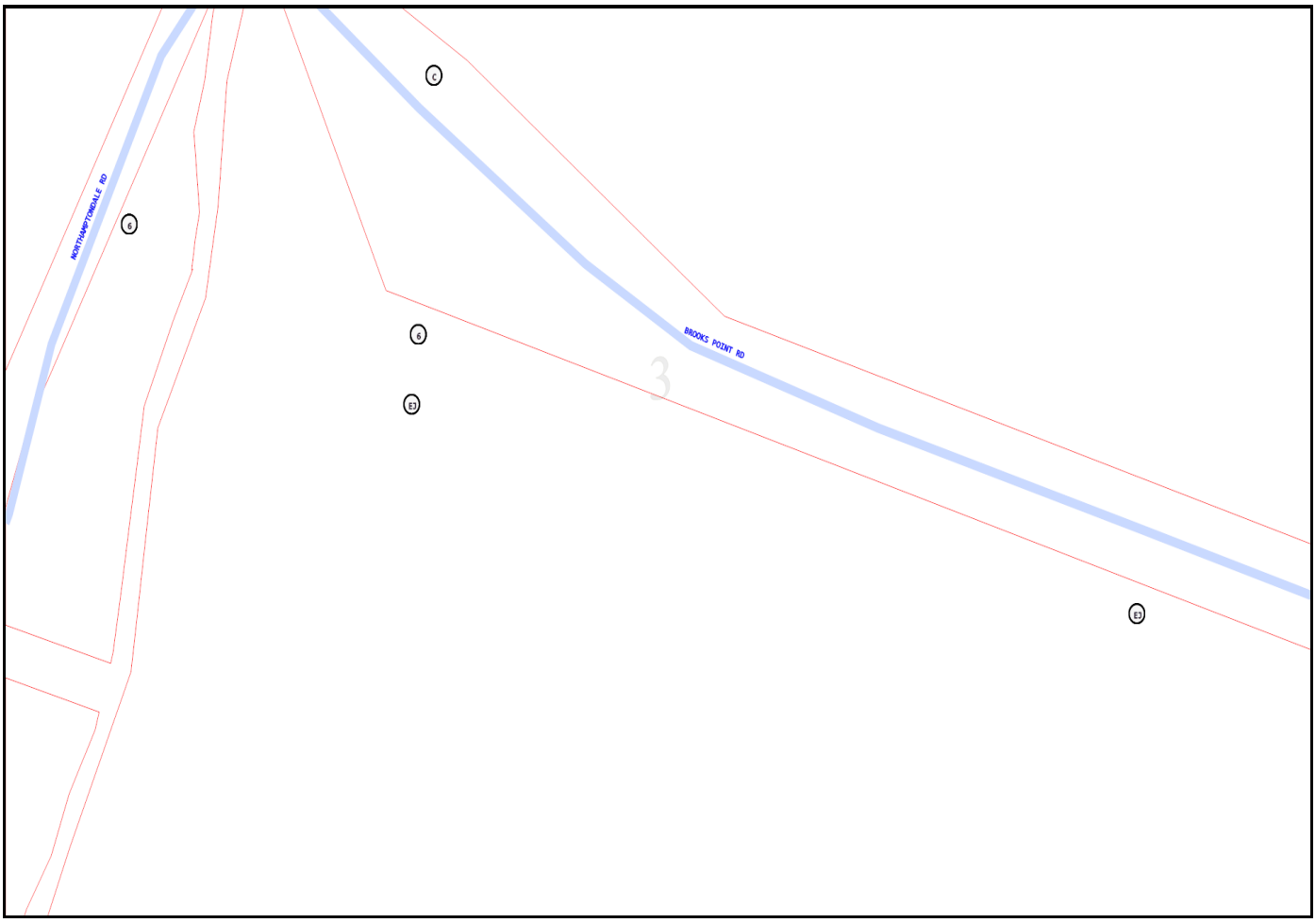


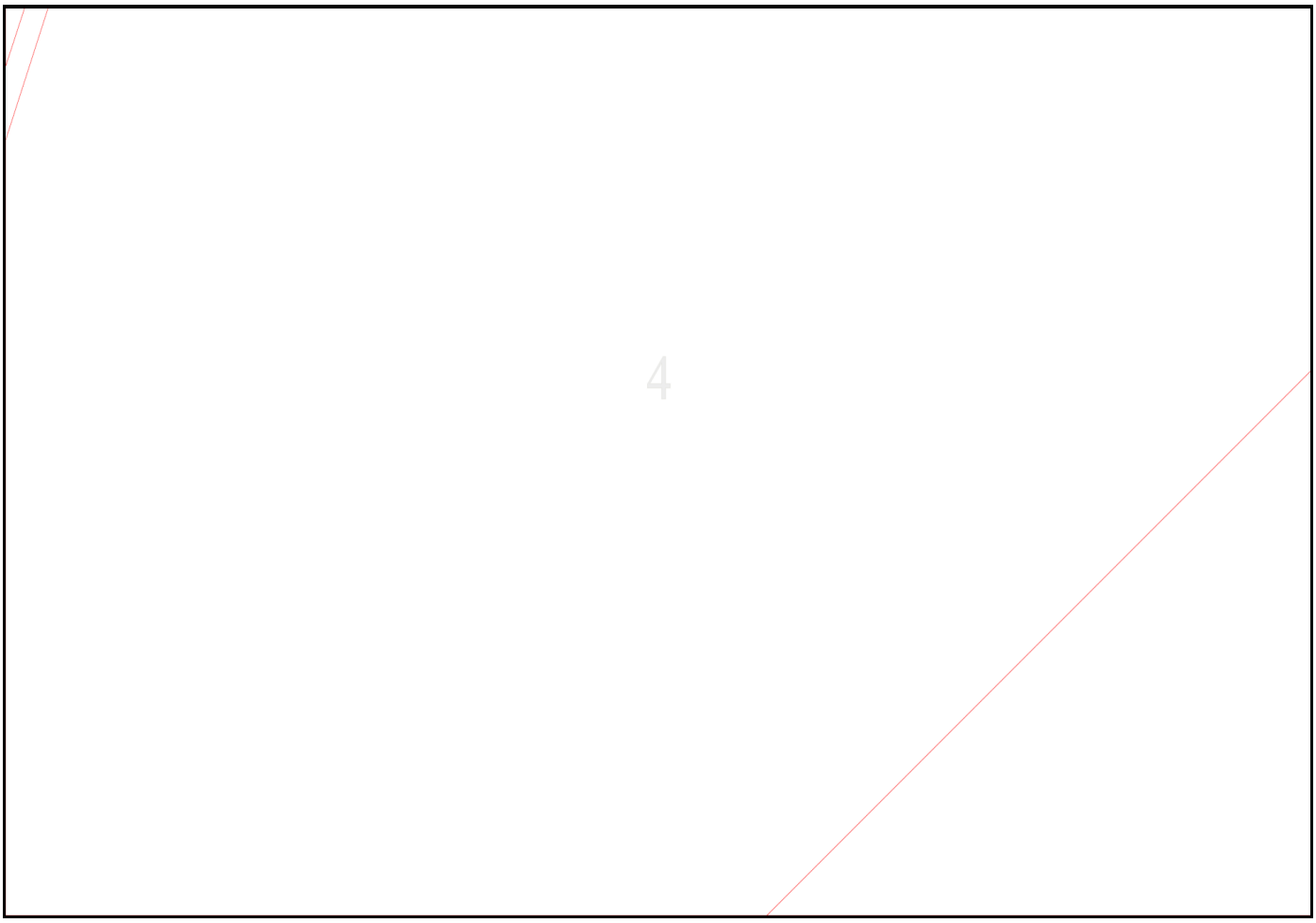
LEGEND

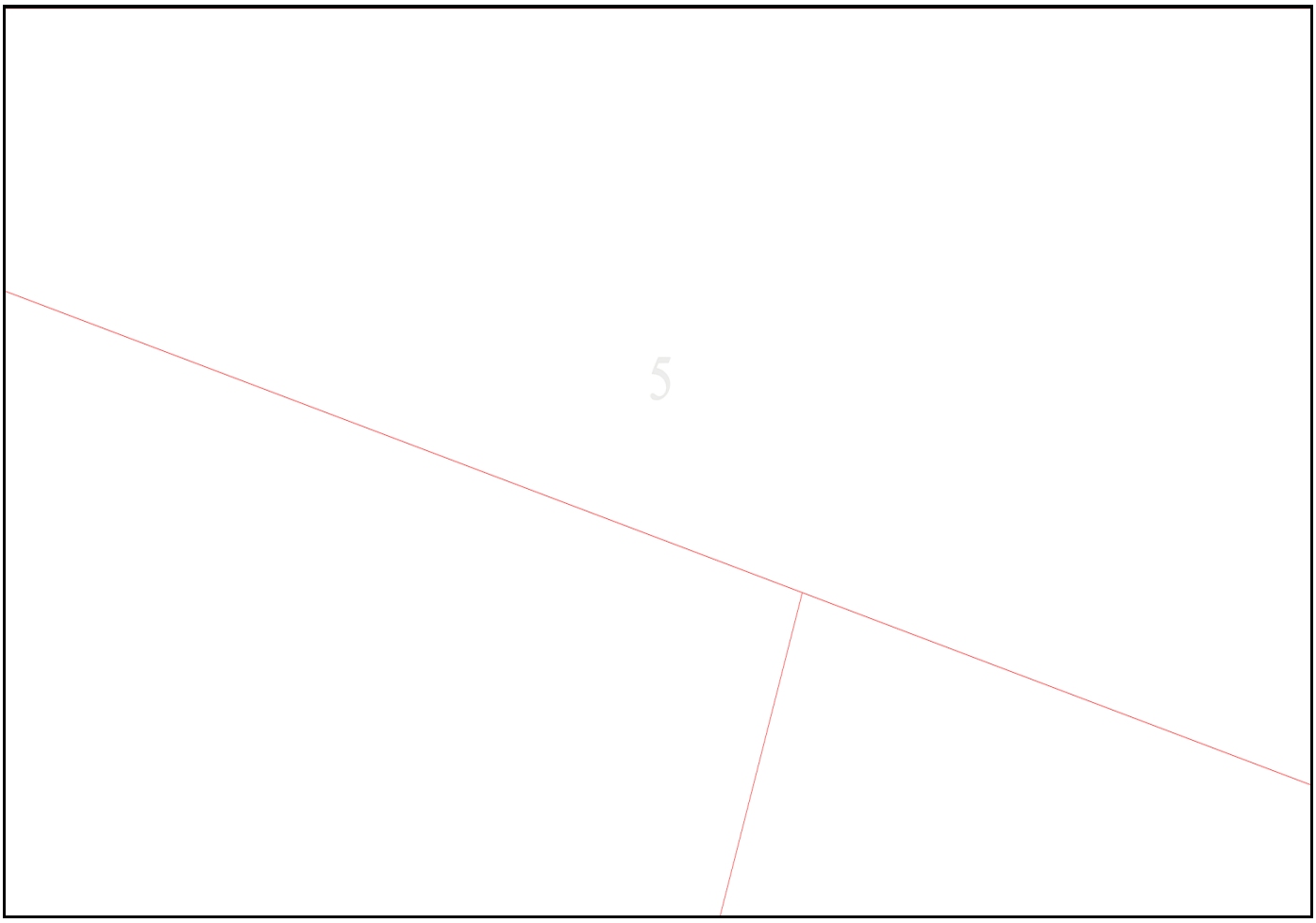
34	Parcel and the location
5	Pit with size "5"
2E	Power Pit with size "2E". Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null.
	Manhole
	Pillar
2 PO – T- 25.0m P40 – 20.0m 5 9	Cable count of trench is 2. One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart. One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart.
2 10.0m 5 9	2 Direct buried cables between pits of sizes ,"5" and "9" are 10.0m apart.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Copper/RF/Fibre) cables.
5 9	Trench containing only DESIGNED/PLANNED (Copper/RF/Fibre/Power) cables.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Power) cables.
BROADWAY ST	Road and the street name "Broadway ST"
Scale	0 20 40 60 Meters 1:2000 1 cm equals 20 m

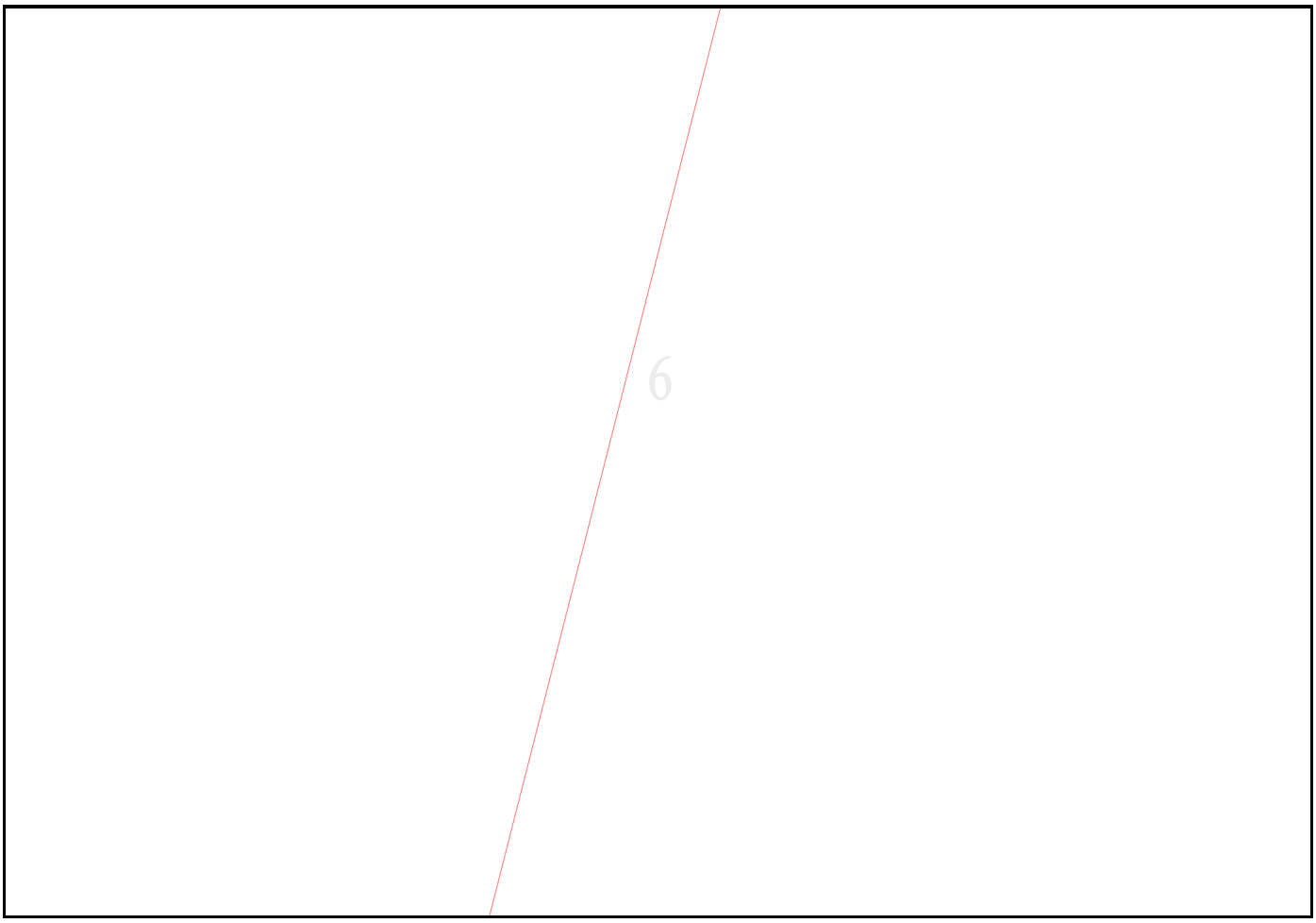

1
100

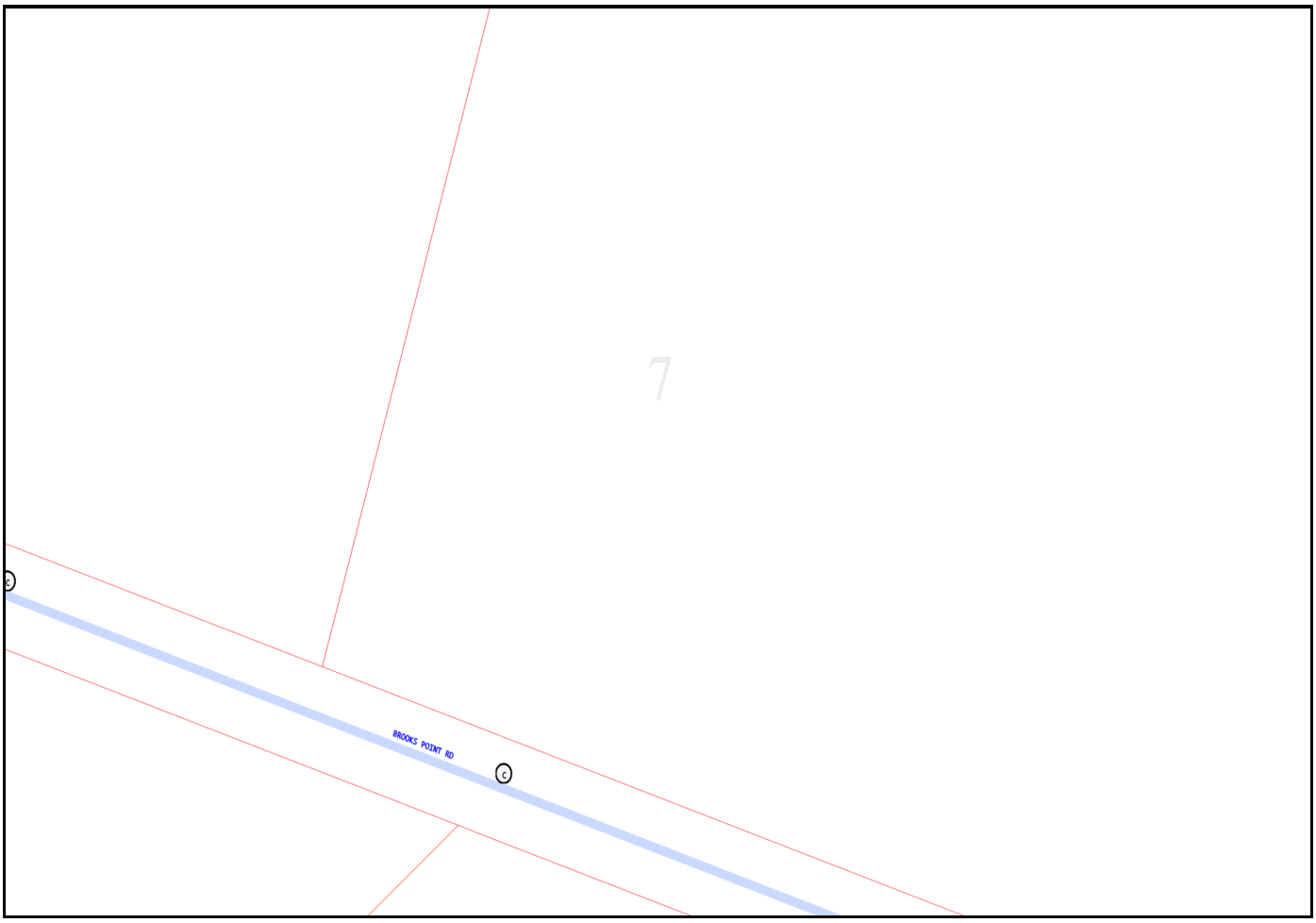

2
BROOKS POINT RD
NORTHAMPTONDALE RD
2
4
2
4

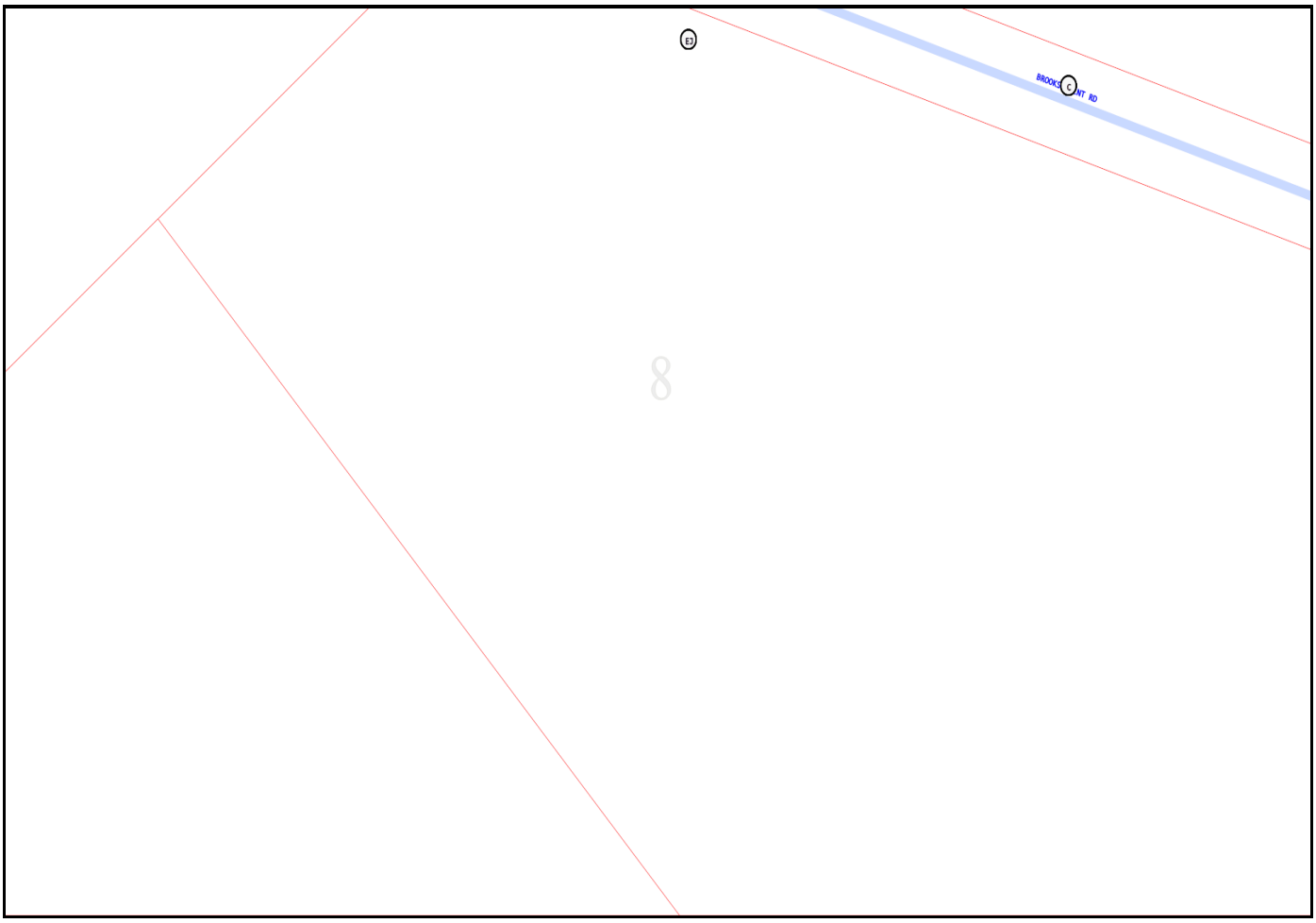

NORTHAMPTONDALE RD
BROOKS POINT RD
C
6
6
E3
E3

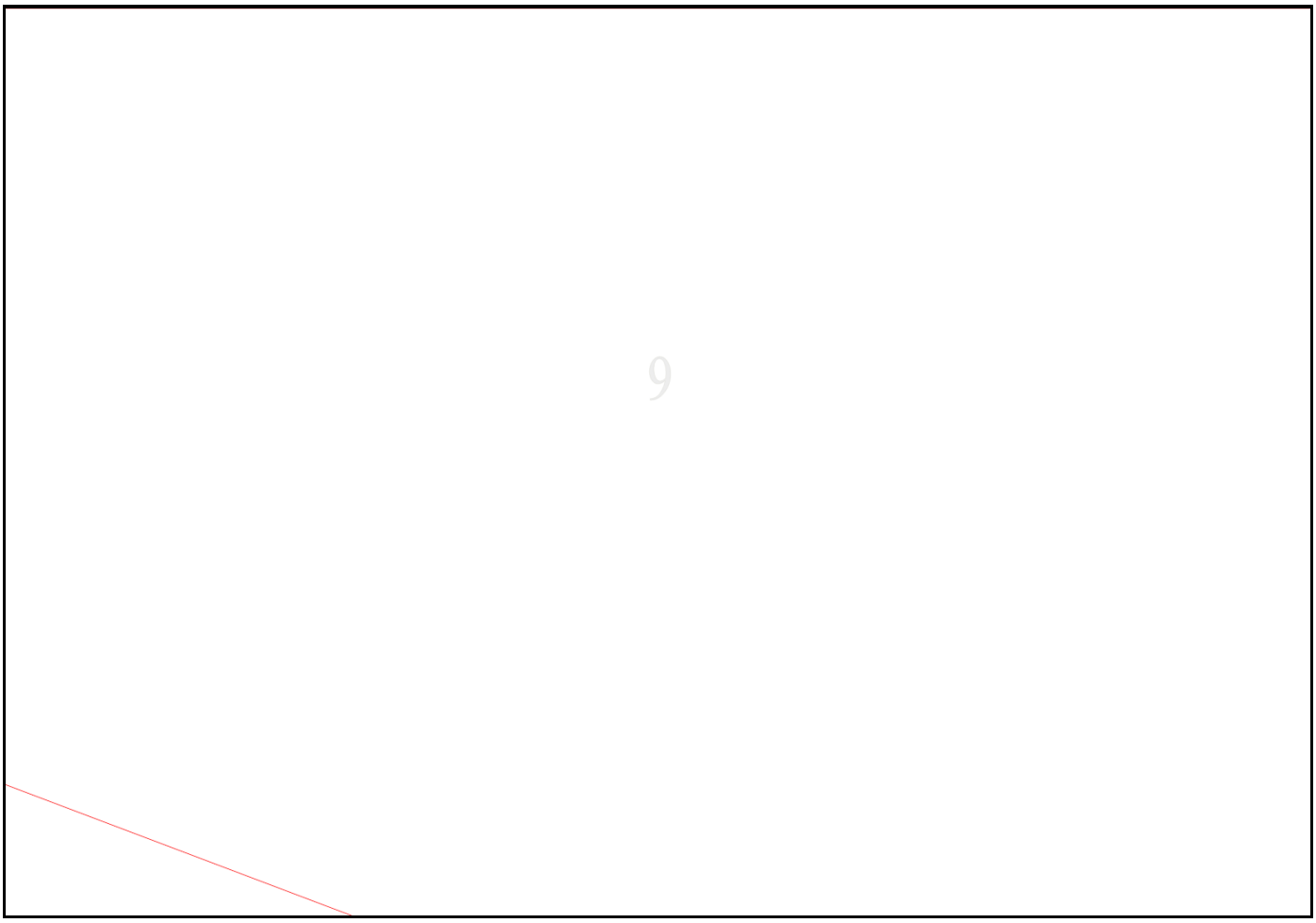

4

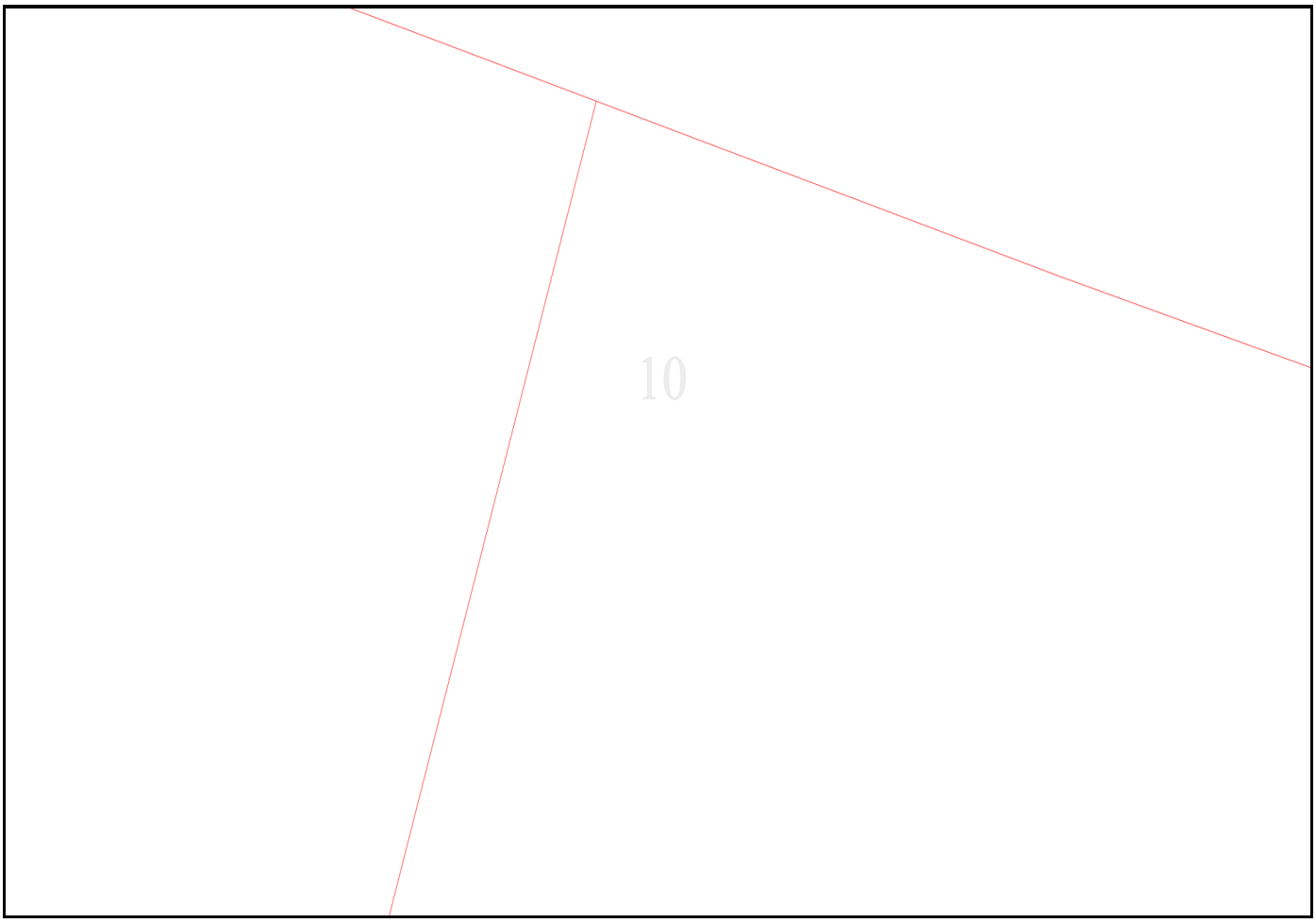

5

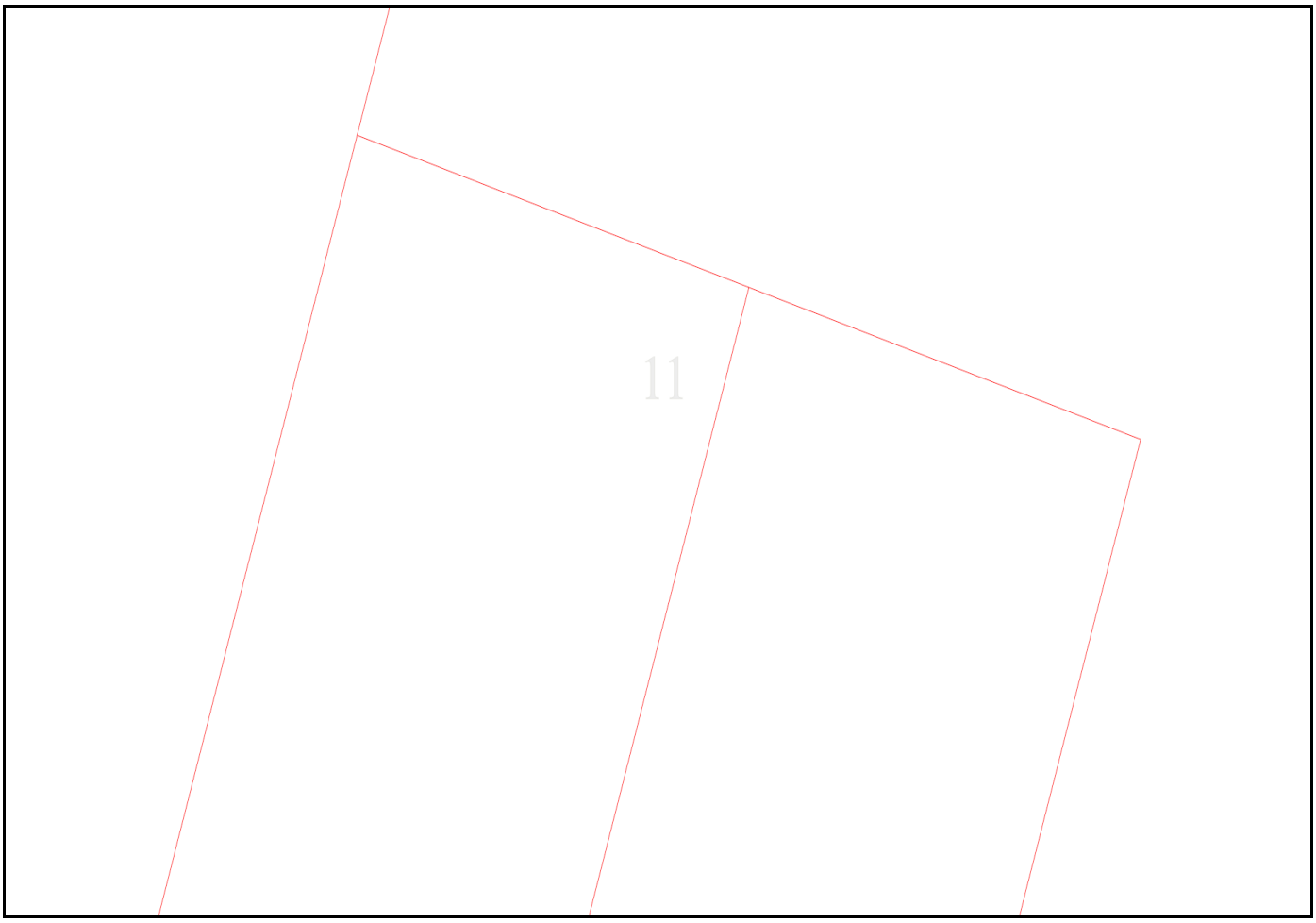

6


7
BROOKS POINT RD

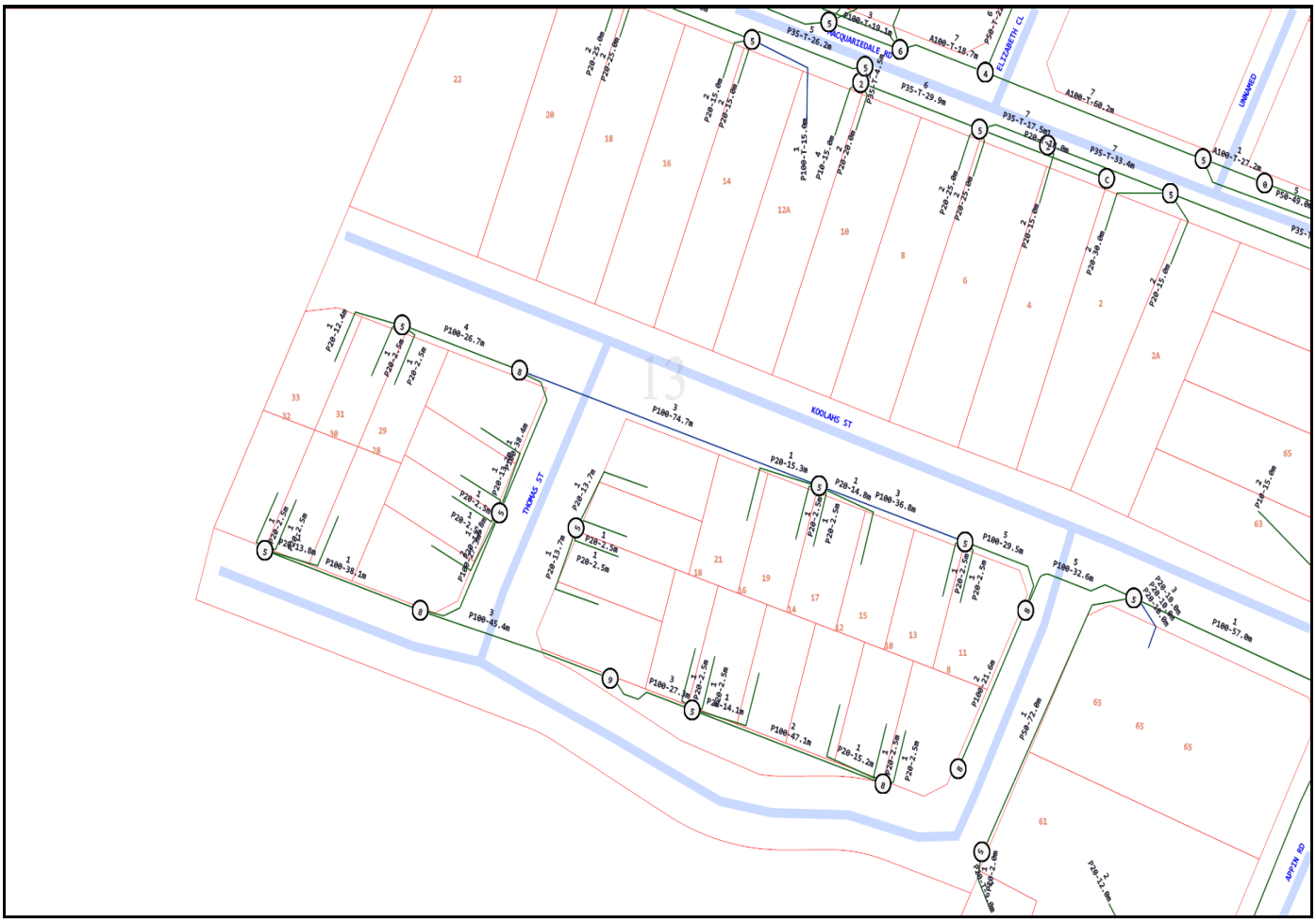

E1
BROOKMONT RD
8

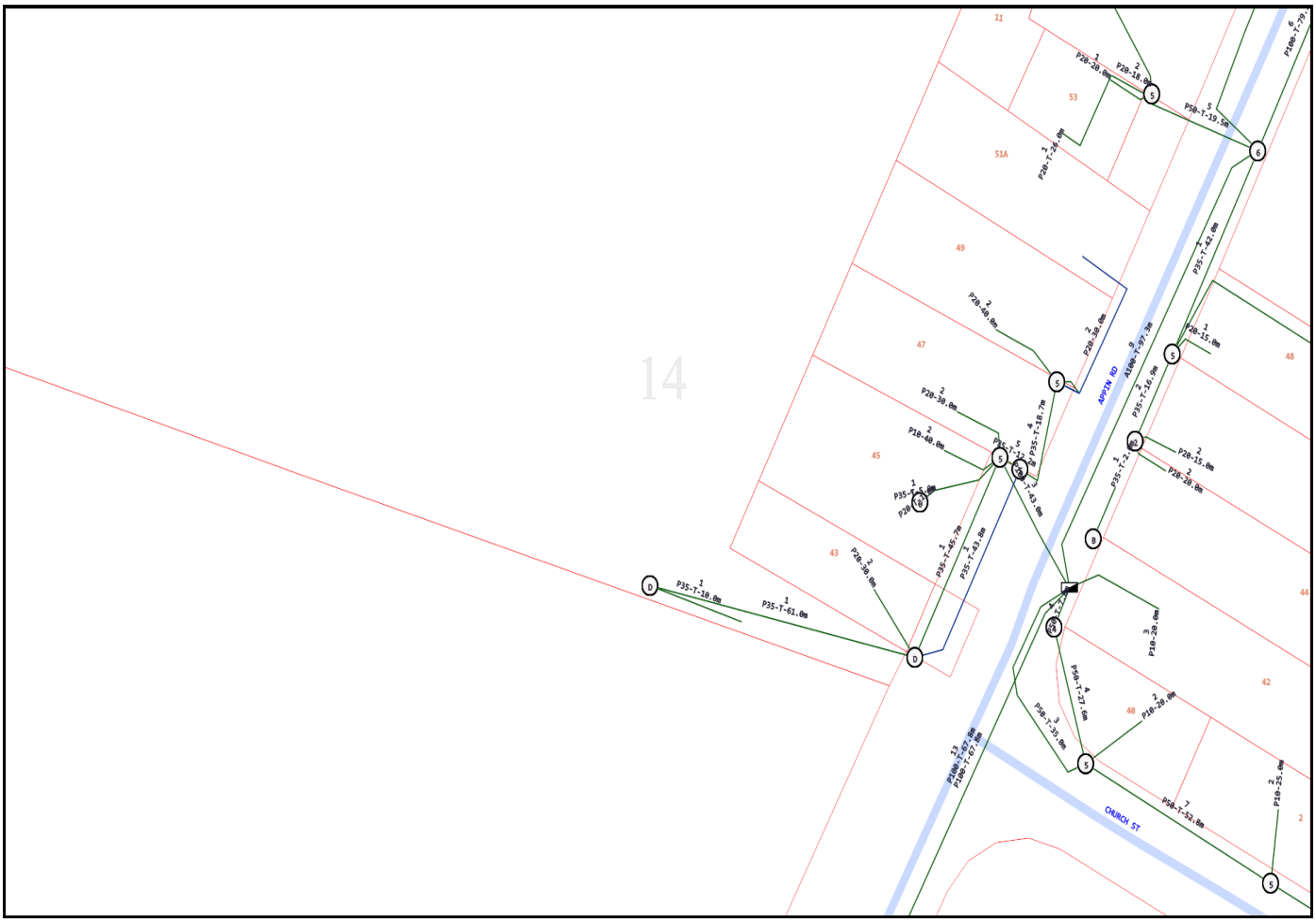

9

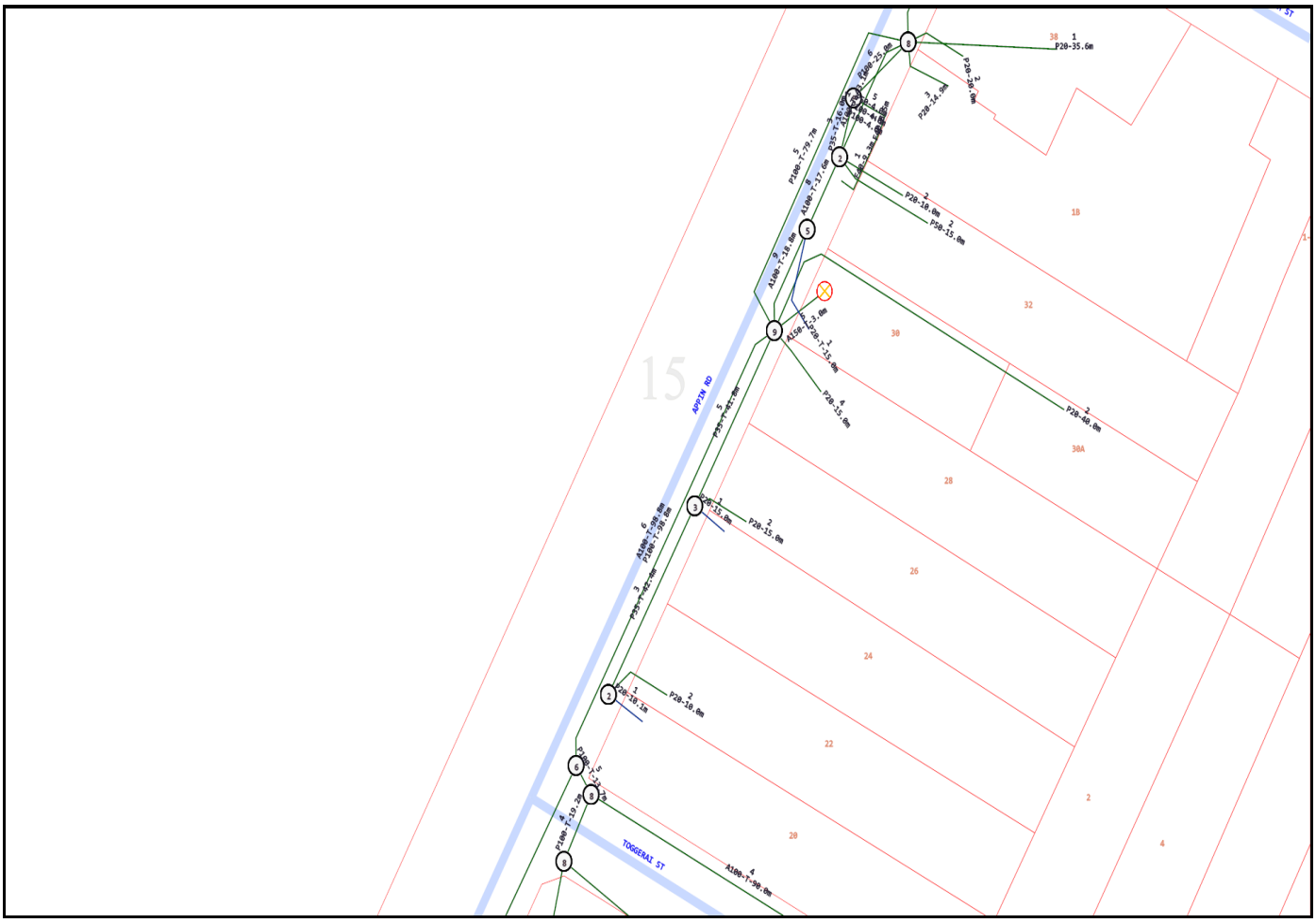

10

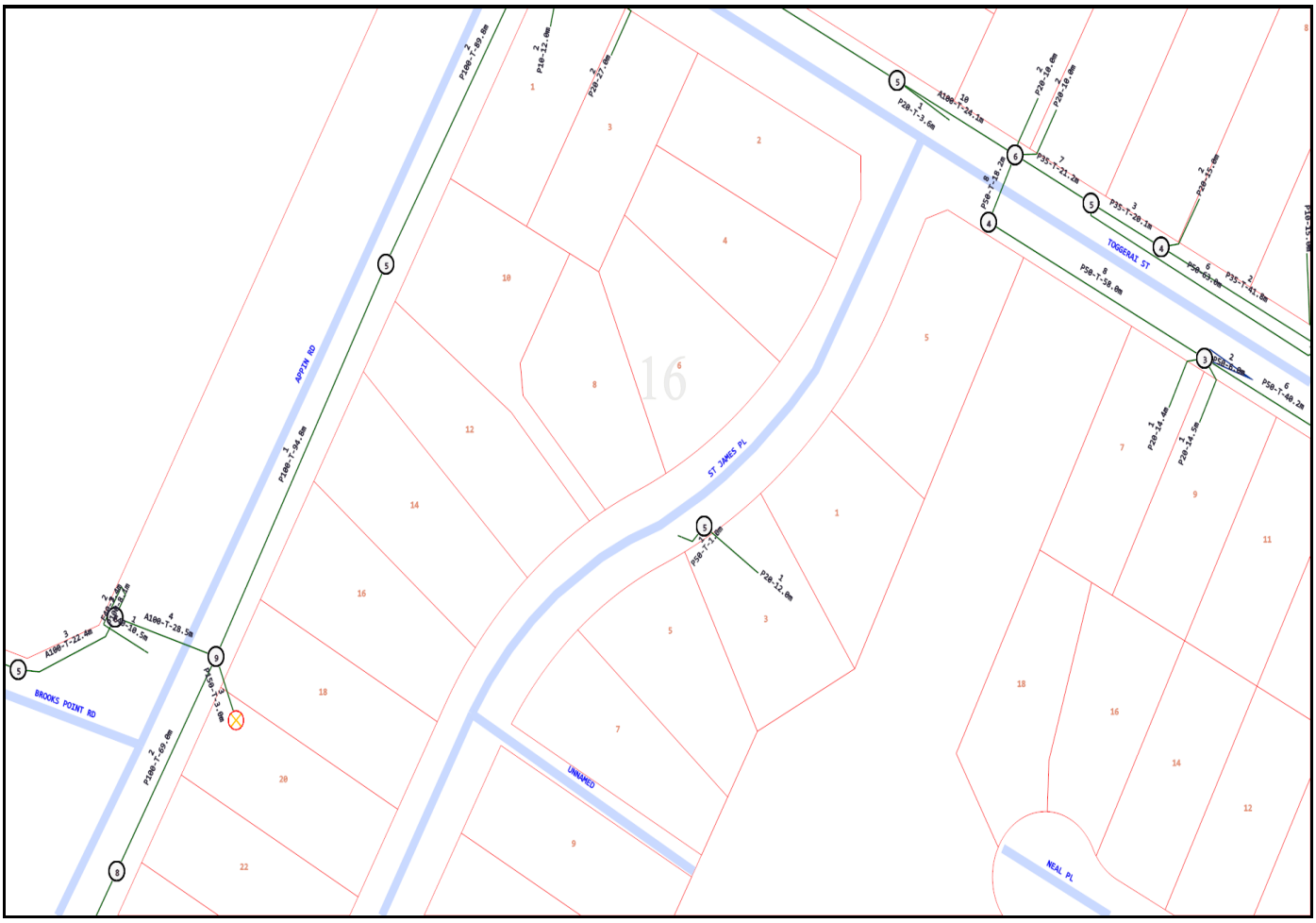

11


12
14
BROOKS POINT RD
4
4
E3
3
3
6
8


KOOLAHS ST
THOMAS ST
JACQUARTIEDALE RD
ELIZABETH CL
UNNAMED
APPIN RD

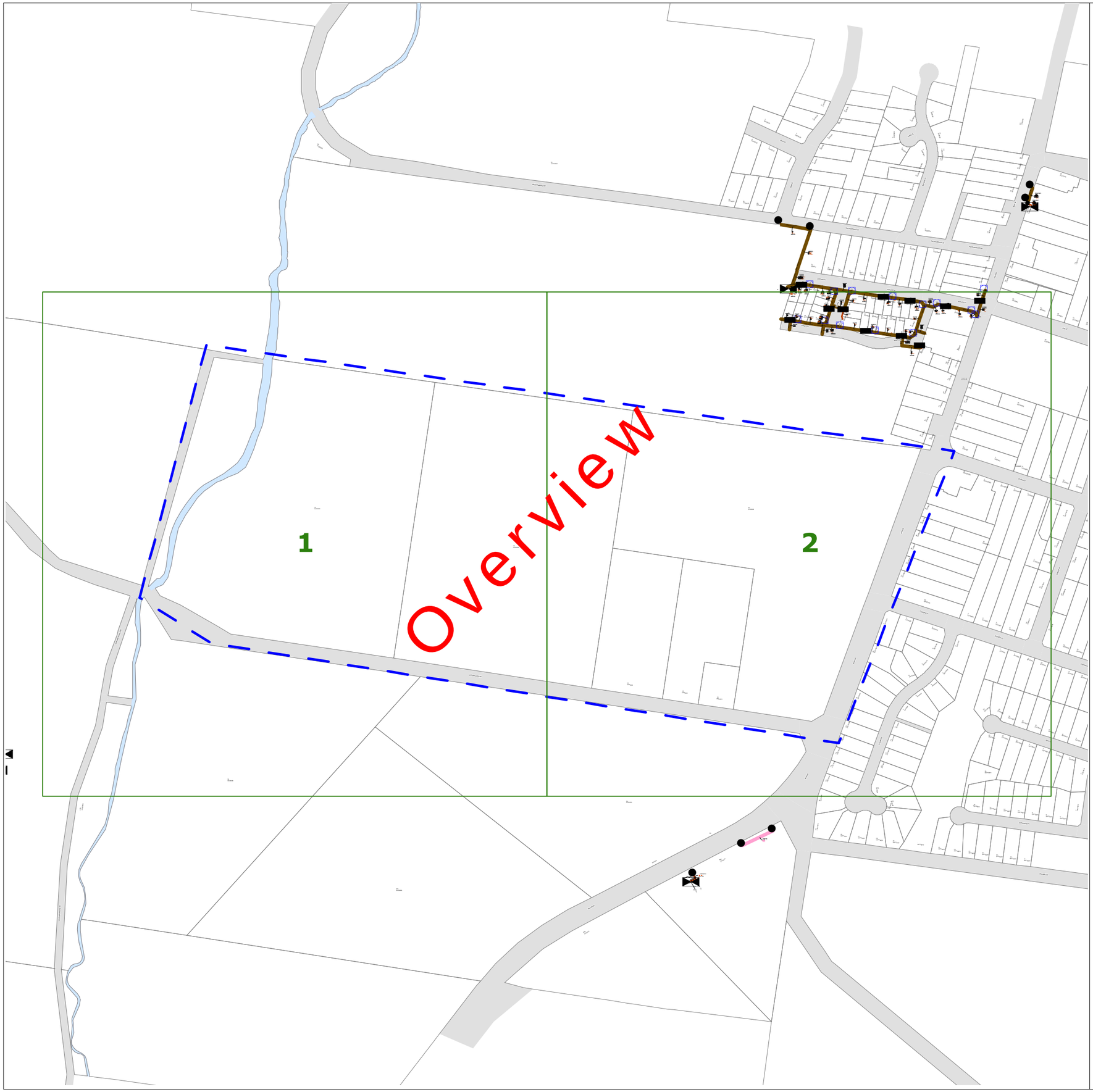

14
ASPEN RD
CHURCH ST


APPIN RD
TOGGERAI ST
15
38
1B
32
30
30A
28
26
24
22
20
2
4



Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.



Endeavour Energy

WARNING

- **All electrical apparatus shall be regarded as live until proved de-energised.** Contact with live electrical apparatus will cause severe injury or death.
- Underground assets may be congested at the approach to bridges and other structures. Typical asset depths and alignment may vary substantially, rising and falling sharply and at much shallower depths than elsewhere as they are channelled into shared allocated spaces on bridges and other structures. Additional precautions and underground asset location methods will be required in proximity to bridges and other structures.
- In accordance with the *Electricity Supply Act 1995*, you are obliged to report any damage to Endeavour Energy Assets immediately by calling **131 003**.
- The customer must obtain a new set of plans from Endeavour Energy if work has not been started or completed within twenty **(20)** working days of the original plan issue date.
- The customer must contact Endeavour Energy if any of the plans provided have blank pages, as some underground asset information may be incomplete.
- Endeavour Energy underground earth grids may exist and their location **may not** be shown on plans. Persons excavating are expected to exercise all due care, especially in the vicinity of padmount substations, pole mounted substations, pole mounted switches, transmission poles and towers.
- Endeavour Energy plans **do not** show any underground customer service mains or information relating to service mains within private property.
- Asbestos or asbestos-containing material may be present on or near Endeavour Energy's underground assets.
- Organo-Chloride Pesticides (OCP) may be present in some sub-transmission trenches.
- All plans must be made available at the worksite where excavation is to be undertaken in either printed or electronic format. If the plans are in an electronic format, they must be in a format visible on a screen size 10 inches or greater. Plans must be reviewed and understood by the crew on site prior to commencing excavation.
- Non-destructive water excavation must be operated at or below 2000PSI. Any operation exceeding 2000PSI must be classed and treated as a destructive excavation practice

INFORMATION PROVIDED BY ENDEAVOUR ENERGY

- Any plans provided pursuant to this service are intended to show the approximate location of underground assets relative to road boundaries, property fences and other structures at the time of installation.
- Depth of underground assets may vary significantly from information provided on plans as a result of changes to road, footpath or surface levels subsequent to installation.
- Such plans have been prepared solely for use by Endeavour Energy staff for design, construction and maintenance purposes.
- All enquiry details and results are kept in a register.

DISCLAIMER

Whilst Endeavour Energy has taken all reasonable steps to ensure that the information contained in the plans is as accurate as possible it will accept no liability for inaccuracies in the information shown on such plans.

or — Street light column

Padmount substation

or — Overground pillar (O.G.Box)

Underground pit

Duct run

Cable run

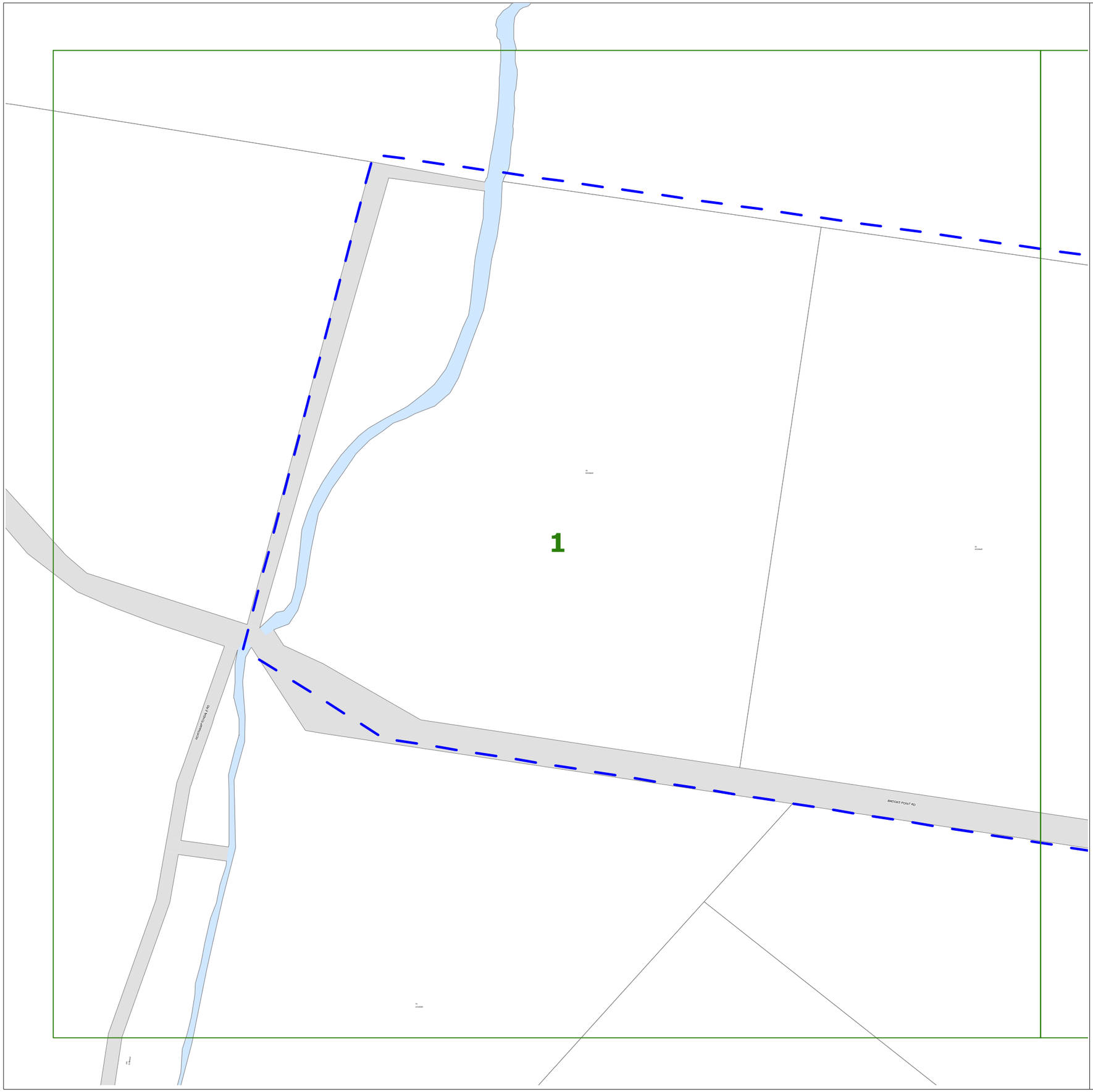
Typical duct section

Asbestos warning

N

NOT TO SCALE

DBYD Sequence No.:	219401306
Issued Date:	16/12/2022



Endeavour Energy

WARNING

- **All electrical apparatus shall be regarded as live until proved de-energised.** Contact with live electrical apparatus will cause severe injury or death.
- Underground assets may be congested at the approach to bridges and other structures. Typical asset depths and alignment may vary substantially, rising and falling sharply and at much shallower depths than elsewhere as they are channelled into shared allocated spaces on bridges and other structures. Additional precautions and underground asset location methods will be required in proximity to bridges and other structures.
- In accordance with the *Electricity Supply Act 1995*, you are obliged to report any damage to Endeavour Energy Assets immediately by calling **131 003**.
- The customer must obtain a new set of plans from Endeavour Energy if work has not been started or completed within twenty **(20)** working days of the original plan issue date.
- The customer must contact Endeavour Energy if any of the plans provided have blank pages, as some underground asset information may be incomplete.
- Endeavour Energy underground earth grids may exist and their location **may not** be shown on plans. Persons excavating are expected to exercise all due care, especially in the vicinity of padmount substations, pole mounted substations, pole mounted switches, transmission poles and towers.
- Endeavour Energy plans **do not** show any underground customer service mains or information relating to service mains within private property.
- Asbestos or asbestos-containing material may be present on or near Endeavour Energy's underground assets.
- Organo-Chloride Pesticides (OCP) may be present in some sub-transmission trenches.
- All plans must be made available at the worksite where excavation is to be undertaken in either printed or electronic format. If the plans are in an electronic format, they must be in a format visible on a screen size 10 inches or greater. Plans must be reviewed and understood by the crew on site prior to commencing excavation.
- Non-destructive water excavation must be operated at or below 2000PSI. Any operation exceeding 2000PSI must be classed and treated as a destructive excavation practice

INFORMATION PROVIDED BY ENDEAVOUR ENERGY

- Any plans provided pursuant to this service are intended to show the approximate location of underground assets relative to road boundaries, property fences and other structures at the time of installation.
- Depth of underground assets may vary significantly from information provided on plans as a result of changes to road, footpath or surface levels subsequent to installation.
- Such plans have been prepared solely for use by Endeavour Energy staff for design, construction and maintenance purposes.
- All enquiry details and results are kept in a register.

DISCLAIMER

Whilst Endeavour Energy has taken all reasonable steps to ensure that the information contained in the plans is as accurate as possible it will accept no liability for inaccuracies in the information shown on such plans.

or — Street light column

Padmount substation

or — Overground pillar (O.G.Box)

Underground pit

Duct run

Cable run

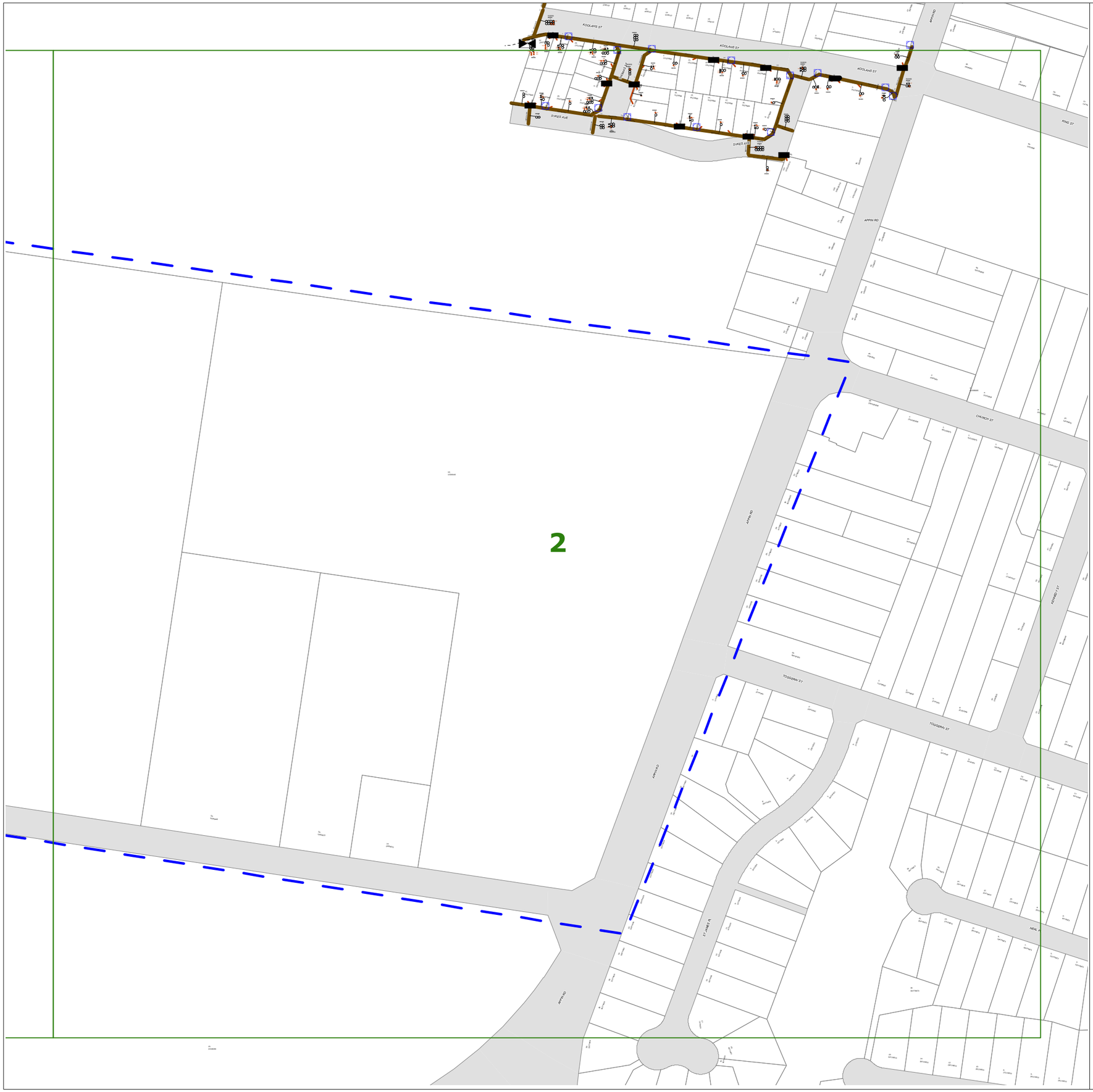
Typical duct section

Asbestos warning

N

NOT TO SCALE

DBYD Sequence No.:	219401306
Issued Date:	16/12/2022



WARNING

- **All electrical apparatus shall be regarded as live until proved de-energised.** Contact with live electrical apparatus will cause severe injury or death.
- Underground assets may be congested at the approach to bridges and other structures. Typical asset depths and alignment may vary substantially, rising and falling sharply and at much shallower depths than elsewhere as they are channelled into shared allocated spaces on bridges and other structures. Additional precautions and underground asset location methods will be required in proximity to bridges and other structures.
- In accordance with the *Electricity Supply Act 1995*, you are obliged to report any damage to Endeavour Energy Assets immediately by calling **131 003**.
- The customer must obtain a new set of plans from Endeavour Energy if work has not been started or completed within twenty **(20)** working days of the original plan issue date.
- The customer must contact Endeavour Energy if any of the plans provided have blank pages, as some underground asset information may be incomplete.
- Endeavour Energy underground earth grids may exist and their location **may not** be shown on plans. Persons excavating are expected to exercise all due care, especially in the vicinity of padmount substations, pole mounted substations, pole mounted switches, transmission poles and towers.
- Endeavour Energy plans **do not** show any underground customer service mains or information relating to service mains within private property.
- Asbestos or asbestos-containing material may be present on or near Endeavour Energy's underground assets.
- Organo-Chloride Pesticides (OCP) may be present in some sub-transmission trenches.
- All plans must be made available at the worksite where excavation is to be undertaken in either printed or electronic format. If the plans are in an electronic format, they must be in a format visible on a screen size 10 inches or greater. Plans must be reviewed and understood by the crew on site prior to commencing excavation.
- Non-destructive water excavation must be operated at or below 2000PSI. Any operation exceeding 2000PSI must be classed and treated as a destructive excavation practice

INFORMATION PROVIDED BY ENDEAVOUR ENERGY

- Any plans provided pursuant to this service are intended to show the approximate location of underground assets relative to road boundaries, property fences and other structures at the time of installation.
- Depth of underground assets may vary significantly from information provided on plans as a result of changes to road, footpath or surface levels subsequent to installation.
- Such plans have been prepared solely for use by Endeavour Energy staff for design, construction and maintenance purposes.
- All enquiry details and results are kept in a register.

DISCLAIMER

Whilst Endeavour Energy has taken all reasonable steps to ensure that the information contained in the plans is as accurate as possible it will accept no liability for inaccuracies in the information shown on such plans.

or — Street light column

Padmount substation

or — Overground pillar (O.G.Box)

Underground pit

Duct run

Cable run

Typical duct section

Asbestos warning

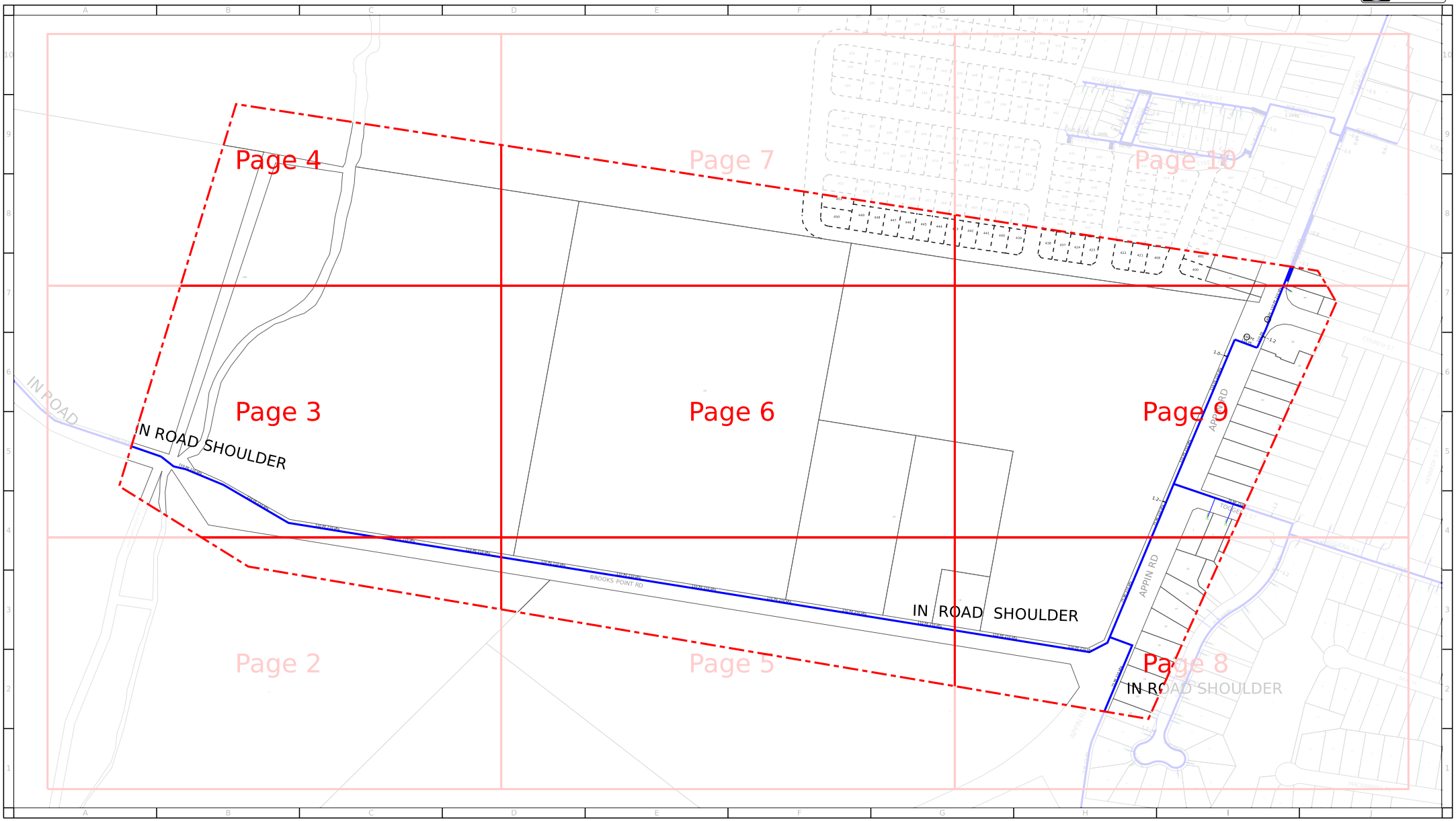
N

NOT TO SCALE

DBYD Sequence No.:	219401306
Issued Date:	16/12/2022

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: 10 Brooks Point Road Appin NSW, 2560



Jemena
ABN 87 003 004 322

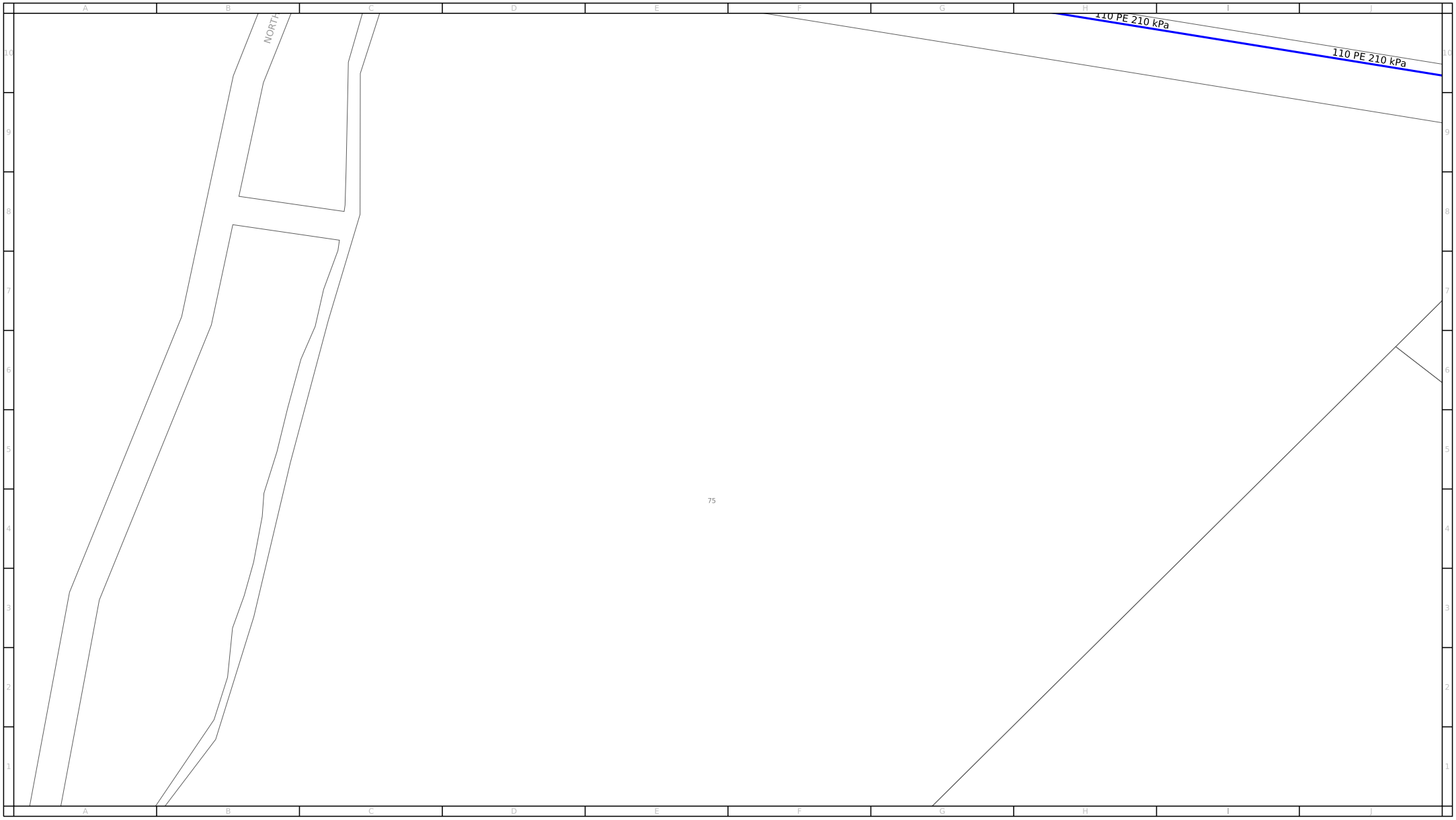
For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

Scale: 1:6302

Issue Date: 15/12/2022
DBYD Seq No: 219401304
DBYD Job No: 33310642
Overview Page:

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: 10 Brooks Point Road Appin NSW, 2560



Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

N
W
E
S

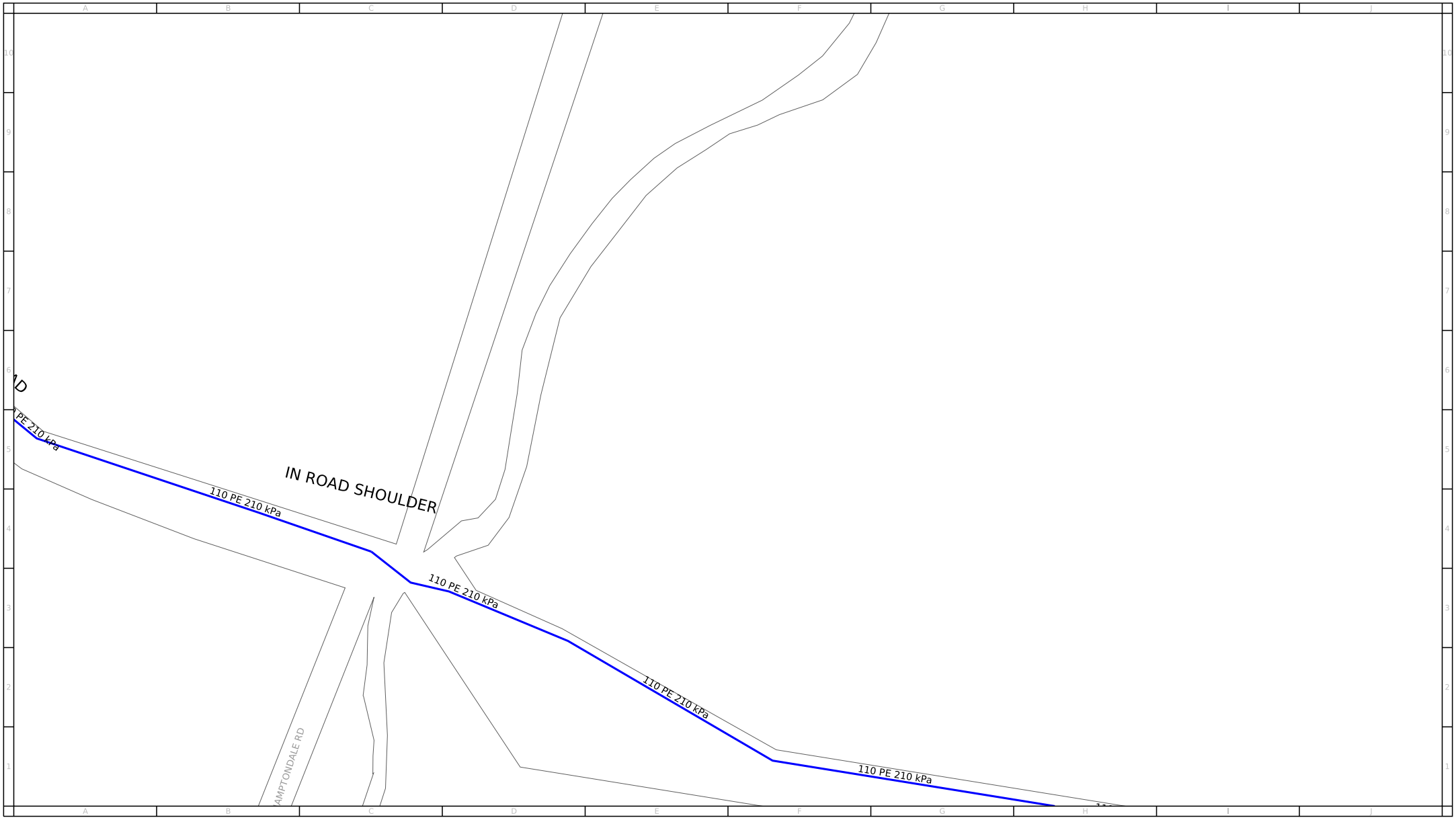
Scale: 1:2000

Issue Date: 15/12/2022
DBYD Seq No: 219401304
DBYD Job No: 33310642

0m 10m 20m 30m 40m 50m 60m 70m 80m

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: 10 Brooks Point Road Appin NSW, 2560



Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

N
W E
S

Scale: 1:2000

Issue Date: 15/12/2022
DBYD Seq No: 219401304
DBYD Job No: 33310642

0m 10m 20m 30m 40m 50m 60m 70m 80m

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: 10 Brooks Point Road Appin NSW, 2560

Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

N
W E
S

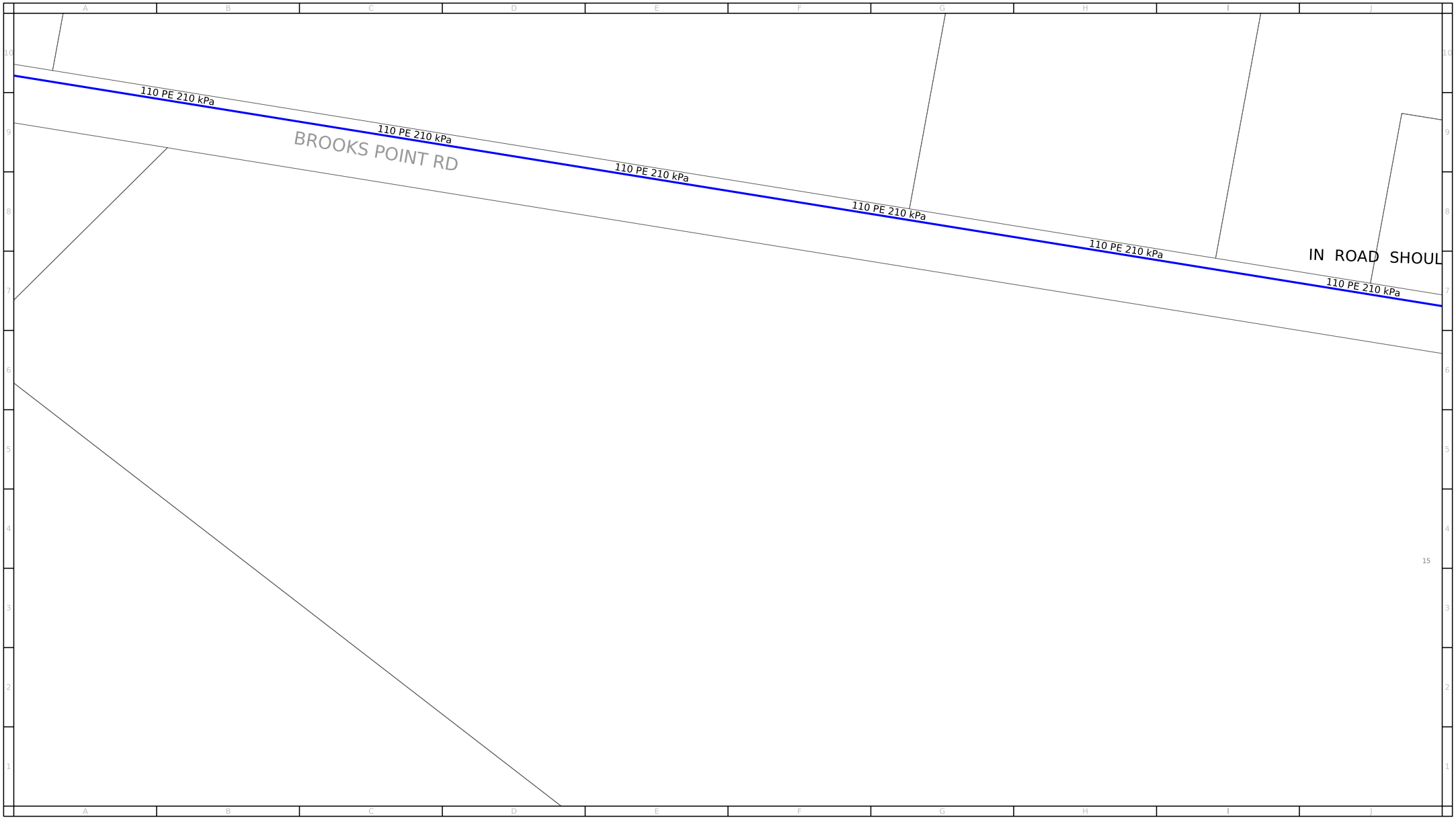
Scale: 1:2000

Issue Date: 15/12/2022
DBYD Seq No: 219401304
DBYD Job No: 33310642

0m 10m 20m 30m 40m 50m 60m 70m 80m

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: 10 Brooks Point Road Appin NSW, 2560



Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

N
W E
S

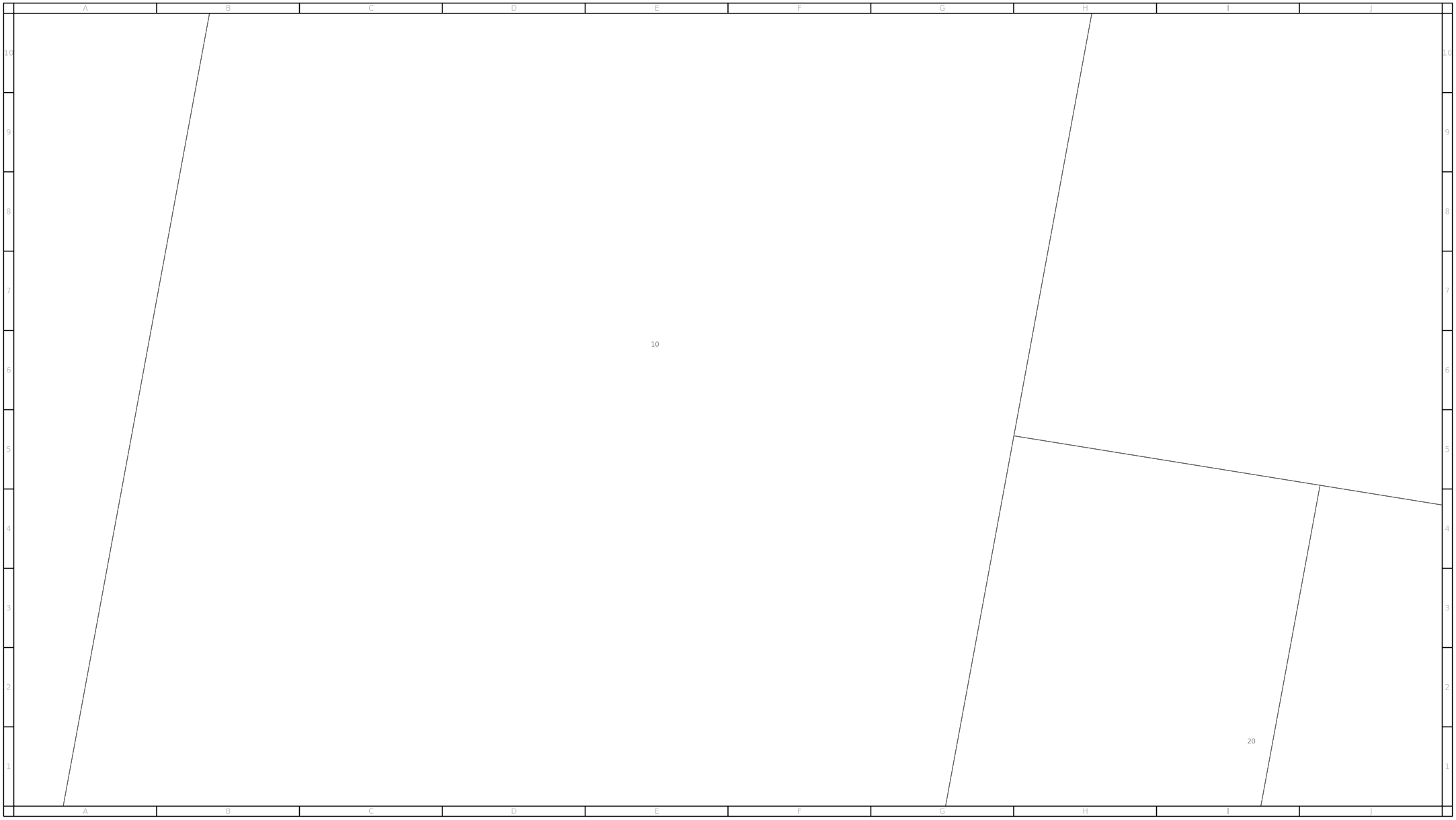
Scale: 1:2000

Issue Date: 15/12/2022
DBYD Seq No: 219401304
DBYD Job No: 33310642

0m 10m 20m 30m 40m 50m 60m 70m 80m

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: 10 Brooks Point Road Appin NSW, 2560



Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

N
W
E
S

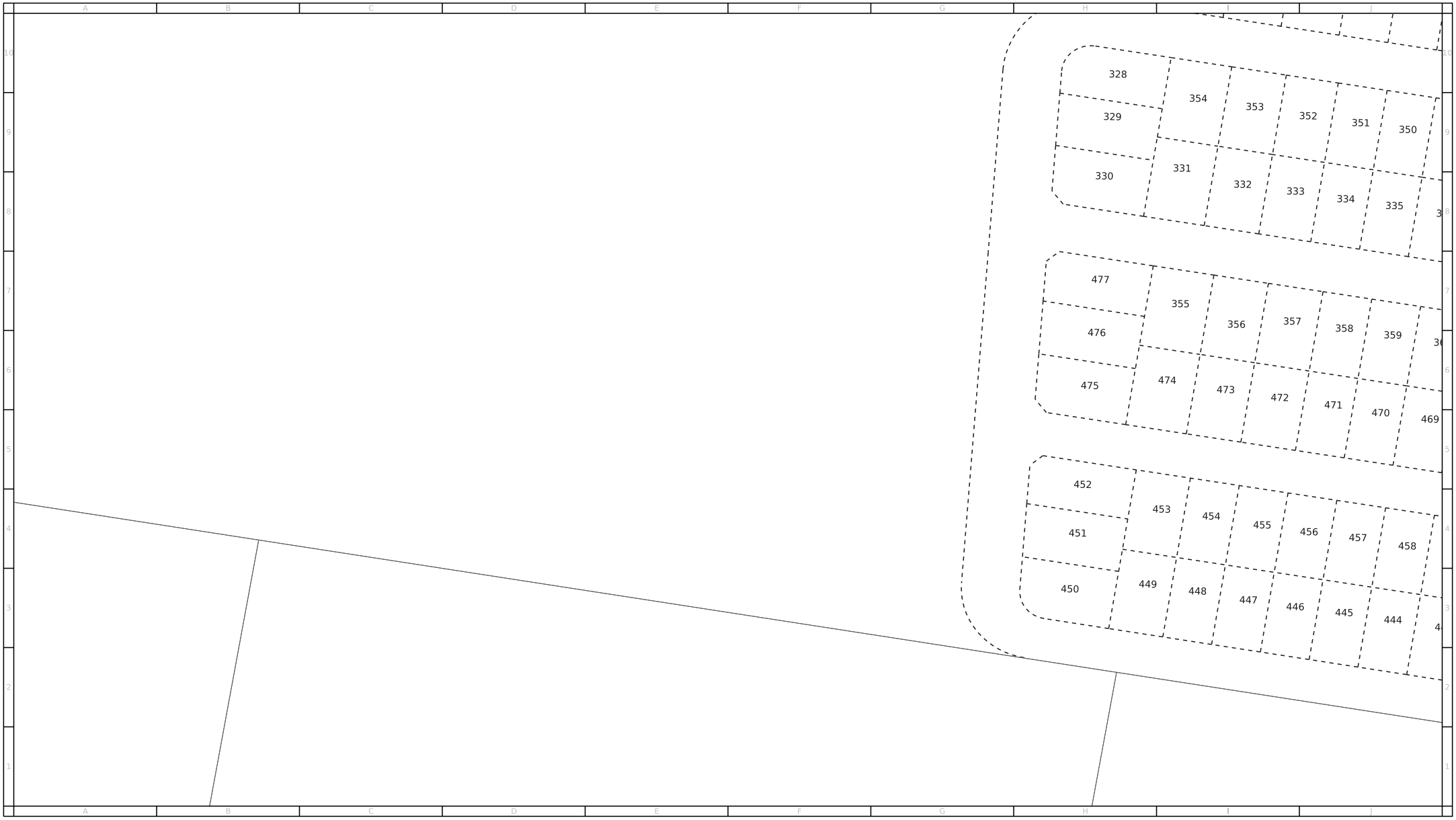
Scale: 1:2000

Issue Date: 15/12/2022
DBYD Seq No: 219401304
DBYD Job No: 33310642

0m 10m 20m 30m 40m 50m 60m 70m 80m

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: 10 Brooks Point Road Appin NSW, 2560



Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

N
W E
S

Scale: 1:2000

Issue Date: 15/12/2022
DBYD Seq No: 219401304
DBYD Job No: 33310642

0m 10m 20m 30m 40m 50m 60m 70m 80m

WARNING: This is a representation of Jemena Gas Networks underground assets only and may not indicate all assets in the area. It must not be used for the purpose of exact asset location in order to undertake any type of excavation. This plan is diagramatic only, and distances scaled from this plan may not be accurate. Please read all conditions and information on the attached information sheet. This extract is subject to those conditions. The information contained on this plan is only valid for 28 days from the date of issue.

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: 10 Brooks Point Road Appin NSW, 2560

Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

N
W E
S

Scale: 1:2000

Issue Date: 15/12/2022
DBYD Seq No: 219401304
DBYD Job No: 33310642

0m 10m 20m 30m 40m 50m 60m 70m 80m

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: 10 Brooks Point Road Appin NSW, 2560

Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

N
W E
S

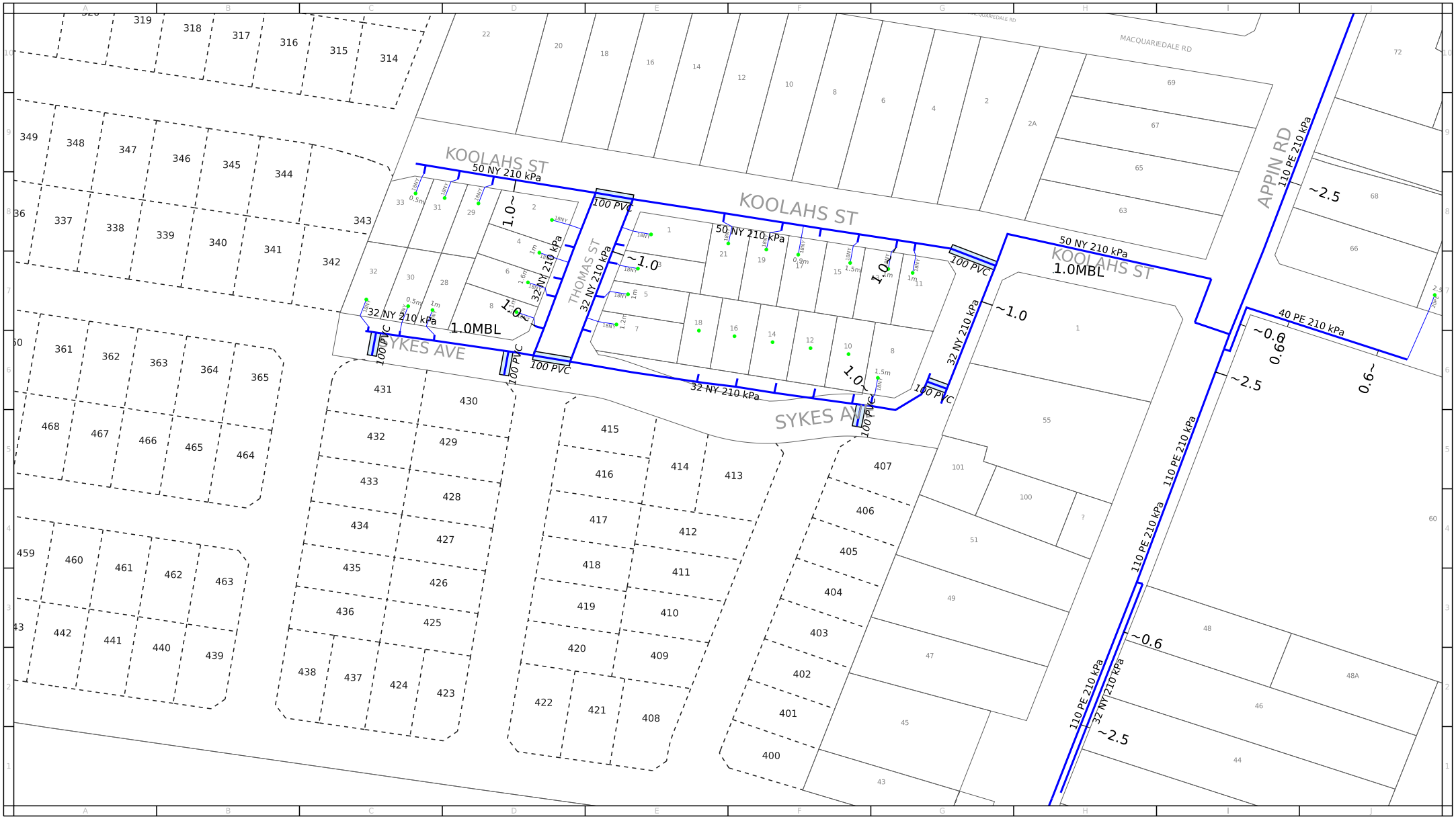
Scale: 1:2000

Issue Date: 15/12/2022
DBYD Seq No: 219401304
DBYD Job No: 33310642

0m 10m 20m 30m 40m 50m 60m 70m 80m

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: 10 Brooks Point Road Appin NSW, 2560



Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

Scale: 1:2000

Issue Date: 15/12/2022
DBYD Seq No: 219401304
DBYD Job No: 33310642

0m 10m 20m 30m 40m 50m 60m 70m 80m

WARNING: This is a representation of Jemena Gas Networks underground assets only and may not indicate all assets in the area. It must not be used for the purpose of exact asset location in order to undertake any type of excavation. This plan is diagramatic only, and distances scaled from this plan may not be accurate. Please read all conditions and information on the attached information sheet. This extract is subject to those conditions. The information contained on this plan is only valid for 28 days from the date of issue.

A0

DBYD Address:
10 Brooks Point Road
Appin NSW 2560

DBYD Job No: 33310642

DBYD Sequence No: 219401305

SYDNEY WATER CORPORATION
No warranty is given that the information shown is complete or accurate.

Scale: 1:2000
Date of Production: 16/12/2022 10:22:00

0m 40m 80m 120m 160m

Plan 1 of 1

APPENDIX D: APPIN SOUTH WATER SUPPLY SERVICING PREFERRED OPTION PREPARED BY CALIBRE 6 SEPT 2021

REPORT

Appin South Water Supply Servicing Preferred Option

PREPARED FOR WALKER CORPORATION

17-003196 | 6 September 2021

Calibre Consulting (NSW) Pty Ltd
ABN 30 109 434 513

DOCUMENT CONTROL

ISSUE	DATE	ISSUE DETAILS	AUTHOR	CHECKED	APPROVED
A	26/05/2021	Issued to Walkers for Review	MO & WK	RT	RT
B	10/06/2021	Issued to SWC (Frist Draft)	MO & WK	RT	RT
C	06/09/2021	Final Report	MO	WK	RT

Contents

Tables

Figures

Appendices

1 Purpose

The purpose of this options report is to document and seek endorsement for the preferred water supply option based on the assessment of the short-listed options that were previously endorsed by Sydney Water. This technical memorandum should be read in conjunction with the endorsed Basis of Planning Technical Memorandum and the Assessment of Long List of Options which outline the approved servicing area, growth projections and the long list of options that were assessed.

The Preferred Option Report includes:

- Modelling Assessment
- Environmental Constraints
- Geotechnical Constraints
- Refinement of Option Alignments
- Risk Assessment
- Recommended Preferred Option
- Staging and Investment Plan

2 Introduction

Walker Corporation plans to develop approximately 259 lots (in 3 stages) off Macquariedale Road, Appin. The site, known as *"Appin South*", is located generally to the south and west of the existing Appin village. A new school (1000 students + 200 staff) is also part of the proposal by Walker and is to be located at 865 Wilton Road, Appin. The development site was rezoned in October 2020 with first lots within Stage 1 requiring water and wastewater services by June 2022. The proposed lot layout is shown in Figure 2.1

Appin South and other proposed developments that were identified in the Basis of Planning Tech Memo are shown in Figure 2.2. A potential development site identified in the Basis of Planning Tech Memo as "240 Appin Rd" has been removed from the study area due to this area subsequently being identified as being located within the "Georges River Koala Reserve" and therefore is unlikely to be supported by Wollondilly Council for residential development.

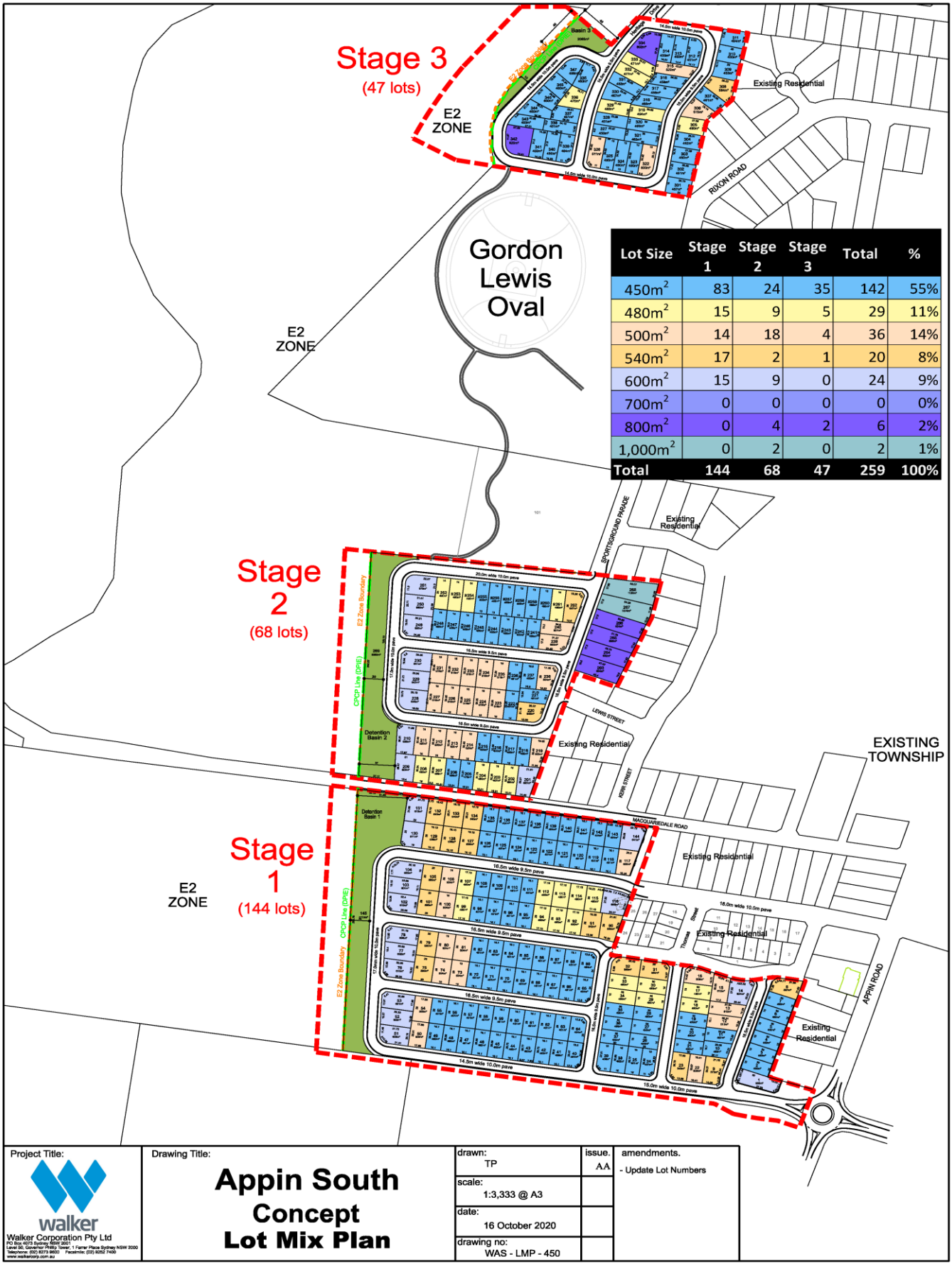
Sydney Water completed the Local Area Servicing Plan (LASP) for the Appin area in 2017. The preferred strategy for servicing both Appin South and Brooks Point Rd development sites is as follows:

- **Water Supply** – connect to the existing Appin Water Supply System
- **Wastewater** – transfer flows to the existing Glenfield Wastewater System (via the existing Appin system)

The water supply options identified in this tech memo are consistent with Sydney Water's strategy.

2.1 Assumptions

The scope of work to be included in the detailed assessment of options as part of this report exclude the proposed reticulation mains that service the individual lots within the proposed development sites. The planning approval for the reticulation mains will be part of the subdivision works and will be assessed by Council under Part IV of the Environmental Planning & Assessment Act. Additionally, as the costs for reticulation are the same for all water supply options their exclusion from the total life cycle assessment will not influence the selection of the preferred option. However, in sizing all infrastructure identified in this report, all flows from the proposed development sites have been included.



Lot Size	Stage 1	Stage 2	Stage 3	Total	%
450m^2	83	24	35	142	55%
480m^2	15	9	5	29	11%
500m^2	14	18	4	36	14%
540m^2	17	2	1	20	8%
600m^2	15	9	0	24	9%
700m^2	0	0	0	0	0%
800m^2	0	4	2	6	2%
1,000m^2	0	2	0	2	1%
Total	144	68	47	259	100%

Figure 2.1 Appin South Lot Layout

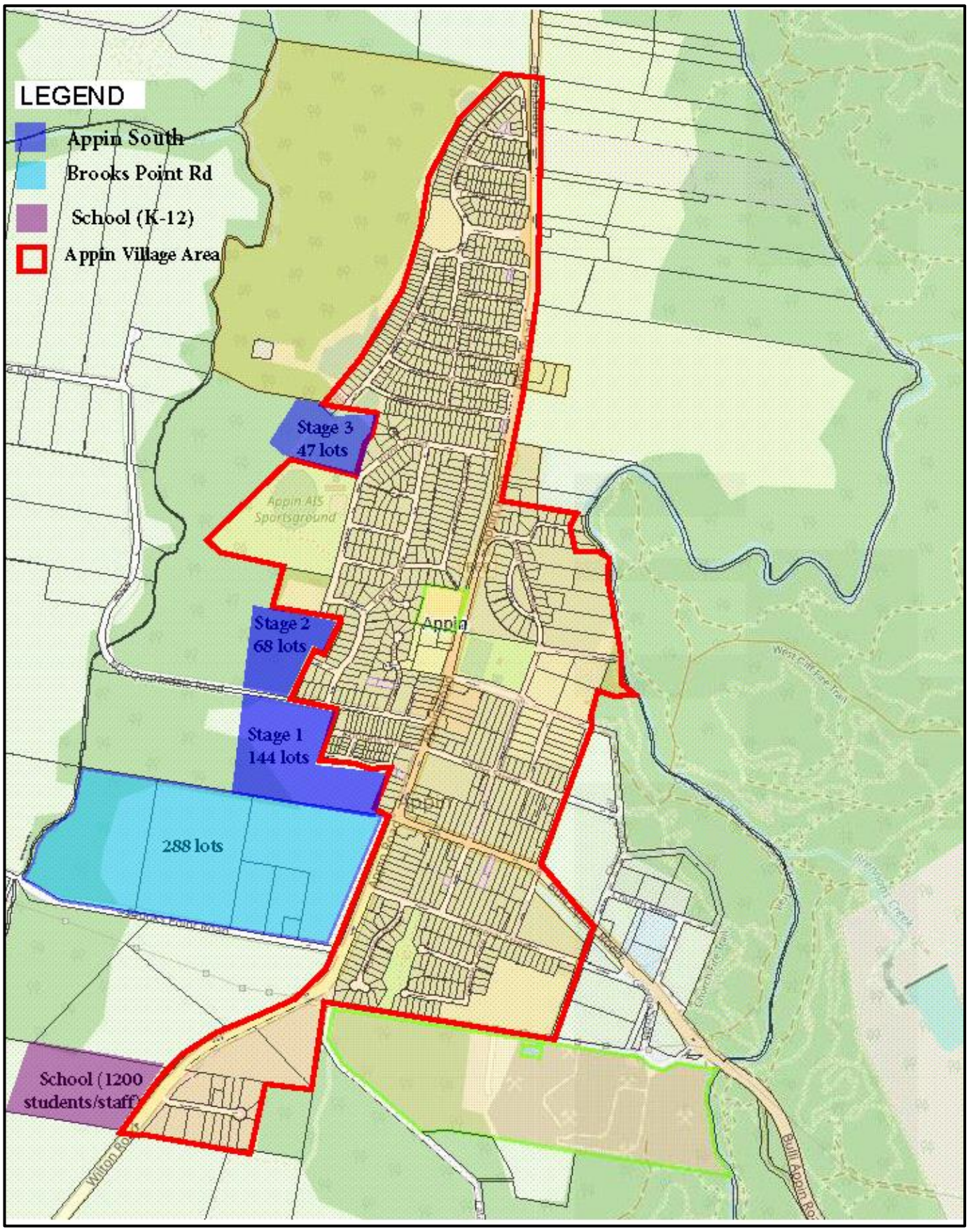


Figure 2.2 Future Growth

3 Hydraulic Assessment

3.1 Introduction

The *Assessment of Long List of Options Technical Memorandum* recommended that the following water supply options be shortlisted for detailed assessment:

Option 1 proposes that both Appin South and Brooks Point Rd development sites would be serviced via the supply from the outlet main of Appin Reservoir with the exception of the proposed school, which would be supplied from the DN150 boosted main in Wilton Rd. No other areas would require boosting. It was noted that modelling was required to confirm if properties are at risk of experiencing low pressures as a preliminary assessment identified that some properties within Appin South (Stage 1) and Brooks Point Rd may experience water pressures below Sydney Waters minimum requirements.

Option 4b proposes to extend the booster zone of WP418 to the elevated areas of Appin South and Brooks Point Rd development areas to ensure water pressures meet Sydney Water requirements. Preliminary assessment showed that this requires construction of a new DN150 to connect to the existing boosted watermain. All other proposed development areas (outside of the designated elevated areas) are proposed to be supplied via the outlet main of Appin Reservoir with the exception of the proposed school which will connect to the existing DN150 boosted main in Wilton Rd. Hydraulic modelling was recommended as part of the detailed assessment to the confirm capacity of WP418 to be extended to supply these areas.

The proposed preliminary scheme layouts for both options that were developed as the basis for the initial hydraulic modelling assessment are illustrated in Figures 3.1 and 3.2. The hydraulic modelling report is shown in Appendix A.

3.2 Background

- Appin Village is currently serviced via Appin Reservoir.
- Appin Reservoir has a capacity of 10 ML which corresponds to a design maximum day capacity of approximately 15 MLD.
- The elevated areas are supplied via a booster water pumping station (WP418). Based on the Needs Specification for WP418 there is spare capacity to supply an additional 100 lots approximately.
- The Needs Specification for WP418 (2013) identified Appin South as part of the supply area of WP418.
- Sydney Water provided direction on the appropriate model to be used for this hydraulic assessment.
- The Macarthur Blueprint identified a failure repair time of 48 hr. Sydney Water have advised that a requirement to have 48 hours of reserve storage within the Appin system is outside the scope of this assessment and will be addressed (and potentially revised) by Sydney Water as part of the Macarthur System Planning Refresh Study.
- Based on Sydney Water's normal requirements for reserve storage (ie 1/3 max day storage), the design Reserve Storage Level for Appin Reservoir under 2026 conditions is approximately 45% (equivalent to 4.5 ML of storage).
- Presently, to maintain water pressures above 15m to the **unboosted** elevated areas within the Appin Village area, the reservoir level must not fall below 55%. Sydney Water also advised that this level (equivalent to 5.5 ML of reserve storage) be used for reserve storage requirements rather than the design RSL (ie 4.5 ML of reserve storage). This 55% level is known as the operational adjusted Reserve Storage Level (RSL).
- Sydney Water advised that the minimum water pressure to be used for the assessment be 15m residual head. This is due to the proposed development sites fronting existing watermains.

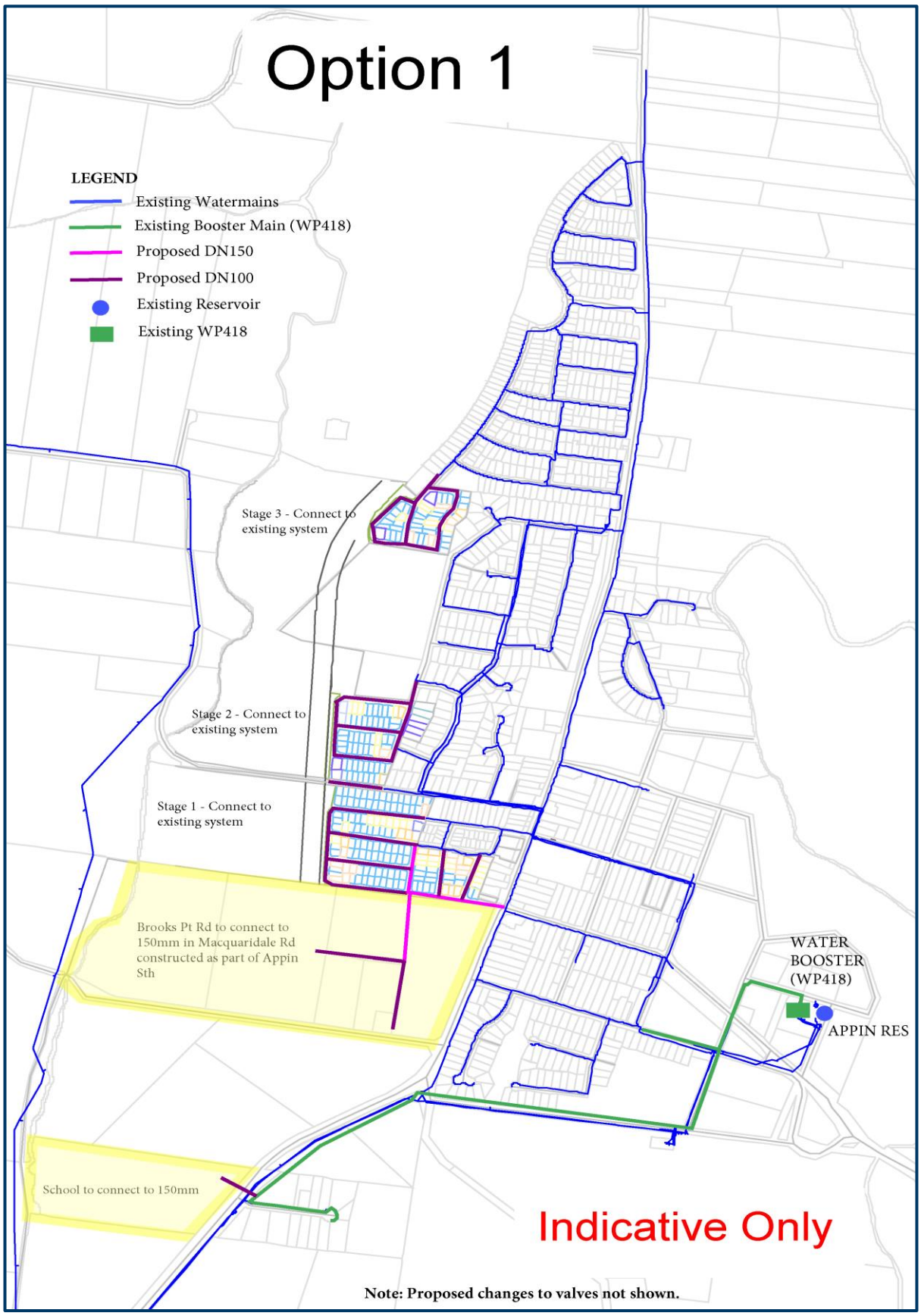


Figure 3.1 Option `1 – Supply development areas from Appin Reservoir (Unboosted)

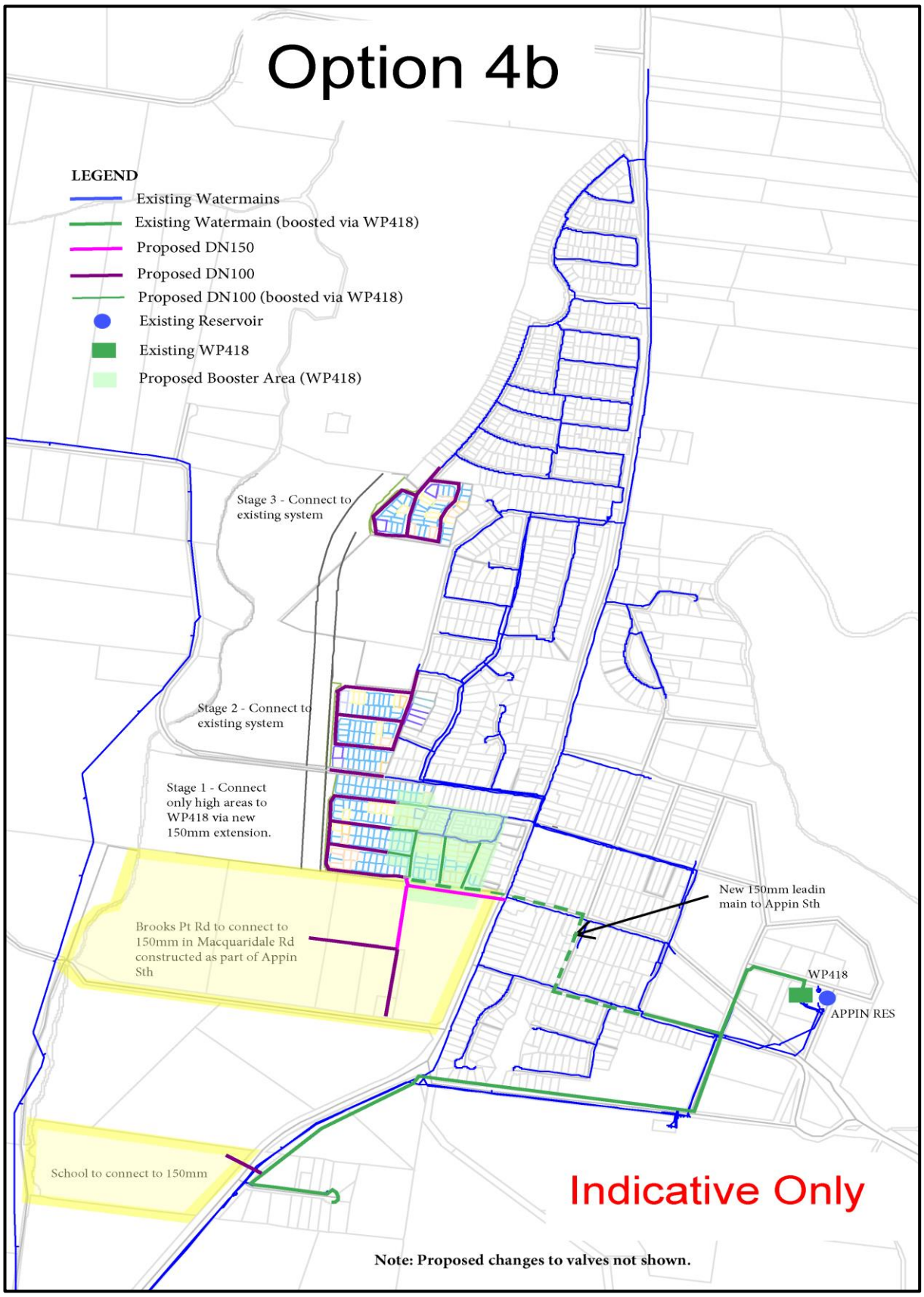


Figure 3.2 Option 4b – Supply elevated areas from WP418 via new 150mm watermain (Boosted)

3.3 Modelling Assessment

The following modelling performance assessment has been based on the *Water Supply Modelling Report* shown in Appendix A. This report has already been reviewed separately by Sydney Water.

3.3.1 Assessment Scenarios

Three modelling scenarios were assessed. Scenario 1 provides the existing situation while Scenario 2 allows for all committed growth in the system and Appin South but excludes land yet to be rezoned (eg Brooks Point Rd). Scenario 3 includes Brooks Point Rd. The modelling scenarios are shown in the table below:

Table 3.1 Modelling Scenarios

Model Scenario	Planning Horizon	Description
1	Existing	Existing Appin System
2	2026	Existing Appin + Infill Growth + Committed Greenfield Growth + Appin South (incl School) + Mt Gilead [1]
3	2026	Existing Appin + Infill Growth + Committed Greenfield Growth + Appin South (incl School) + Mt Gilead[1] + Brooks Point Rd

Note: 1. An allowance of approximately 415 lots has been allowed for Mt Gilead development for 2026.

3.3.2 Option 1

Based on hydraulic modelling, the performance results (water pressure and reserve storage) for Option 1 are summarised in Table 3.2. The results show that this option fails to meet the key criteria of maintaining adequate water pressures to customers under Scenarios 2 and 3. The modelling assessment confirmed that the reservoir needs to be maintained above the 55% level in order to maintain pressures above 15m to the unboosted elevated areas within Appin Village. In order to maintain the reservoir level above the 55% this option was revised to include an upgrade to the existing pump units at WP302. The upgraded pumps were sized to meet 2026 demands under Scenario 3. It is assumed that by 2026 Sydney Water will have commissioned the new WP302 to supply the ultimate demands for the Appin system. The revised hydraulic performance based on the revised Option 1 is shown in Table 3.3.

Table 3.2 Hydraulic Performance (Option 1)

Model Scenario	All Customers receive minimum 15m water pressure ?	Appin System maintains reserve storage based on operational adjusted RSL (5.5 ML) [1] ?	Appin System maintains reserve storage based on Design RSL (4.5 ML)[1] ?
1	✓	✓	✓
2	×	✓	✓
3	×	×	✓

Note: 1. In calculating the combined reserve storage for the Appin System, an allowance of 0.37 ML from the temporary North Wilton Reservoir has been included.

Table 3.3 Hydraulic Performance (Revised Option 1)

Model Scenario	All Customers receive minimum 15m water pressure ?	Appin System maintains reserve storage based on operational adjusted RSL (5.5 ML) [1] ?	Appin System maintains reserve storage based on Design RSL (4.5 ML)[1] ?
1	✓	✓	✓
2	✓	✓	✓
3	✓	✓	✓

Note: 1. In calculating the combined reserve storage for the Appin System, an allowance of 0.37 ML from the temporary North Wilton Reservoir has been included.

Modelling also showed that for Option 1 the firefighting capability within the elevated areas would be at risk in being able to provide a basic fireflow of 10 L/s.

3.3.3 Option 4b

Based on hydraulic modelling, the performance results (water pressure and reserve storage) for Option 4b are summarised in Table 3.4. This option assumes that all lots at a ground level higher than RL 241 and higher within the development areas are connected to the WP418 boosted supply. Modelling results show that this option meets the key criteria of maintaining adequate water pressures (15m minimum) to customers under all scenarios and that the existing booster has sufficient capacity to supply the additional lots and the proposed school. Modelling also confirmed that under a booster failure scenario, minimum pressures of 12m are maintained within the boosted zone (see Scenario 3 Modelling Results). The proposed schools impact on the capacity of the booster is not significant due to the schools highest demands on the system occurring outside the peak demand period for the boosted area (which occurs in the evening). The minimum water pressure to any customer is estimated to be 18m under this option which exceeds the minimum requirement of 15m. However, the modelling assessment also confirmed that Option 4b does not meet the required combined system reserve storage (of 5.5 ML) under Scenario 3. The shortfall in reserve storage is approximately 0.2 ML. As noted previously, it is unlikely that Brooks Point Road would be developed prior to 2026 as it is yet to be rezoned. Under Scenario 2 (ie without Brooks Point Rd) the required reserve storage is maintained. However, it should be noted that Option 4b does meet Sydney Water's normal reserve storage requirements based on 1/3 max day (4.5 ML) under all scenarios.

Table 3.4 Hydraulic Performance (Option 4b)

Model Scenario	All Customers receive minimum 15m water pressure ?	Appin System maintains reserve storage based on operational adjusted RSL (5.5 ML) [1] ?	Appin System maintains reserve storage based on Design RSL (4.5 ML)[1] ?
1	✓	✓	✓
2	✓	✓	✓
3	✓	×	✓

Note: 1. In calculating the combined reserve storage for the Appin System, an allowance of 0.37 ML from the temporary North Wilton Reservoir has been assumed.

3.4 Conclusion

Hydraulic assessment (under 2026 conditions) shows that the revised Option 1 meets all the key performance criteria but option 4b fails to meet the required reserve storage of 5.5 ML (based on the operational adjusted RSL) under Scenario 3. The shortfall in storage of approximately 0.2 ML is not considered a significant risk considering that by 2026 there is likely to be additional system storage provided in the network driven by significant growth at Wilton. Additionally, modelling did confirm that Option 4b does meet Sydney Water's normal reserve storage requirement of 4.5 ML which would generally be considered as providing adequate response time to detect and repair a failure between WP302 and Appin Reservoir.

4 Preliminary Environmental Assessment

4.1 Existing Environment

A desktop environmental constraints and opportunities assessment was undertaken within the study area by environmental consultants *SURE Environmental*. The report, along with the environmental maps, are shown in Appendix B and these were used to assist in refining the preferred infrastructure alignments that were identified earlier.

Two critically endangered ecological communities under State and Federal legislation are found within the study area – Cumberland Plain Woodland and Shale Sandstone Transition Forest. Most Shale Woodland is endangered under State legislation and also critically endangered under Federal legislation. While the larger areas of vegetation are generally concentrated along creek line and in gullies, there is also significant Cumberland Plain Woodland in the Appin Road corridor. Figure 4.1 shows the vegetation map most relevant to the proposed works.

A NSW BioNet Atlas search found records of 32 threatened species under State and Federal Legislation in the study area. The Appin Township contains records of **23 threatened fauna species** (see Figure 4.2) and **9 threatened flora species**. The koala population in the Campbelltown area is healthy and disease free. Figure 4-2 shows the high number of recorded koala sightings in the study area. Records are mainly on the eastern side of Appin Road in the bushland along the Georges River. However, there are records along Appin Road and in bushland on the western side of the road. Reports indicate that this koala population is expanding and moving to bushland areas where it hasn't been found previously.

The *Draft Cumberland Plain Conservation Plan Sub-Plan B: Koalas* (DPIE, 2020) states that connectivity between important patches of koala habitat is critical to the continued presence of koalas in South Western Sydney. The sub-plan defines koala corridors as:

- Primary - connected area of koala habitat that is contiguous (gaps between trees less than 100 metres) and greater than 380 hectares in width
- Secondary - movement corridors that are less than 50 metres wide or not connected at both ends to other koala habitat.

The study area contains a primary koala corridor along the Georges River and secondary koala corridor around Ousedale Creek on the western side of the study area (Figure 4-3). Under the sub-plan primary and secondary corridors are classed as 'important habitat' that is critical to the long viability of the species. Urban capable land is also identified in the sub-plan as land where future development is likely to occur.

Travers prepared a Biodiversity Offset Strategy (Travers, 2014) for the proposed rezoning of the Appin South development site. The report provides information on **threatened species and communities** in this area. Travers identified most of the vegetation in the proposed rezoning area as the critically endangered Shale Sandstone Transition forest. This is consistent with previous mapping. Eleven threatened species were identified in this area. The report identified the impact to Cumberland Plain Land Snail habitat as a potential issue. Figure 4.4 shows the vegetation mapped by Travers.

An Aboriginal Heritage Information Management System (AHIMS) search found that there are **28 recorded Aboriginal heritage sites** in the Appin Township study area (see Figure 4.5). The sites are generally found along creek lines and in undisturbed vegetation. Grinding grooves and shelters are mainly found along the Georges River while the Ousedale Creek area contains art sites, artefact sites and potential archaeological deposits (PADs).

Mary Dallas Consulting Archaeologists (MDCA) carried out a Preliminary Due Diligence **Aboriginal Heritage Assessment (MDCA, 2014)** as part of the requirements of the OEH 2010 Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales for three lots at 40 Appin Road and 55 Macquariedale Road, Appin in 2014. The proposed Appin South development site is located within this assessment site. The assessment concluded that apart from the one registered Aboriginal site the area has been found to contain no further evidence of past Aboriginal use, and there is no likelihood for surviving deposits of Aboriginal stone artefacts.

As part of the **Non-Aboriginal Heritage Assessment**, the following heritage databases were checked for heritage within the study area:

- Commonwealth Heritage List
- National Heritage List
- State Heritage Register (SHR)
- Wollondilly LEP
- Public authority s170 heritage and conservation registers.

Most of the heritage items are locally significant and mostly located on Appin Road in the Appin Township with the exception of the only State Heritage Listed item, the Windmill Hill group which is located to the south east of the study area (see Figures 4.6 and 4.7).

More detailed information of the above key and other environmental constraints can be found in Appendix B.

Figure 4.1 Sydney Metro vegetation mapping

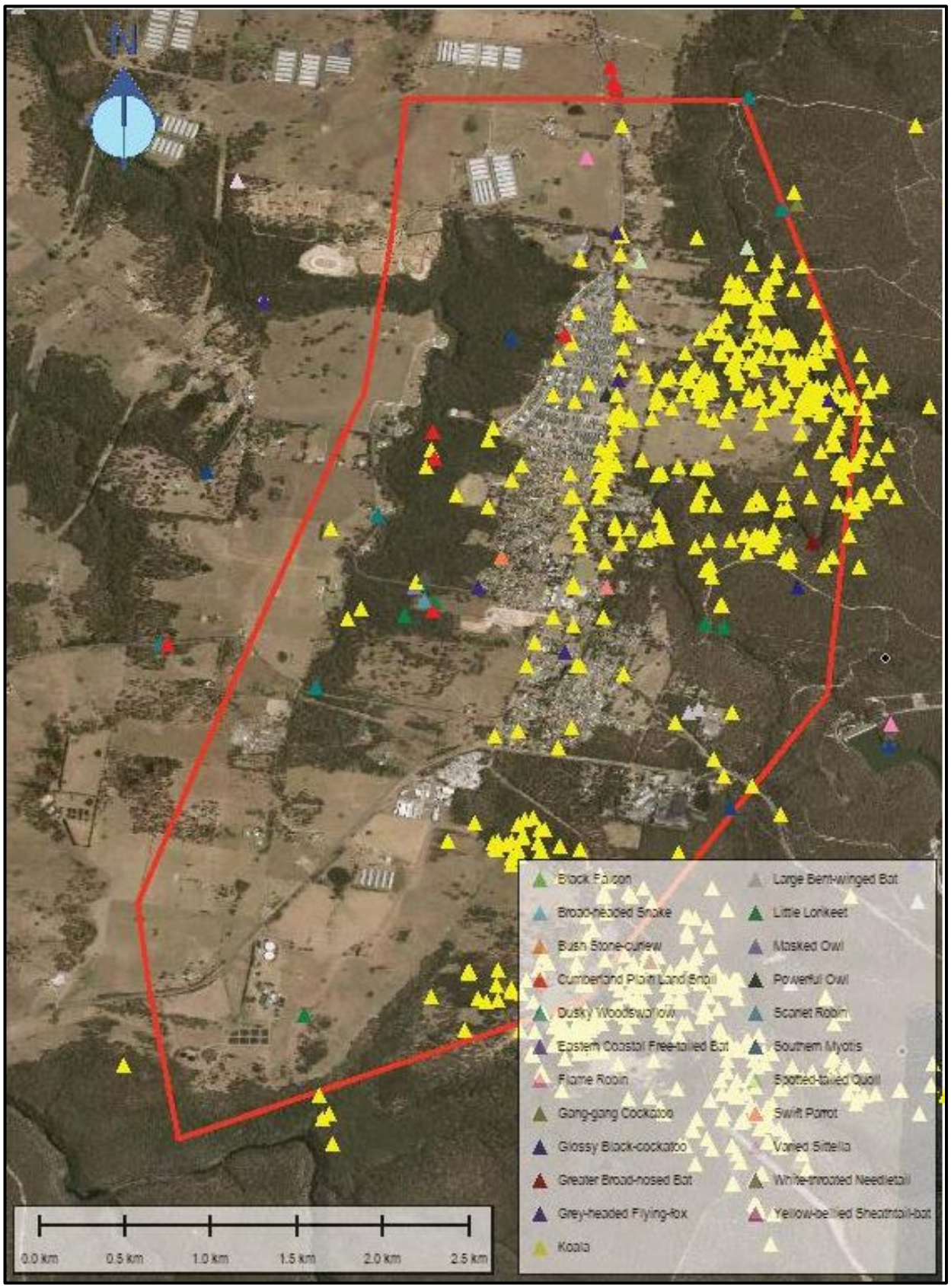


Figure 4.2 Threatened fauna species

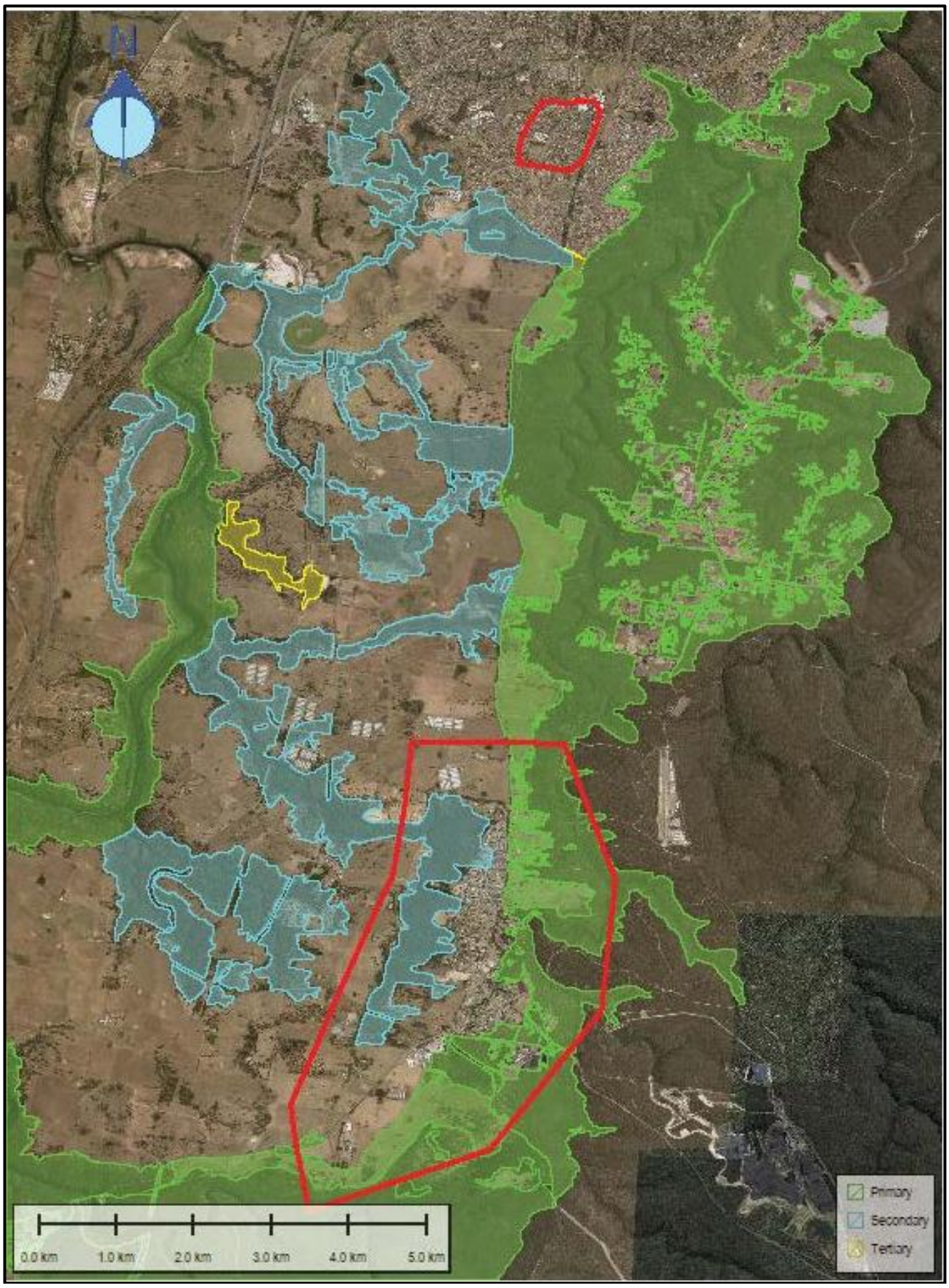


Figure 4.3 Koala corridors

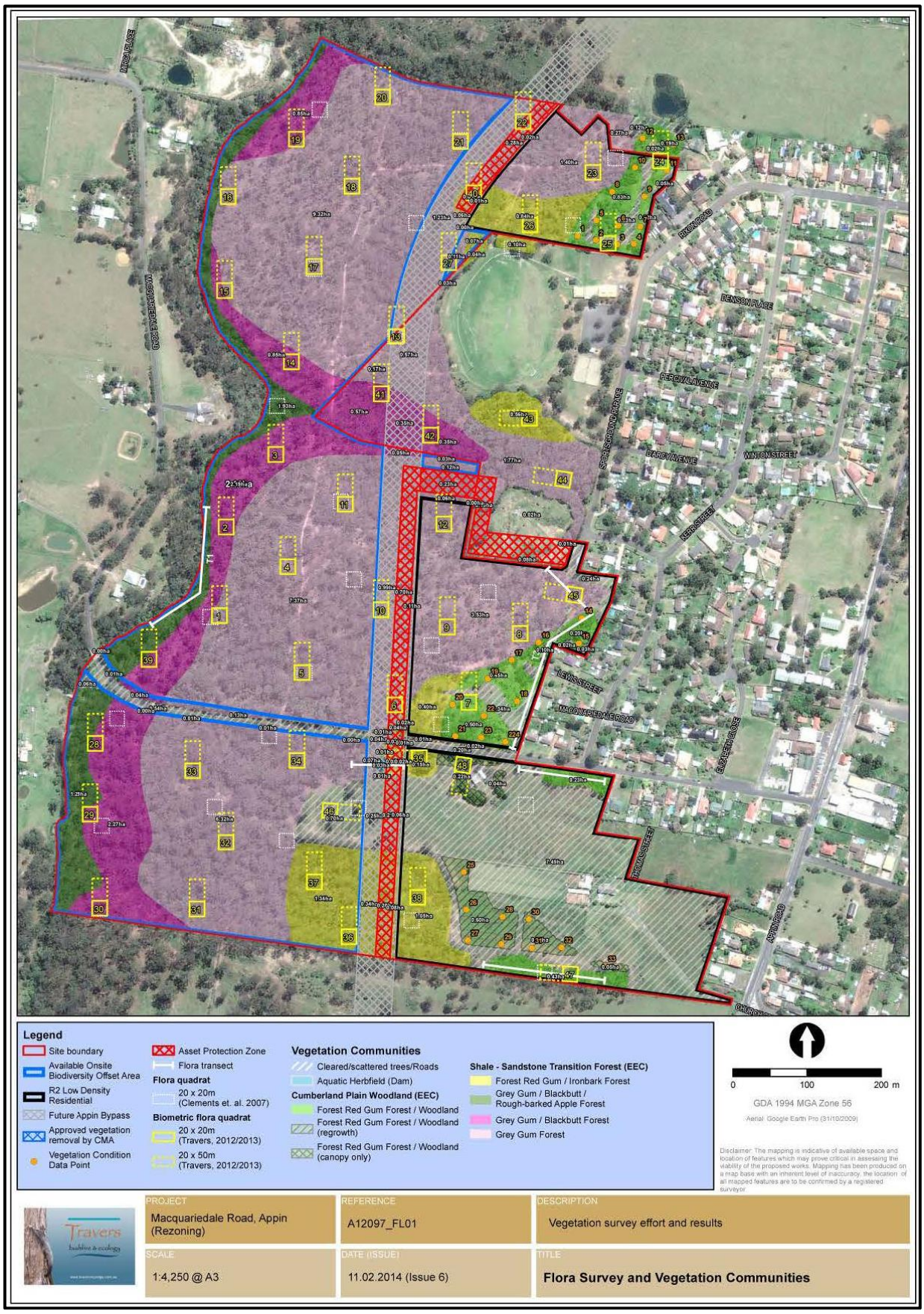


Figure 4.4 Vegetation assessed by Travers (2014).

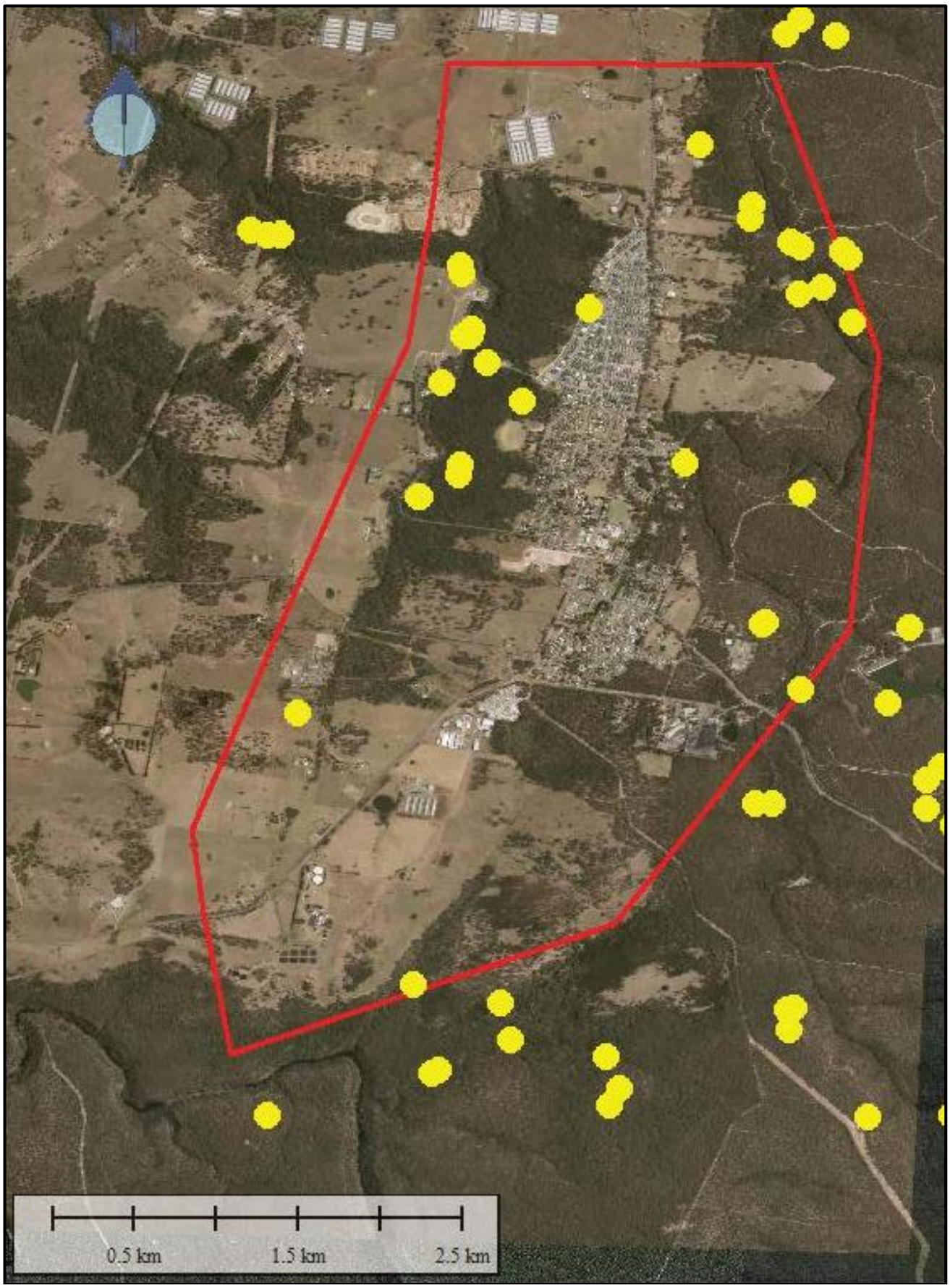


Figure 4.5 AHIMS sites located within the study area

Figure 4.6 *State Heritage Register items in the Appin Township study area*

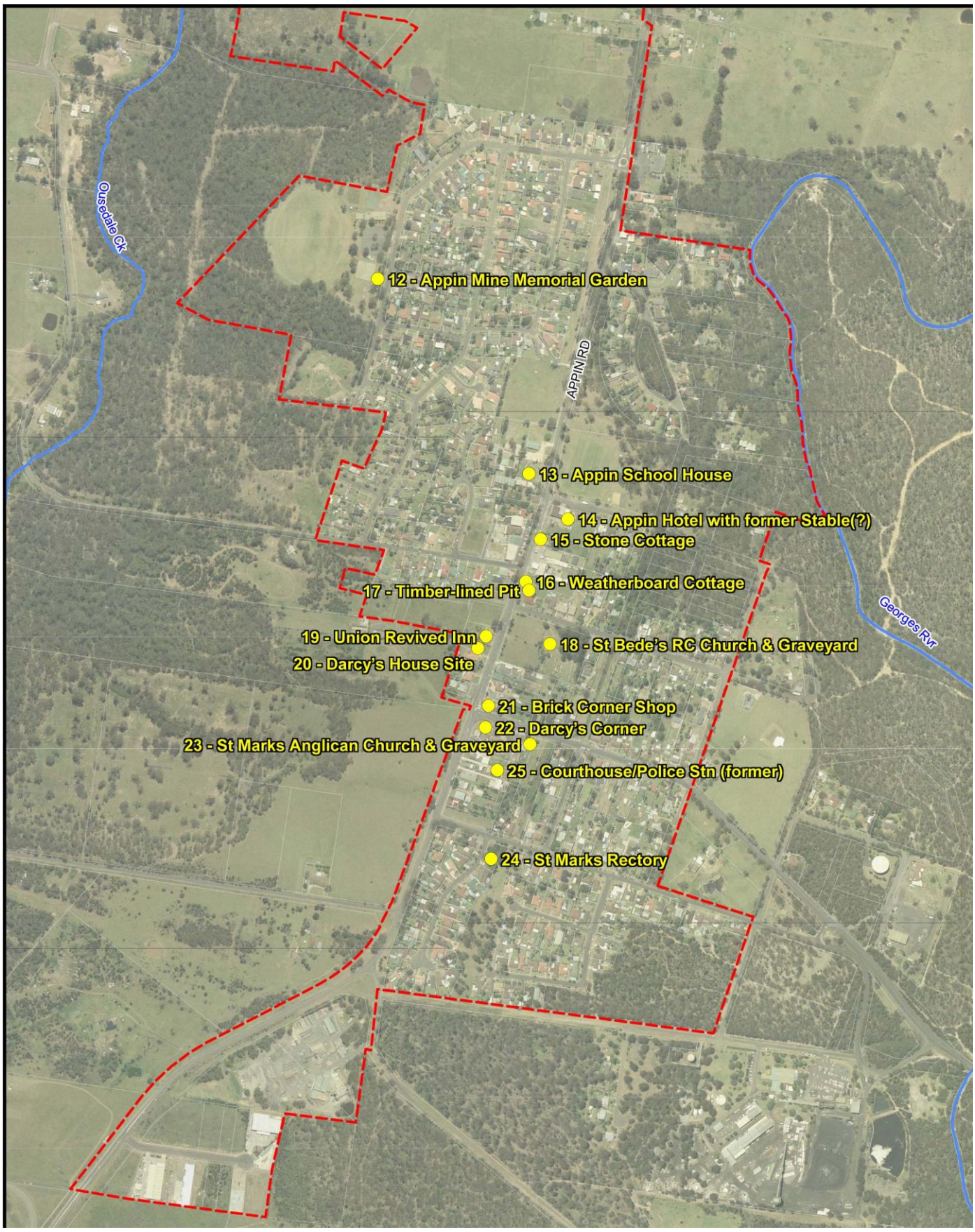


Figure 4.7 *Heritage items in the Appin Township study area (Appin PSP REF, 2010)*

4.2 Assessment of Options

Reticulation infrastructure constructed within the development sites are not within the scope of this environmental assessment as these works will be assessed separately as part of the development application for the site. This includes minor reticulation extensions for connection purposes.

Both Options 1 and 4b propose works within disturbed land or within existing/proposed road corridors.

Option 1 proposes an upgrade to the existing pump units at WP302. This pump station is owned and operated by the operators of the Macarthur Water Filtration Plant (see Figure 4.8). The proposed works are to be located within the internal structure of the existing pumping station and therefore no further assessment is required as part of the current desktop assessment phase. If this option was to be selected as the preferred, the detailed environmental assessment as part of obtaining planning approval would consider additional potential impacts such as noise from the new pump units and other impacts such as during construction.

Figure 4.8 WP302 – Macarthur Water Filtration Plant

Option 4b proposes watermains to be constructed within existing/proposed road corridors by open trenching methods except where the watermain crosses Appin Road which is planned for trenchless technology (see Figure 4.8). There are some pockets of native vegetation and potential koala habitat located within sections of the existing road corridor of the planned pipeline especially along section A-B. However, it is anticipated that these pockets could still be largely avoided via design (ie locating the section of pipe within the road shoulder rather than the footway) or adopting trenchless methods along these sections. A section of the watermain (D-F) will also be located within a future road that will be constructed as part of Appin South development. This future road is located within an area designated under the *Draft Cumberland Plan Conservation Plan* as "**Certified – Urban Capable**". A section of the pipeline is also located close to existing heritage items including the St Marks Evangelist Church (1843) and the Brick Corner Shop.

The preferred option will undergo a more rigorous environmental assessment as required under the EP&A Act during the concept phase of the project including detailed field studies if required.

4.3 Conclusion

Based on the desktop assessment, the key environmental aspects that have the potential to constrain/impact the proposed water supply options, or influence the design or environmental assessment process include:

- **Native Vegetation Communities**
- **Threatened species** (particularly the presence of a koala population)
- **Non-Aboriginal Heritage Items**

The majority of area that will be affected by both Options (1 & 4b) can be considered to be highly disturbed by prior development including road construction and construction of infrastructure facilities (ie an existing water pump station). As such, the potential environmental impacts are anticipated to be low for both options. A section of watermain for Option 4b is proposed within a future road corridor however this road is located within an area that has been earmarked as “Certified – Urban Capable”. Even though Option 4b has a higher potential impact compared to Option 1, any impacts are largely avoidable or can be mitigated through design (eg alignment selection) and/or construction methods (eg trenchless technology).

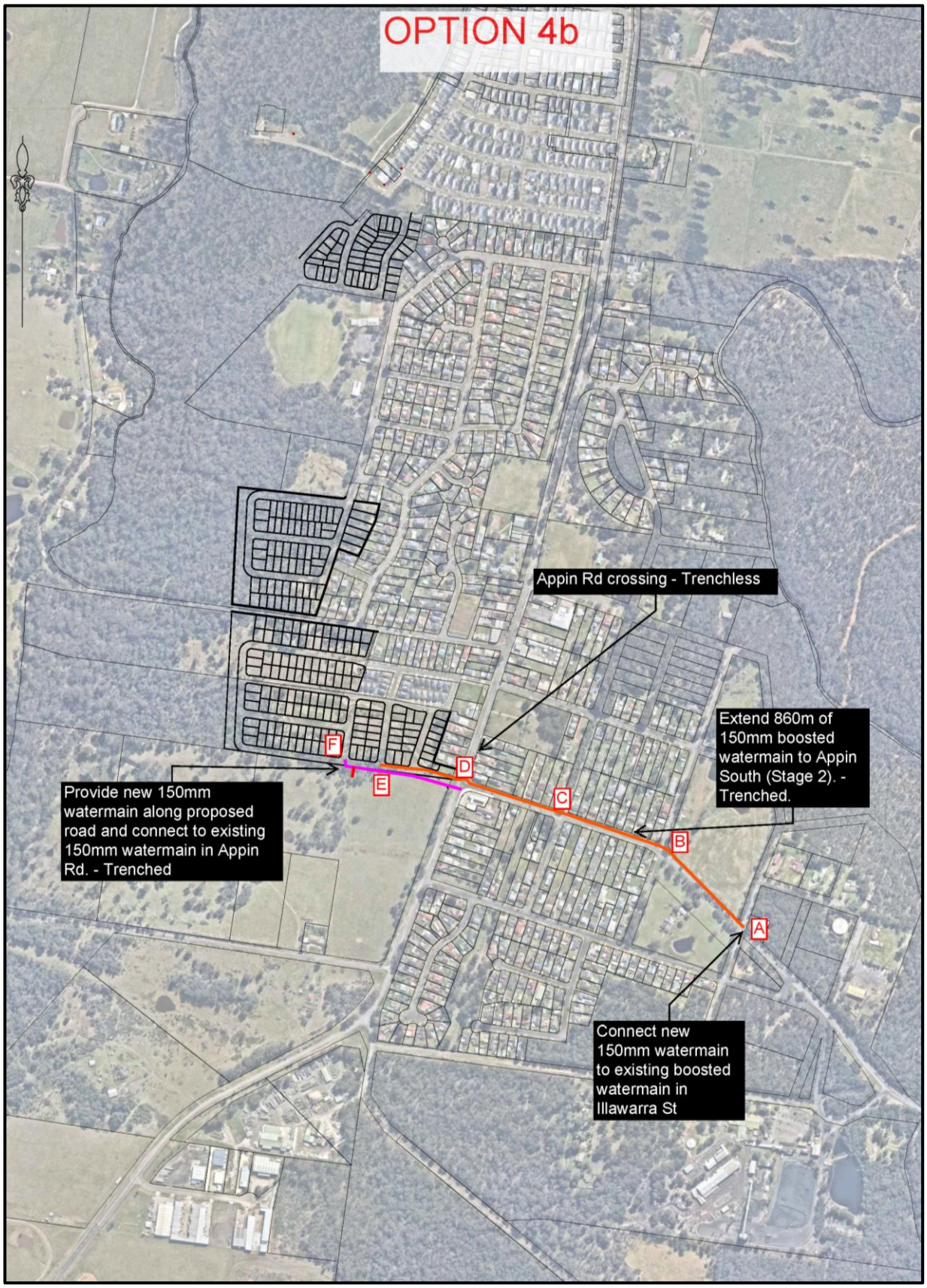


Figure 4.9 Option 4b – Proposed Pipeline Alignment (internal reticulation not shown)

5 Preliminary Geotechnical Assessment

5.1 Existing Environment

A desktop geotechnical and contamination assessment was undertaken by consultants *Douglas Partners* within the study area for the proposed pipeline alignment of Option 4b as shown in Figure 4.8. The proposed works for Option 1 were not considered as part of the desktop assessment as this option does not require any excavation works. The report, along with the geotechnical and contamination maps, are shown in Appendix C and these were used to assist in refining the preferred pipeline alignment.

The key geotechnical and contamination constraints that were identified in the study area include:

- The study area is largely underlain by a combination of **Triassic Aged Hawkesbury Sandstone and Wianamatta Group Ashfield Shale** and to a lesser extent Bringelly Shale. All these rocks can weather to form clays of medium to high plasticity
- The study area is underlain by a combination of Blacktown soils, Lucas Heights soils, Hawkesbury soils and Luddenham soils. The pipeline alignment proposed as part of Option 4b is **largely impacted by Blacktown soils**. Blacktown soils comprise shallow to moderately deep red and brown podzolic soils on crests, upper slopes and well drained areas and deep yellow podzolic soils and soloths on lower slopes and in areas of poor drainage. Such soils are generally moderately reactive, highly plastic and of low soil fertility with poor soil drainage.
- The study area has an **extremely low probability of occurrence of acid sulfate soils**.
- The study area varies in salinity potential from very low to high with the proposed alignment of Option 4b being **located within an area of moderate risk of encountering salinity**.
- Nine groundwater bores are registered within the study area, and a further 11 within approximately 1 km of the area. The bore details indicate that the **local groundwater depth generally ranges between 3.5 m to 38 m below the ground surface level.**
- **Previous geotechnical studies** carried out within the Appin Township suggest that the subsurface conditions comprise relatively shallow depths of overburden soils (ie up to 2 m) then shale, siltstone and sandstone bedrock. Groundwater was not encountered in most test pits.
- The study area lies within the **Appin Mine Subsidence District**. Correspondence with Subsidence Advisory NSW (SA NSW) is shown in Appendix D. Based on the most recent requirements from SA NSW (31 March 2021) for the development site of South Appin (which covers the same mining lease as the proposed works) the following design mine subsidence parameters have been adopted:
  - Maximum Strain – 2mm/m
  - Maximum Tilt – 4mm/m

  The design of the watermain shall make an allowance for the movement associated with the ground strain. The pipe jointing system selected shall be capable of accepting ground movements, without impairing the water tightness of the joint. Consideration during Concept Design stage to be given for the use of shorter effective length pipes.
- The results of the desktop assessment indicate the study area has **very low risk of site instability**.
- 10 sites with a potential to impact the proposed pipeline alignment from a **contamination** risk were identified within the study area. See Figure 5.1.

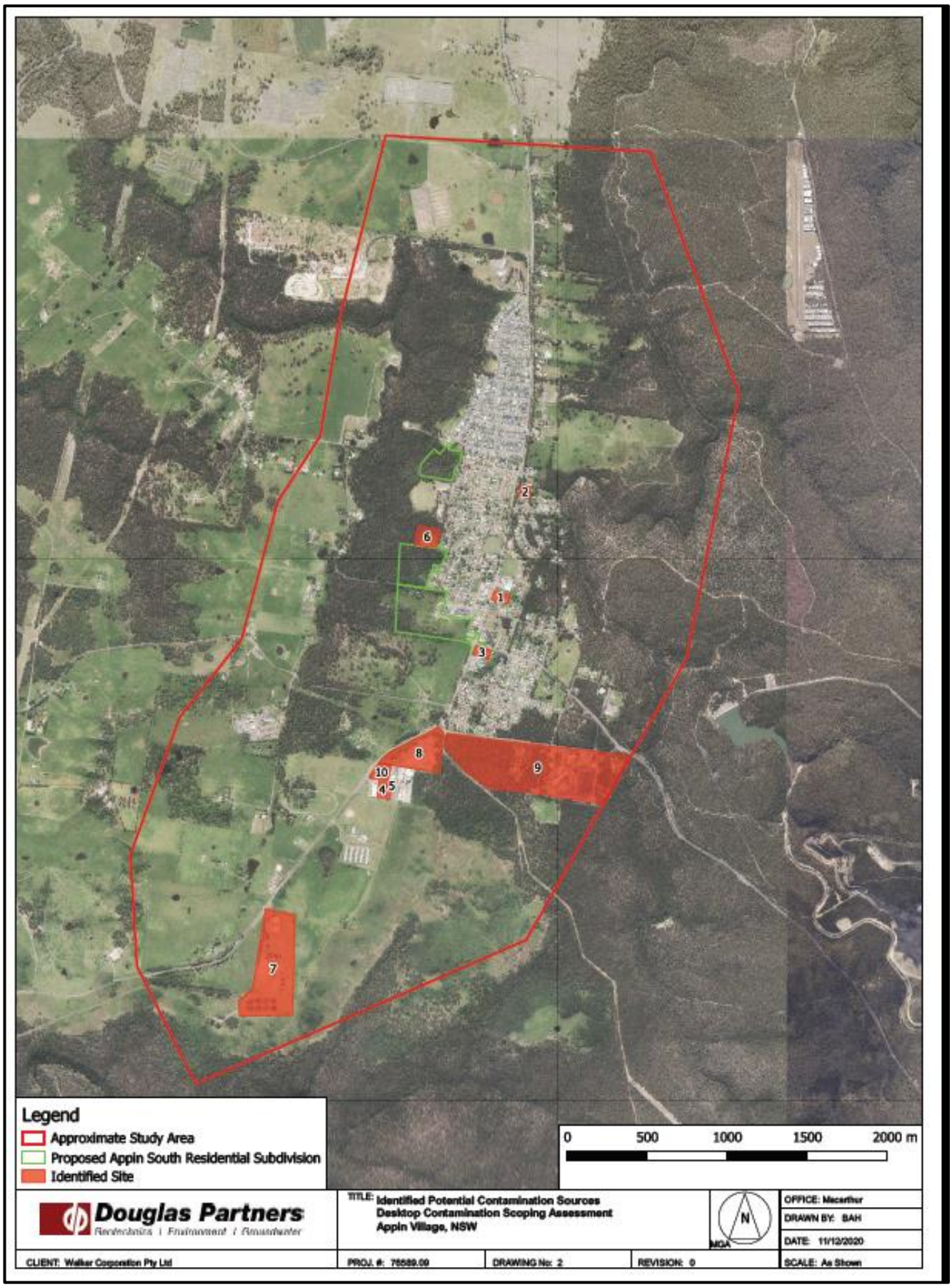


Figure 5.1 Potential Contamination Site (Source: Douglas Partners)

5.2 Assessment of Options

The following advice and findings only apply to Option 4b and should be considered in further detail during the concept design phase of the project to assist in identifying preferred construction methods.

5.2.1 Geotechnical

The results of the desktop geotechnical review suggest that subsurface conditions that are likely to be encountered along the proposed pipeline routes for Option 4b will include:

- Relatively shallow overburden soils;
- Shale, siltstone and sandstone bedrock, that typically increase in strength with depth;
- Relatively deep groundwater (probably greater than 3 m) within the bedrock, although seepage could occur at the clay/rock interface.

These conditions suggest that whilst the overburden soils will be relatively easy to excavate using conventional excavating plant, excavations extending into rock will require heavy ripping or hammering plant possibly with diamond saws to limit overbreak and vibrations in built-up areas.

Additionally, the following risk profiles apply to the proposed pipeline alignment:

- Low risk of site instability;
- Low probability of acid sulphate soils;
- Moderate potential of salinity.

Notwithstanding this, other than the margins of the watercourses, most of the study area is considered suitable for the installation of underground services.

5.2.2 Contamination

One site (Site 3) has been identified to have a potential impact on the proposed alignment for Options 4b from a contamination perspective. The site information is summarised in Table 5.1. Although this site (an existing Petrol Station) has been identified as having a potential for contaminants, this does not mean that the listed site is actually contaminated.

Table 5.1 Potential Contamination Sites along the Pipeline Route (Option 4b)

Map Reference Number (see Figure 5.1)	Potential Contaminants of Concern	Impacts on Options
3	Metals, TRH, BTEX and PAH	Potential impacts on the proposed pipeline alignment along Appin Rd

It is recommended that intrusive investigation and sampling may need to be completed during the concept design phase if considered appropriate by the Designer.

5.3 Conclusion

The desktop geotechnical and contamination assessment identified conditions and risks for the proposed pipeline alignment for Option 4b. Option 1 was not considered as part of the assessment as no excavation is proposed as part of this option. One potential contamination site was identified as being located close to the proposed pipeline alignment for Option 4b. Generally the assessment confirmed that the geotechnical conditions likely to be encountered are considered suitable for the installation of underground services.

Option 4b is also impacted by Mine Subsidence. During concept design, the Designer shall consider as part of the watermain design the movement associated with the predicted ground strain as provided by the Subsidence Advisory NSW.

It is recommended that additional site walkover assessments along the final preferred alignment followed by detailed intrusive investigations and sampling (if required) be undertaken during the concept design phase of the project.

6 External Stakeholder Engagement

6.1 Introduction

As part of the assessment approach to determine the preferred water supply option, key external stakeholders were contacted to seek their feedback on the short-listed servicing options. *MR Communications Services* were engaged to facilitate this process and the outcomes of the engagement report are summarised in this Section.

Only feedback for Option 4b was sought from the stakeholders as the proposed works for Option 1 did not require any new infrastructure being constructed. Option 1 is proposing upsizing pump units within an existing pump station facility located within the grounds of the Macarthur Water Filtration Plant.

The full Consultation Outcomes Report is shown in Appendix E.

6.2 Engagement Approach

Engagement activities for this stage of the project focused on informing key external stakeholders about the planned development and intended timing, identifying any additional potential growth that could be included as part of the servicing area (by Calibre Consulting) and understanding any servicing opportunities or constraints that should be considered during the options assessment process.

Targeted stakeholders included:

- Wollondilly Shire Council (planning team)
- Transport for NSW
- Department of Planning, Industry and Environment

Other stakeholders, such as energy and other utility providers, will be consulted during the design phase. If Option 1 is selected as the preferred option then engagement with the operators of the Macarthur Water Filtration Plant will be required.

Due to limitations on face-to-face meetings during the pandemic, *MR Communications Services* contacted each stakeholder by phone, and then email, to explain the servicing options and ask the following questions about the proposed location of new infrastructure:

1. *Do you have any feedback, questions or concerns about the general location of the planned new infrastructure in any of the attached diagrams? There may be existing or future planned assets in these areas that you would like us to consider before we finalise a preferred option and prepare our concept designs?*

2. *Do you have any current or upcoming maintenance/capital works projects in Appin South that we should know about? It's important that we consider coordination opportunities and potential constraints for our design work and construction planning.*

Follow up phone calls and emails were used to ensure timely feedback from each stakeholder.

6.3 Engagement Outcomes

The following summarises the feedback provided by each off the stakeholders contacted.

- **Transport for NSW** (Network and Assets, South Region). Feedback for Option 4b was that consideration be given to minimise the number of crossings under Appin Road and utilise underboring rather than trenching techniques for major road crossings. They reported no planned capital works or major maintenance programs for the study area.

- The **Department of Planning, Industry and Environment** (Water Group) raised issues relating to potential capacity constraints in Sydney Water's water and wastewater networks and highlighted the need to cater for other developments in the area. No concerns were raised with the current proposed location of new infrastructure however the Department's representative reinforced the need for an assessment of environmental impacts.
- **Wollondilly Shire Council**'s (Director of Planning) declined to provide comment at this stage of the planning process other than to express that Council looks forward to working with the applicant once their Development Application has been submitted. They also stated that the applicant will need to demonstrate a plan to work with Sydney Water regarding wastewater capacity to the site.
- **Subsidence Advisory NSW (SA NSW)** confirmed that the infrastructure falls in an area wholly within the Appin Mine Subsidence District. Even though mining has already occurred in this area, the area remains in an active coal lease. Applications for development (including infrastructure) must be lodged with SA NSW to receive formal design requirements.

6.4 Conclusion

None of the external stakeholders raised any concerns about the proposed water pipeline alignment based on the diagrams provided during the detailed planning phase. Each stakeholder expressed interest in reviewing more detailed plans during future project stages.

Stakeholders will be updated on the final preferred option and opportunities for further consultation at the end of the detailed planning process.

7 Refinement of Option 4b

7.1 Introduction

As a result of detailed assessments completed (hydraulic, environmental, geotechnical and stakeholder engagement), Option 4b was further refined. The proposed refined alignment is presented in this Section.

7.1.1 Refinement of Alignment

During the hydraulic assessment, a more optimal pipe alignment for the boosted watermain was selected. This was to minimise the head losses and the velocities along the existing 100mm boosted watermain as a result of extending the boosted area to Appin South and Brooks Point Road. The refined alignment compared to the original alignment is shown in Figure 7.1.

The preferred alignment for Option 4b is shown in Figure 7.2. This option proposes two watermain extensions to the servicing area:

Boosted Watermain ("A" to "E) - To supply the elevated areas (generally where GL > 241 m) it is proposed to extend from the existing 100mm boosted watermain along Appin Rd to the servicing area. The proposed watermain extension (DN150) is shown in Figure 7.2 and can be identified as "A" to "E" (shown in orange).

Watermain ("D" to "F") – To supply the lower areas (generally where GL <= 241 m) it is proposed to construct a new DN150 along the proposed road which will be constructed as part of Appin South (Stage 1) development. The proposed watermain (DN150) is shown in Figure 7.2 and can be identified as "D" to "F" (shown in purple).

Details of the proposed alignments are shown in Tables 7.1 and 7.2.

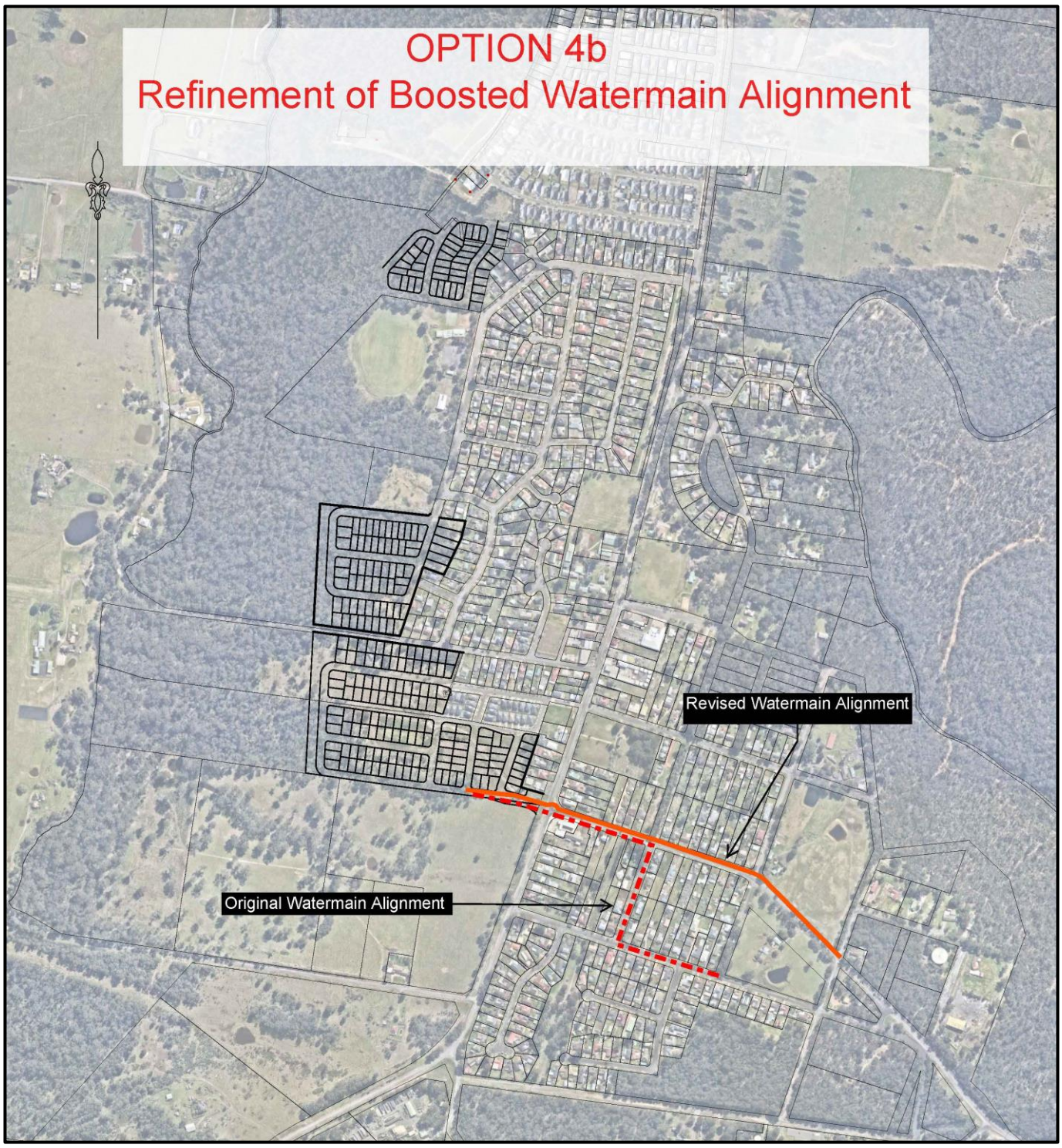


Figure 7.1 Refinement of Boosted Pipeline Alignment (Option 4b)

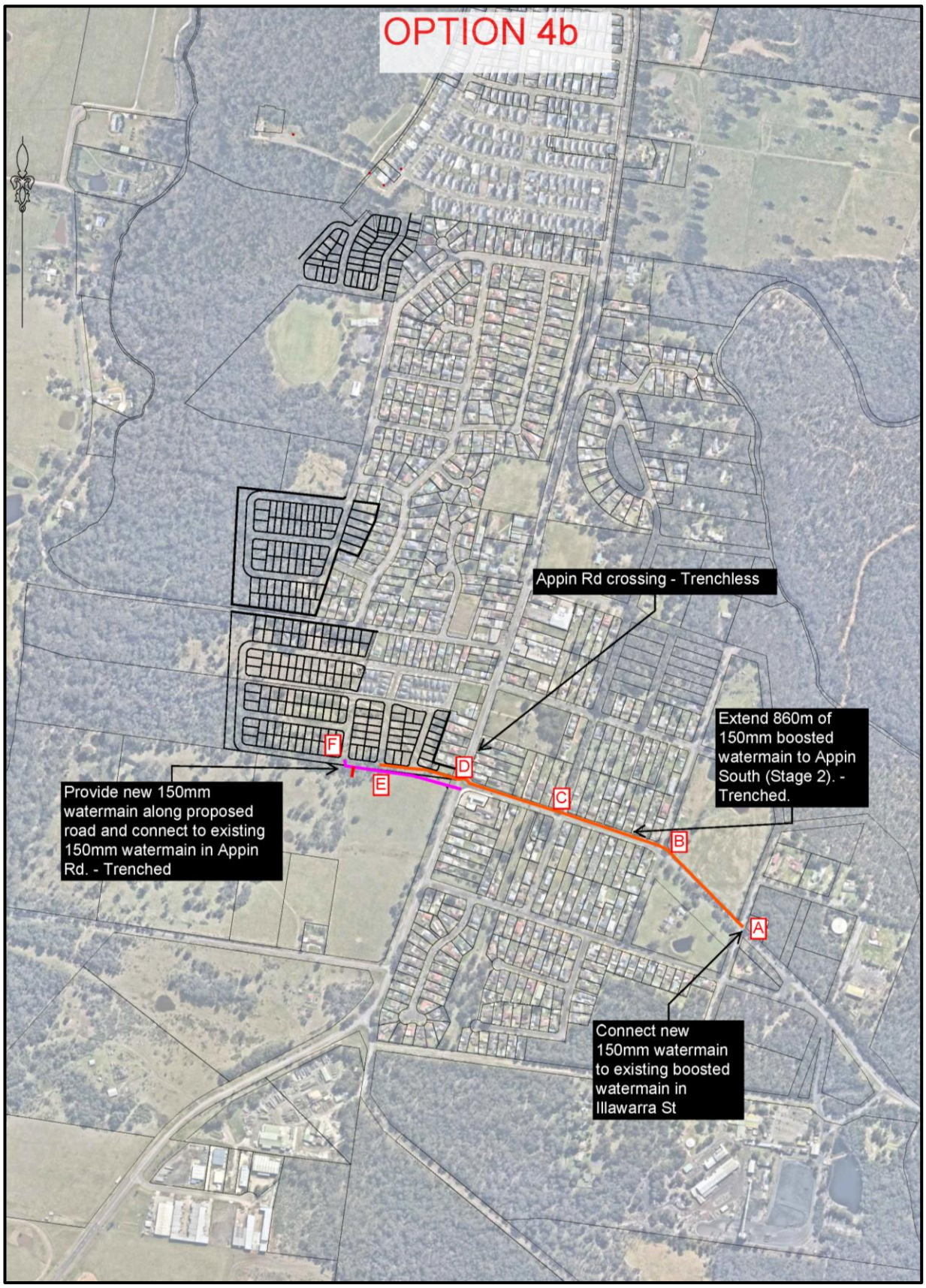


Figure 7.2 Proposed Pipeline Alignment (Option 4b)

Table 7.1 Proposed Watermain Alignment ("A" to "E") – Boosted Supply

Line No.	Asset Type	Location	Size (mm)	Length (m)	Construction Method	Description
A	Connection	Illawarra St (cnr of Appin Rd)	DN150	NA	NA	Connect to existing 150mm watermain (boosted supply)
A-B	Watermain	Appin Rd	DN150	235m	Open Trench	To be laid within the road reserve on the northern side of Appin Rd and if possible within Sydney Water's footway allocation. Avoid existing native vegetation by constructing within road shoulder if required. **See Photo A-B**
B-C	Watermain	Appin Rd	DN150	215m	Open Trench	To be laid within the road reserve on the northern side of Appin Rd and if possible within Sydney Water's footway allocation **See Photo B-C**
C-D	Watermain	Appin Rd	DN150	205m	Open Trench	To be laid within the road reserve on the northern side of Appin Rd and if possible within Sydney Water's footway allocation. **See Photo C-D**
D	Road Crossing	Appin Rd	DN150	~30m	Trenchless	Consider trenchless technology for road crossing to minimise disruption. **See Photo D-C**
D-E	Watermain	Proposed Road in Appin South (Stage 1)	DN150	175	Open Trench	To be laid within Sydney Water's footway allocation in the proposed road constructed as part of Stage 1. Provide future connection to Brooks Point Rd development. **See Photo D-E**
E	Connection	Proposed Road in Appin South (Stage 1)	DN150	NA	NA	Proposed Connection point to the future reticulation mains within Appin South (Stage 1)

Table 7.2 Proposed Watermain Alignment ("D" to "F") – Gravity Fed

Line No.	Asset Type	Location	Size (mm)	Length (m)	Construction Method	Description
D	Connection	Appin Rd (Eastern Side)	DN150	NA	NA	Connection to the existing 150mm watermain located in Appin Rd (gravity supply).
D	Road Crossing	Appin Rd	DN150	~30m	Trenchless	Consider trenchless technology for road crossing to minimise disruption. **See Photo D-C**
D-F	Watermain	Proposed Road in Appin South (Stage 1)	DN150	250m	Open Trench	To be laid within Sydney Water's footway allocation in the proposed road constructed as part of Stage 1. Provide future connection to Brooks Point Rd development. **See Photo D-E**
F	Connection	Proposed Road in Appin South (Stage 1)	DN100	NA	NA	Proposed connection point to the future reticulation mains within Appin South (Stage 1).

Table 7.3 Photos of Pipeline Alignment

	
Photo A-B – Looking west along Appin Rd from the corner Illawarra Rd.	**Photo B-C**– Looking west along Appin Rd from the corner of Burke St.
	
Photo C-D – Looking west along Appin Rd from the corner of Kennedy St.	**Photo D-C** – Looking east along Appin Rd from point “D”. Also shows proposed road crossing of Appin Rd.

	
Photo D-E – Looking west from point “D” towards the proposed road.	**Photo H1** – Heritage Site – St Marks Anglican Church, located on southern side of Appin Rd between points “C” and “D”.

8 Risk Assessment

8.1 Assessment Results

Calibre undertook a risk assessment in accordance with the Sydney Water's Corporate Risk Framework.

Although there are a large number of uncertainties, there are only a few select risks that will guide the decision making process for this project. The key risks identified are presented in Table 8.1 with the detailed risk assessment matrix attached in Appendix G.

Table 8.1 Risk Assessment

Risk	Risk Description ID	Option / Risk Level[1]	
		Option 1	Option 4B
1	Delays in servicing Appin South	High 2	**Low 6**
2	Construction impacts on Community	Low 6	Medium 4
3	Construction impacts on RMS/Council Assets	Low 6	Low 6
4	Construction impacts on other Utility Assets	Low 6	Low 6
5	Financial Cost Increases including Scope Creep and Mainbreaks	High 3	Medium 4
6	Safety Risks during Construction	Medium 4	Medium 4
7	Impact to Threatened Species	**Low 6**	Low 6
8	Impact on critically endangered ecological communities	**Low 6**	Medium 5
10	Impact from Mine Subsidence	**Low 6**	**Low 6**
11	Risk to Impacts to Waterways	**Low 6**	Medium 5
12	Land Contamination	**Low 6**	**Low 6**
13	Impact on Heritage Items	**Low 6**	Medium 4
14	Potential for Low Water Pressure Complaints	High 3	**Low 6**
17	Impact on future servicing	High 2	**Low 6**

Note: 1. Very High Risk Level (1), High Risk Level (2 & 3), Medium Risk Level (4 & 5) and Low Risk Level (6)

8.2 Conclusion

Option 4b is the option with the lowest risk profile. Option 1 has four (4) high risk items while Option 4b did not have any high risk items identified. The high risk items for Option 1 include a delay to servicing, potential pressure complaints from customers, significant scope creep and mainbreak risk (to existing inlet main to Appin Reservoir) associated with the temporary upgrade to WP302 and impacts on future servicing due to constraints on Appin Reservoir.

9 Financial Assessment (NPV Analysis)

9.1 Methodology

Sydney Water's ECON Ver8 lifecycle cost estimation tool was used to develop life cycle cost estimates for the short listed options. Life cycle costs include net present value (NPV) of capital, operation and maintenance costs. The following assumptions apply to this assessment:

- A discount rate of 5.3 % and an assessment period of 40 years.
- Capital expenditure, including direct, indirect
- Indirect costs to allow for Design Costs (10%), Contractor Indirects (20%), Contractor Margin (15%) & Risk Contingency (35%).
- An additional cost contingent risk allowance of $0.20M was applied to Option 1 due to a number of uncertainties at WP302 that were identified during the risk assessment (ie confirmation of space available for upsized pump units, additional effort in engaging with the owner of WP302 to plan and deliver the upgrade etc)**.**
- The new pump units proposed as part of Option 1 are considered interim only. It is assumed that by 2026, Sydney Water will have commissioned the new ultimate pump station to replace the existing WP302.

Capital and operating costs included in the model for each option are summarised in Table 9.1. Costs that are common for both options (eg reticulation costs and Section "D" to "F") have been excluded from the assessment as they are common for each option and therefore have no influence on the preferred outcome.

Capital costs (direct) for watermain infrastructure have been based on Sydney Water's cost estimating spreadsheet. A CAPEX contingency of 15% of the direct costs has also been allowed for. Indirect costs have been based on Sydney Water's cost estimating manual. A preliminary cost estimate for the upgrade of pumps to WP302 has been based on historical costs completed for similar type projects.

The operation & maintenance costs for each of the options are based on Sydney Water's *Operation & Maintenance Costs (Technical Information Sheet 1).*

9.2 Assessment Results

Capital costs for each of the two options are provided in Table 9.1. These estimates were based on refined alignment of the infrastructure as shown in Section 7. The preferred option will be modelled during the Concept Design stage and the sizing of the proposed infrastructure will be further optimised if required.

Table 9.1 provides a summary of the life cycle assessment for each option. The NPV assessment indicates that **Option 4b is the preferred option providing a total saving of $10,000 when compared to Option 1** over the 40 year study period at a discount rate of 5.3%. However, due to the accuracy of planning estimates used in the assessment (in the order of +- 35%), neither option can be decisively identified as the 'lowest cost' solution.

A copy of the financial assessment (ECONV8) is shown in Appendix F.

9.3 Sensitivity Analysis

The item that has the greatest risk of uncertainty in the cost estimate is the cost of the pump upgrade (for Option 1). An additional contingent risk allowance of $200,000 was provided for *risk and uncertainty* for this option. A sensitivity analysis was undertaken on a number of scenarios as follows:

- Scenario 1 – Remove the contingent risk allowance for Option 1.
- Scenario 2 – Increase the O&M costs by 50% for Option 4b.

- Scenario 3 – Realise Opportunity Cost for Option 4b to lay 250m of watermain in footway

Table 9.2 shows the revised net effects of the NPV for each scenario. The sensitivity assessment shows that under all cost scenarios assessed the per cent difference between the options ranges from 0.6% (Base) to 18% (Scenario 3).

Table 9.1 Cost Estimates

Option	Infrastructure	Asset ID	Capital Cost ($m)	Operation & Maintenance ($/yr)[1]	Net Present Value ($M)[4]	Ranking
Option 1 – Upgrade WP302	Supply and install 2 new pump units (16 MLD vs 40m), motors and associated pipework.	WP302	$1.40M	$21,460[5]	**$1.67 M**	**2**
	Construct 280m of DN150 watermain	D-F	$0.35M	$2,117		
	TOTAL		**$1.75M**	**$23,557/yr**		
Option 4b – Construct new boosted watermain	Construct 860m of DN150 watermain	A-B-C-D-E	$1.35M	$8,083		
	Construct 280m of DN150 watermain	D-F	$0.35M	$2,117	**$1.66 M**	**1**
	TOTAL		**$1.70M**	**$10,200/yr**		

Note: 1. Based on Sydney Water's Operation & Maintenance Costs (Information Sheet 1)
3. Cost Estimate for WP302 based on supply and install 2 pump units (16MLD vs 40m) with new motors, pipework and plinths. Also including an additional contingent risk allowance of $200,000 based on the risk assessment.
4. NPV calculated using Sydney Water's ECONV8 financial tool. Detailed results are shown in Appendix F.
5. Based on an estimated additional annual 86 MWhr of power being required.

Table 9.2 Sensitivity Assessment

Scenario	Description	NPV Net effect of Option 4b compared to Option 1	Changed in ranking from Base Case ?
Base Case	Cost Estimates as per Table 9.1	-$10,000	-
1	Remove Contingent Risk Allowance for Option 1	$168,000	Yes
2	Increase O&M costs for Booster (Option 4b) by 50%	$49,200	Yes
3	Realise opportunities to lay part of the watermain for Option 4b within the footway allocation (~250m)	-$279,000	No

Note: 1. The Base Case ($10,000) is the difference between the NPVs of Options 1 ($1.67m) and 4b ($1.66m) as shown in Table 9.1.

9.4 Conclusion

The results of the total life cycle assessment show that both **Option 1 and Option 4b perform very similarly in regards cost**. Option 4b provides savings of approximately $10,000 compared to Option 1 but this isn't considered significant considering the accuracy of the planning estimates used for the assessment. The sensitivity assessment indicates that the predicted lowest cost option is highly sensitive to the assumptions (inclusion of additional contingent risk allowance) and estimates (eg O&M) used in the assessment. Under all sensitivity scenarios, neither option can be decisively identified as the "lowest cost option" due to the accuracy of the planning estimates used in the assessment (being +- 35%).

10 Preferred Option

10.1 Description of Preferred Option

The preferred water supply option to service the Appin South and Brooks Point Road development sites is Option 4b. This option proposes to:

- Supply new lots within the development areas with a ground level higher than RL 241m (approx.) via the existing booster zone (WP418). This requires construction of 860m of DN150mm to be extended from the existing booster main to the development area. All customers within this boosted area will receive a minimum of 20m water pressure. An estimated 35 new lots from Appin South (Stage 1) and 30 lots from Brooks Point Rd will be connected to this boosted zone.

- Rezone existing lots adjacent to the development sites that have a ground level higher than RL 241m (approx.) to the new booster main. These customers generally front Sykes, King and Thomas Streets which lie adjacent to the Appin South development site. An estimated 25 existing lots are proposed to be rezoned to the boosted zone with a predicted improvement in water pressure of between 5 to 10m.

- Supply new lots within the development areas with a ground level of RL 241m (approx.) or lower via the existing gravity main directly from Appin Reservoir (ie 'unboosted'). This requires construction of 280m of DN150 along a new road proposed to be constructed as part of Stage 1 Appin South. Some minor reticulation extensions for Stages 2 and 3 of Appin South will also be required. All new customers within this 'unboosted' area will receive a minimum of 15m water pressure.

- Connect the proposed school (865 Appin Rd, Appin) to the existing DN150 boosted watermain located along Wilton Rd.

The proposed scheme layout including reticulation and minor connections is shown in Figure 10.1. Final location of DVs to be determined at concept design stage once final ground levels within the development sites are confirmed.

10.2 Justification of Preferred Option

Option 4b is the preferred option because it provides the optimal servicing solution for the lowest life cycle cost and acceptable risk.

Although the financial assessment concluded that neither option 1 or 4b could be considered decisively as having the "lowest life cycle cost", the assessment did show, based on the assumptions made, that Option 4b did provide savings of approximately $10,000 compared to Option 1. However, the risk assessment did confirm Option 4b as having the more acceptable risk profile compared to Option 1 particularly for timely provision of services, managing scope and cost creep, minimising poor water pressure complaints and impacts to servicing future growth. Option 4b also provides a better outcome in regards firefighting capability to the development areas, improving water pressure to a number of existing customers and is also consistent with the existing servicing strategy for Appin South ie the elevated areas be supplied via the WP418 boosted zone.

Option 4b provides approximately 9.1 hrs of response time (under 2026 maximum day of 13.9 MLD) in the event of a failure to the inlet works to Appin Reservoir. This equates to approximately 5.3 ML of reserve storage within the Appin Network which exceeds Sydney Waters normal requirement in providing a minimum of 4.6 ML (ie 8 hrs response time).

10.3 Concept Design Considerations

During the detailed planning phase to identify the preferred option, a number of issues were identified during the consultation process that should be considered and/or addressed during the concept design phase of the Project. These include:

- Liaise with Wollondilly Council to obtain any updated information on the planning proposal for Brooks Point Rd (eg change in development numbers, development area).
- The Designer is to liaise with Network Operations in regards the inclusion within the scope of work to upgrade the controls/RTU at WP418 to meet the current IICATS Standards.
- Confirm if Independent verification of the design of any infrastructure impacted by Mine Subsidence is required by an accredited/certified engineer.
- Further community and government agency consultation will be required.

10.4 Staging and Investment Plan

An indicative staging and investment plan for the proposed lead-in infrastructure is shown in Table 10.1.

Table 10.1 Staging and Investment Plan (excluding internal reticulation and minor connections)

Stage	Year	Servicing Area	Description	Asset ID	Capital Cost
1a	2022	Appin South (Stages 1 where GL > 241m)	860m of DN150mm watermain	A - E	$1.35M
1b	2022	Appin South (Stages 1 where GL <= 241m)	280m of DN150mm watermain	D - F	$0.35M
Total Capital Cost = $1.70Mv (~ $3107 per lot)					

10.5 Recommendation

It is recommended that Option 4b be approved to proceed to Concept Design and Environmental Planning Approval.

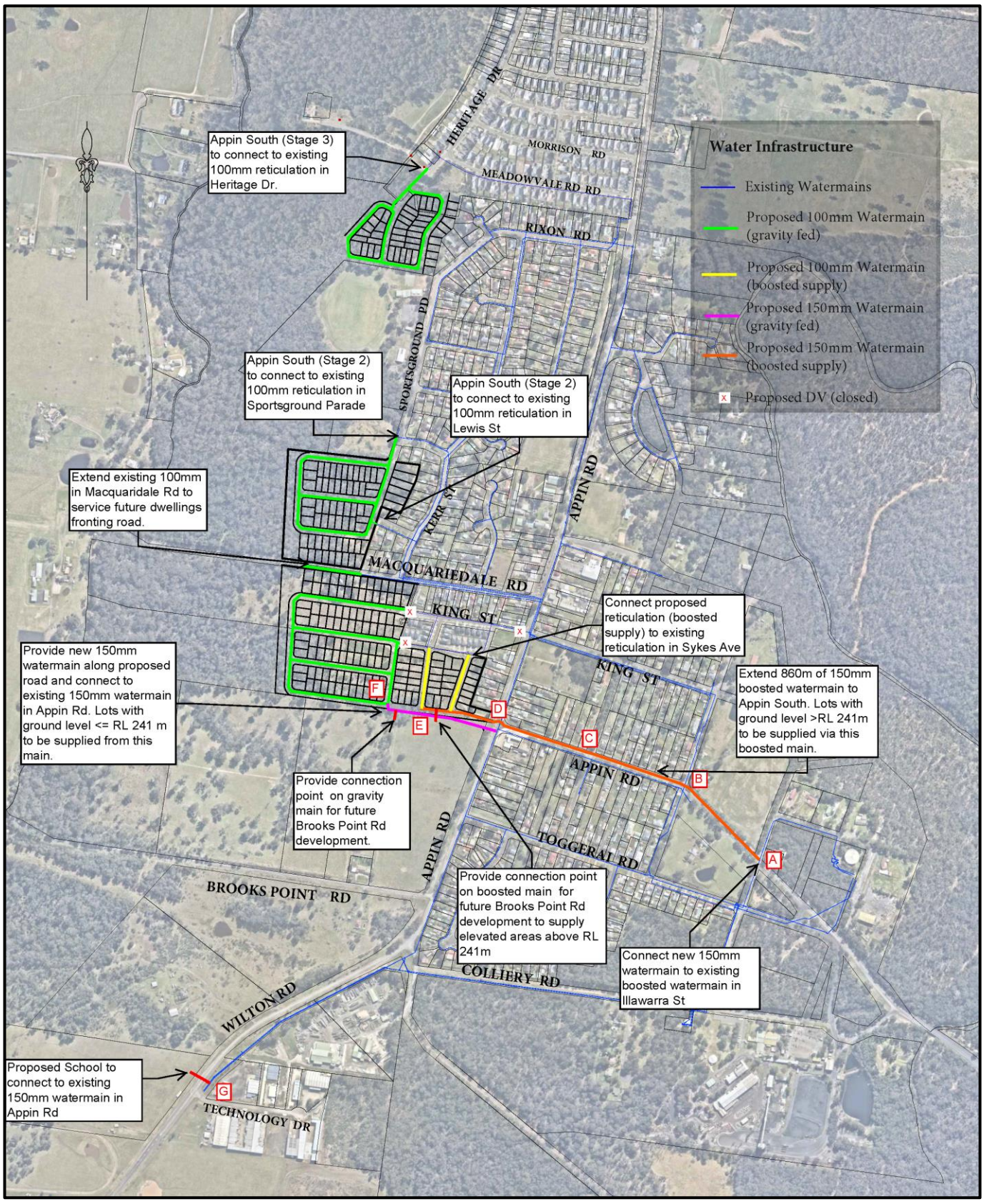


Figure 10.1 Preferred Water Supply Servicing Option

APPIN SOUTH WATER SUPPLY SERVICING PREFERRED OPTION

APPIN SOUTH WATER SUPPLY SERVICING PREFERRED OPTION

Appendix A Water Modelling Report

WALKER CORPORATION

APPIN SOUTH WATER SUPPLY SERVICING PREFERRED OPTION

Appendix B Environmental Constraints & Opportunities Report

WALKER CORPORATION

APPIN SOUTH WATER SUPPLY SERVICING PREFERRED OPTION

Appendix C Geotechnical Constraints & Opportunities Report

WALKER CORPORATION

APPIN SOUTH WATER SUPPLY SERVICING PREFERRED OPTION

Appendix D Mine Subsidence

WALKER CORPORATION

APPIN SOUTH WATER SUPPLY SERVICING PREFERRED OPTION

Appendix E Consultation Outcomes Report

WALKER CORPORATION

APPIN SOUTH WATER SUPPLY SERVICING PREFERRED OPTION

Appendix F EconV8 Assessment Results

WALKER CORPORATION

1. Capital Costs

Cost Estimating Sheet

Project: Appin South Detailed Planning

Job Name: Option 1 : Connect to existing network (Upgrade WP302)

Date: 13-May-21

Item No.	Year	Item Description	Scope Item	Funded By	Direct Costs	Indirect Costs	Total Project Cost
Appin Sth Stage 1	2023	Upgrade WP302	2 pump units (16 MLD vs 40m) + motor + some pipework	Developer	$500,000	$900,000	$1,400,000
Appin Sth Stage 1	2023	New 150mm along Macquariedale Rd to supply unboosted areas	200m	SWC	$129,733	$223,141	$352,874
						Project Cost (2023)	$1,752,874
						Total Project Cost	**$1,752,874**

Cost Estimating Sheet

Project: Appin South Detailed Planning

Job Name: Option 4b : Supply only elevated areas from WP418 via new 150mm leadin

Date: 13-May-21

Item No.	Year	Item Description	Scope Item	Funded By	Direct Costs	Indirect Costs	Total Project Cost
Appin Sth Stage 1	2023	Construct new 150mm lead-in	860m	SWC	$556,687	$790,496	$1,347,183
Appin Sth Stage 1	2023	New 150mm along Macquariedale Rd to supply unboosted areas	200m	SWC	$129,733	$223,141	$352,874
						Project Cost (2023)	$1,700,056
						Total Project Cost	**$1,700,056**

APPIN SOUTH WATER SUPPLY SERVICING PREFERRED OPTION

Appendix G Risk Assessment

WALKER CORPORATION

APPIN SOUTH WATER SUPPLY SERVICING PREFERRED OPTION

Appendix H Workshop Presentation & Minutes

WALKER CORPORATION

CONTACT US

CALIBRE GROUP

Level 2, 2 Burbank Place
Baulkham Hills NSW 2153
02 8808 5000

WWW.CALIBREGROUP.COM

APPENDIX E: ELECTRICAL SERVICES REPORT PREPARED BY POWERLINE DESIGN 4 OCTOBER 2022

powerlinedesign

Accredited Level 3 Service Provider NSW – 2486

ELECTRICAL SERVICES REPORT
10 BROOKS POINT ROAD APPIN

Report Prepared For:	Company: Beveridge Williams Contact: Mr Shane Gray Phone: 02 4625 5055
Location:	10 Brooks Point Road Appin
Supply Authority:	Endeavour Energy
Report Prepared By:	Laurence Mckinnon
Date:	4 October 2022
Reviewed By:	Laurence McKinnon
Reference No:	PLD4349
Version:	1.0

Table of Contents

1

Introduction

This report is to provide details on the existing electrical infrastructure available to 10 Brooks Road Appin and the likely works involved to meet Endeavour Energy's requirements should the site be developed for residential housing.

2 Location

The site is located at the intersection of Brooks Point Road and Appin Road Appin,

Comprising Lots 1, 3, 4 and 5 in DP249446 and Lot 1 in DP584515.

The centre of the site is approximately 1.2km from Endeavour Energy's Appin Zone Substation which is located in Brooks Point Road.

Endeavour Energy's 3 phase 11kv Feeder No. W112 extends past both the Brooks Point Road and Appin Road frontages to the site.

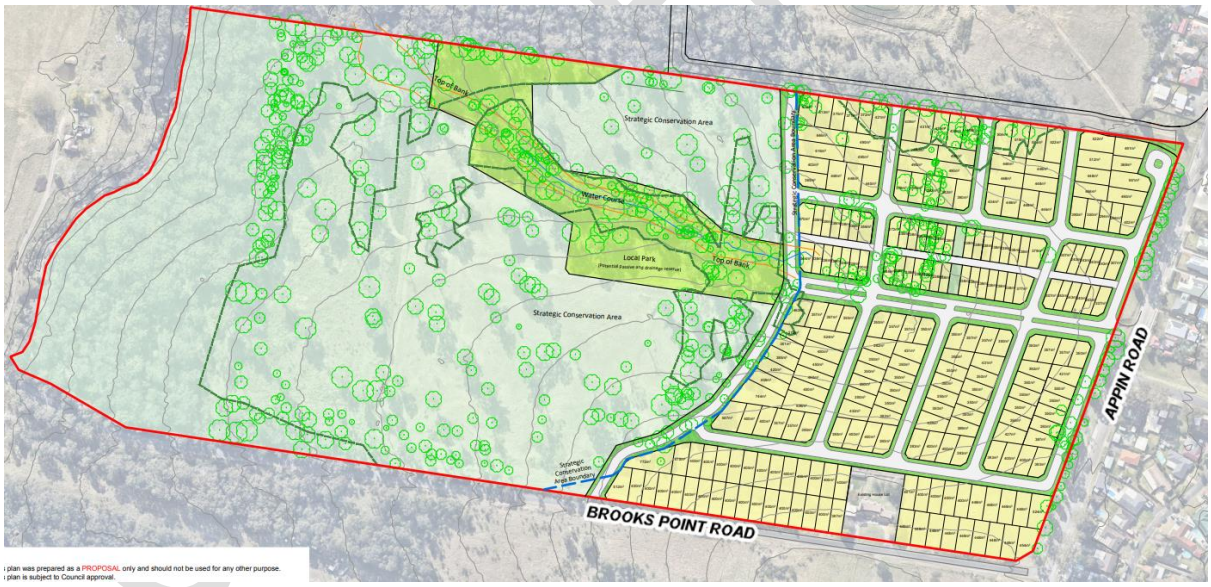
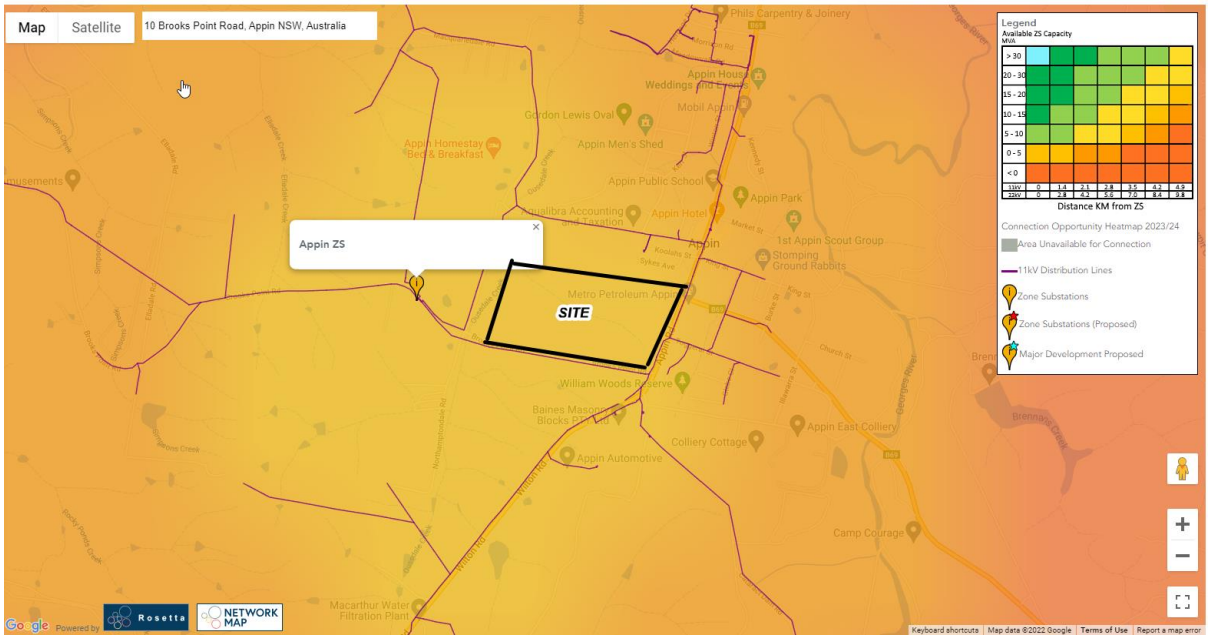


DIAGRAM 1 – PROPOSED SUBDIVISION LAYOUT

DIAGRAM 2 – ENEAVOUR ENERGY'S HIGH VOLTAGE NETWORK

3 Electricity Supply Requirements

Endeavour Energy's Connection Opportunity Heat Map 2023-2024 shows an available capacity for future load of 0-5MVA at this site (see below);



Based on a yield for the site of 244 Residential Lots and allowing an After Diversity Maximum Demand of 6.5kva per Lot in line with Endeavour Energy's requirements (TB 0188A) the total load for the site will be in the vicinity of 1,586kva (1.6MVA).

Endeavour Energy will provide connection requirements for the subdivision with a Supply Offer once an application has been submitted (refer FPJ6010).

The total load for the site will be supplied by 3 or 4 strategically placed Pad Mount Substations within the development.

All new cabling within the development will be placed underground, (Ref MDI0028 extract below), and lighting will be installed to comply with the local Council Requirements and AS/NZS 1158.

3.3 URBAN AREAS

Reticulation of all new and redeveloped residential, commercial, industrial and town centre developments are to be underground. Where this new reticulation is located within a nominated development precinct plan and the surrounding network is proposed to be progressively undergrounded, all existing distribution overhead assets are to be removed.

Where conduits are required, adequate spare conduits and suitable easements must be provided at the outset to cover the final load requirements of the entire development precinct plan.

Extensions to the existing 11kV/22kV network must be underground. Bare overhead wire construction may be used for conductor replacements and augmentations except in heavily treed areas where CCT or NMSHVABC must be used.

Extensions to the existing overhead LV network and augmentations must either be underground or ABC.

In non-bushfire prone areas, new lines within existing overhead areas can be overhead, unless underground lines are cost or environmentally justified or required by the local council.

Where all existing overhead electrical assets are to be removed and there are overhead communications assets attached to Endeavour Energy poles, the developer must advise the communications provider and underground the assets where directed to do so through the Request to Connect process and development application for the subdivision.

4 Funding & Reimbursements

Endeavour Energy's Customer Connection Policy will require that all distribution works are Customer Funded. The design and construction of a new 11kv mains, augmentation work's and the creation of easements will be customer funded.

4.1 Conclusion

The following preliminary advice is subject to feedback and confirmation from Endeavour Energy with the issuing of their Supply Offer.

This report is based on available data and Power Line Design's many years of experience in the electrical distribution Industry.

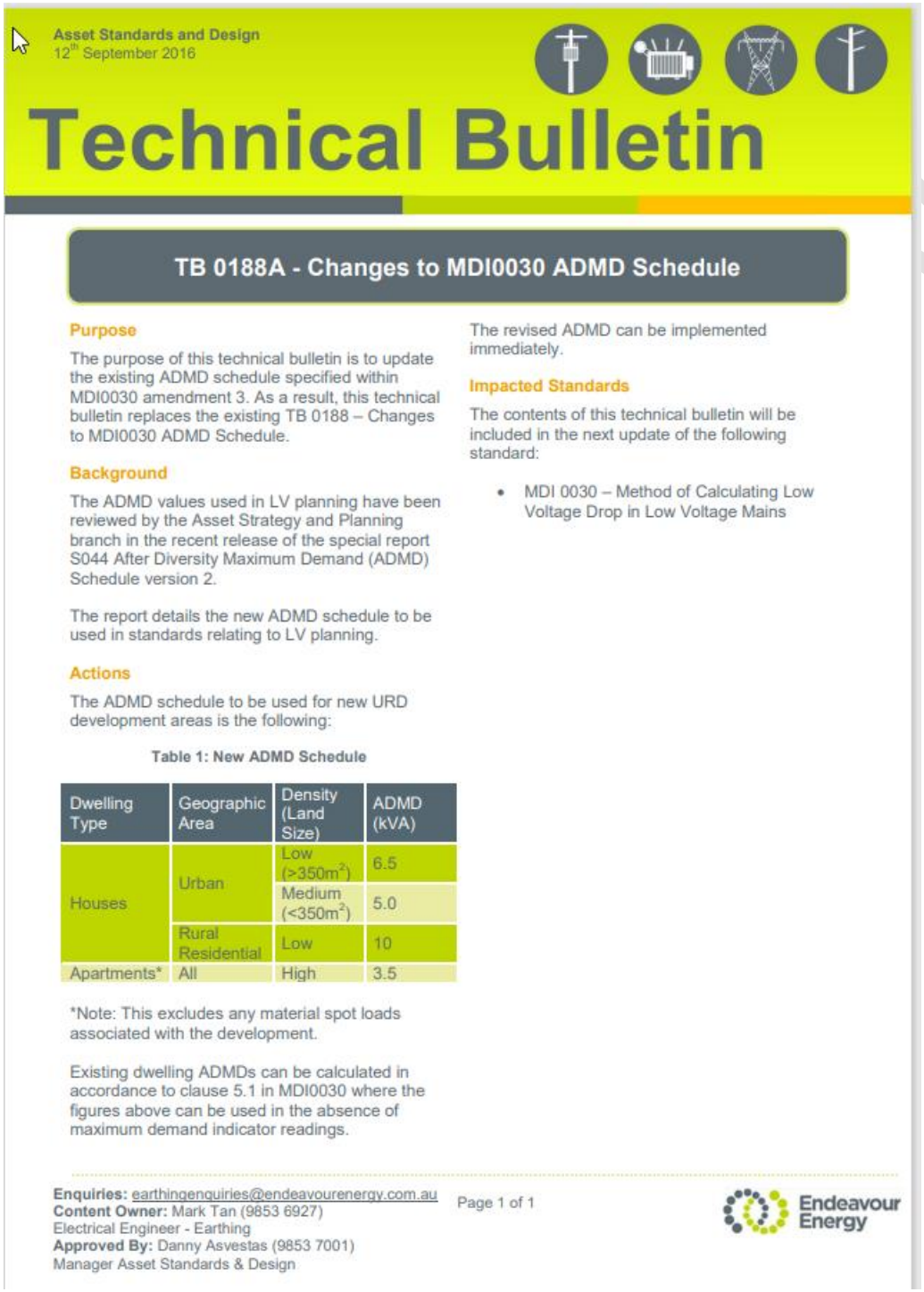
The close proximity of this site to Endeavour Energy's Appin Zone Substation and nearby access to existing Endeavour Energy 11kv Feeders makes this site well situated in respect to the connection of Endeavour Energy's network to supply the 244 proposed residential building blocks.

4.2 Disclaimer

Please note that this report is based on experience and current Endeavour Energy standards. There may be alterations based on Endeavour Energy's network requirements at the time of the design and construction.

There may be alterations depending on any adjacent developments superseding the proposed development, developer planning and design alterations, or changes to relevant standards once the electrical reticulation design is submitted for certification or during the construction phase.

This report has been prepared with every effort made to ensure its accuracy, neither Power Line Design Pty Ltd nor any of its employees shall be liable on any ground whatsoever to any party in respect of decisions or actions taken as a result of this report. This report is subject to the conditions at the time of the report, as a result this report is only valid for a period of up to 31 days after which the report findings should be reviewed.



Asset Standards and Design
12th September 2016

Technical Bulletin

TB 0188A - Changes to MDI0030 ADMD Schedule

Purpose

The purpose of this technical bulletin is to update the existing ADMD schedule specified within MDI0030 amendment 3. As a result, this technical bulletin replaces the existing TB 0188 – Changes to MDI0030 ADMD Schedule.

Background

The ADMD values used in LV planning have been reviewed by the Asset Strategy and Planning branch in the recent release of the special report S044 After Diversity Maximum Demand (ADMD) Schedule version 2.

The report details the new ADMD schedule to be used in standards relating to LV planning.

Actions

The ADMD schedule to be used for new URD development areas is the following:

Table 1: New ADMD Schedule

Dwelling Type	Geographic Area	Density (Land Size)	ADMD (kVA)
Houses	Urban	Low (>350m^2)	6.5
		Medium (<350m^2)	5.0
	Rural Residential	Low	10
Apartments*	All	High	3.5

*Note: This excludes any material spot loads associated with the development.

Existing dwelling ADMDs can be calculated in accordance to clause 5.1 in MDI0030 where the figures above can be used in the absence of maximum demand indicator readings.

The revised ADMD can be implemented immediately.

Impacted Standards

The contents of this technical bulletin will be included in the next update of the following standard:

- MDI 0030 – Method of Calculating Low Voltage Drop in Low Voltage Mains

Enquiries: earthingenquiries@endeavourenergy.com.au
Content Owner: Mark Tan (9853 6927)
Electrical Engineer - Earthing
Approved By: Danny Asvestas (9853 7001)
Manager Asset Standards & Design

Page 1 of 1

Endeavour Energy

FPJ6010

Endeavour Energy

Application for Provision of an Electricity Network in a Subdivision / Boundary Adjustment / Consolidation (Excluding Strata Subdivision)

Application Type: ☐ Subdivision ☐ Boundary Adjustment ☐ Consolidation

Please return completed form along with all attachments to: Endeavour Energy, PO Box 811 Seven Hills NSW 1730
Email: cwadmin@endeavourenergy.com.au | **Fax:** 02 9853 7925 | For connection enquiries, please contact 133 718

Note: All information requested should be provided. Where not applicable please insert N/A. Application submitted with inadequate information will not be accepted.

Site Details

Date supply of electricity is required ___/___/___

Type of subdivision
☐ Urban Residential ☐ Non-Urban Residential (Rural)
☐ Dual Occupancy Torrens ☐ Community Title
☐ Industrial ☐ Torrens
☐ Integrated Housing ☐ Commercial

Lot & DP No. ___/_____ Street No._____ Street Name _____

Cross Street _____ Suburb / Town _____ Post Code_____

Local Council / Shire _____ UBD Map & Reference No. _____/_____

Development Details

Council land zoning_____

Lot numbers of new single dwellings _____ Total _____

Lot numbers of existing dwellings to be retained _____ Total _____

Lot numbers of multiple dwelling areas _____ No. of units _____

Lot numbers of dual occupancy lots _____ Total _____

Lot numbers of residue lots _____

Lot numbers of special use areas (include details if any) _____

Lot numbers of public reserves, road reserves, etc _____

Lots affected by existing overhead power _____
line easements (also show on plan) _____

Community Title *(where applicable)* - maximum living floor area permitted by Council _____

Developer / Developer's Representative Details

Developer's Name _____

Developer's Representative (if applicable) _____

Developer / Developer's Representative Reference Number for correspondence _____

Address for correspondence _____
_____ Post Code _____

Mobile: _____ Telephone: _____ Fax: _____

Email _____

Developer / Developer's Representative Acknowledgement and Agreement

I acknowledge and agree that:

1. in signing and submitting this application I am requesting an expedited connection;
2. I have read and understood the terms of Endeavour Energy's Model Standing Offer for a Standard Connection Service (Subdivision and Asset Relocation), as published on its website at **www.endeavourenergy.com.au**, and a connection offer by Endeavour Energy for a Standard Connection Service (Subdivision and Asset Relocation) on the terms of that Model Standing Offer is acceptable to me; and
3. if Endeavour Energy is satisfied that the service requested by me falls within the terms of Endeavour Energy's Model Standing Offer for a Standard Connection Service (Subdivision and Asset Relocation), then I will be taken to have accepted a connection offer by Endeavour Energy on the terms of that Model Standing Offer on the date that Endeavour Energy receives this application.

Developer / Developer's Representative Signature:

_____ Date: ____/____/____

* **Do you consent to the release of your contact details to other customers with similar works in progress nearby to facilitate co-operation in design and construction activities.** ☐ **Yes** ☐ **No**

APPENDIX F: NBN/TELSTRA INFRASTRUCTURE REPORT BROOKS POINT ROAD APPIN NSW PREPARED BY COMMUNICATIONS EXCAVATIONS 13 OCTOBER 2022

NBN / Telstra Infrastructure Report
Brooks Point Rd Appin NSW

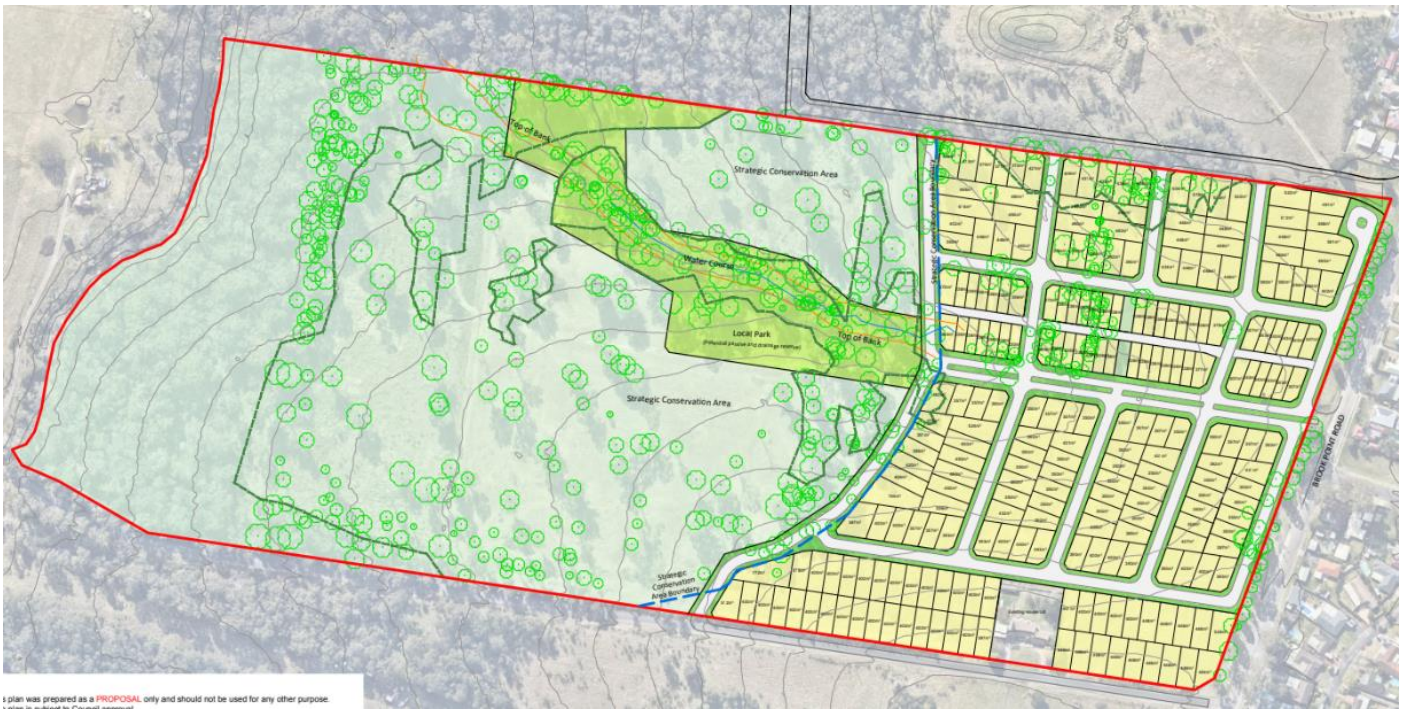


Figure 1: Proposed Brooks Point Road Appin Development masterplan.

NBN Availability, Capacity and Technology:

Currently, the Brooks Point Appin development site is sitting outside of the NBN fixed line footprint and sits within their Satellite & Wireless network footprint. The site is however it is directly adjacent to NBN's fixed line footprint on Appin Road. (see Figure 2, snapshot of NBN rollout map).

NBN commercially reviews any development application outside of their fixed line footprint with their main deciding factors for approval being lot yield and the cost to bring fibre optic cables to the development.

As the proposed development site is directly adjacent to NBN fixed line footprint and the lot yield is significant, NBN will accept and approve a development application for Brooks Point Road Appin. The lot yield meets the minimum NBN requirements as its less than 1km from the NBN fixed line footprint.

NBN has already serviced nearby developments in Appin with their optical fibre network with download speeds capable of up to 1Gbps. The same fibre technology will be used for this development with the same download speeds capable of 1Gbps.

NBN may potentially request a developer contribution for the backhaul costs however this is extremely unlikely and can normally be negotiated back to zero cost if the lot yield is over 100 lots. NBN may also provide a discounted lot rate for this proposed development as its yield and is over 100 lots. Discounts may be up to 20% of their standard $600 per lot rate. A feasibility application can be made to NBN to confirm their lot rate and potential backhaul costs without any NBN charges to the client (allow several weeks for turnaround with NBN).

In summary, NBN is extremely likely to provide Fibre Optic network capable of 1Gbps to this proposed development with reduced lot rates of $600 per lot. NBN will provide network with sufficient capacity to the development with little or no additional backhaul charges to the developer (subject to final lot yield).

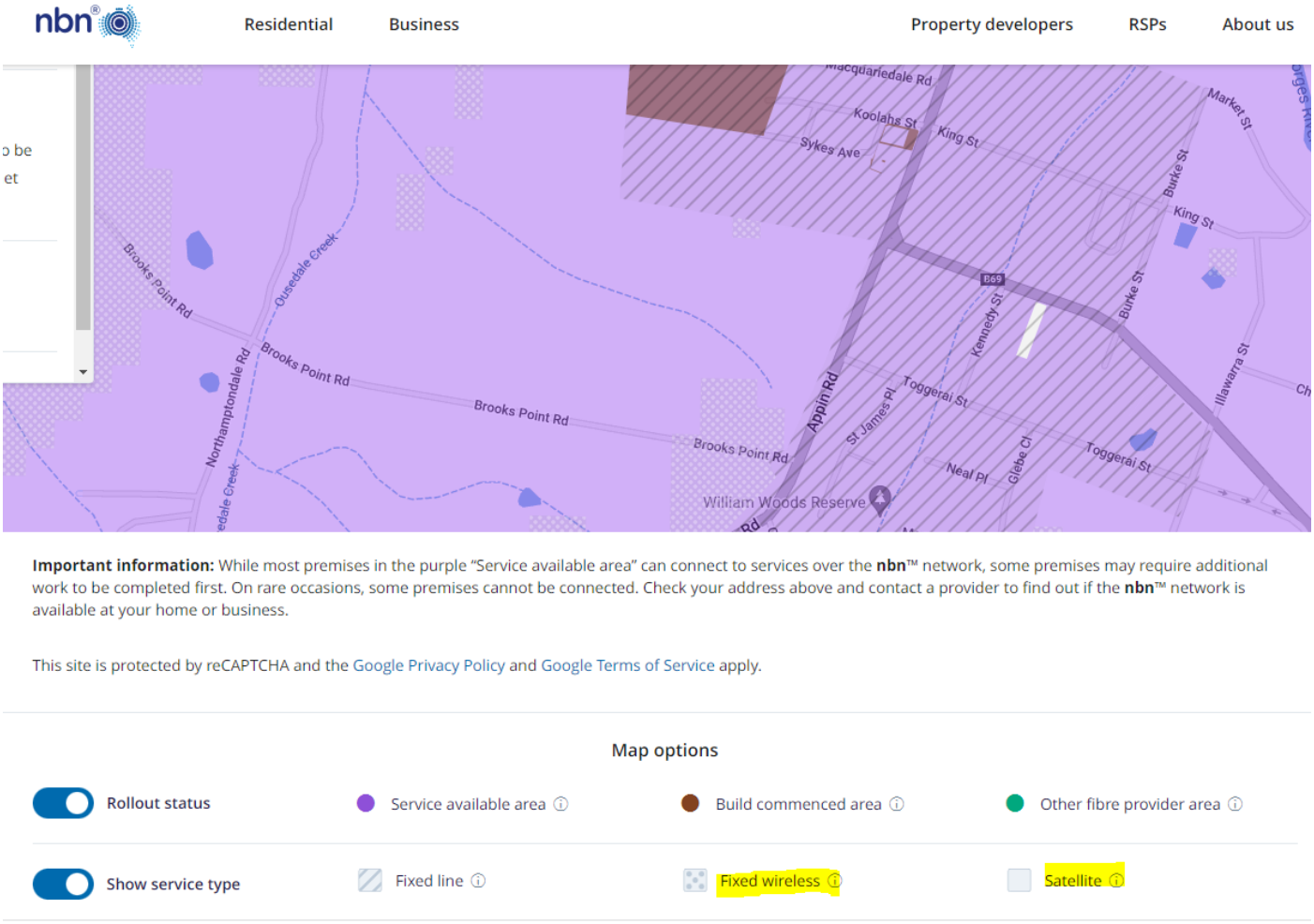


Figure 2: NBN rollout Map showing NBN Satellite / Wireless Footprint – Dated 13th October 2022

Existing Telstra Infrastructure:

At of the time of field inspection 12th October 2022, the only existing underground telecommunication networks within the development frontage of this proposed development is from the corner of Brooks Point & Appin Roads and continues approximately 350 metres along Brooks Point Road. The underground telecommunications network along brooks point road is owned by Telstra and no evidence was found of any another Telecommunications infrastructure provider. The majority of this underground Telstra network was found to be buried and covered by long grass during the field inspection (The affected Telstra network is highlighted on the Telstra dial plans from figure 3 below).

Note: New telecommunication networks maybe installed along any of these development frontages in the council verge at any time without notification to the land owners of the Brooks Point Road Appin development site.

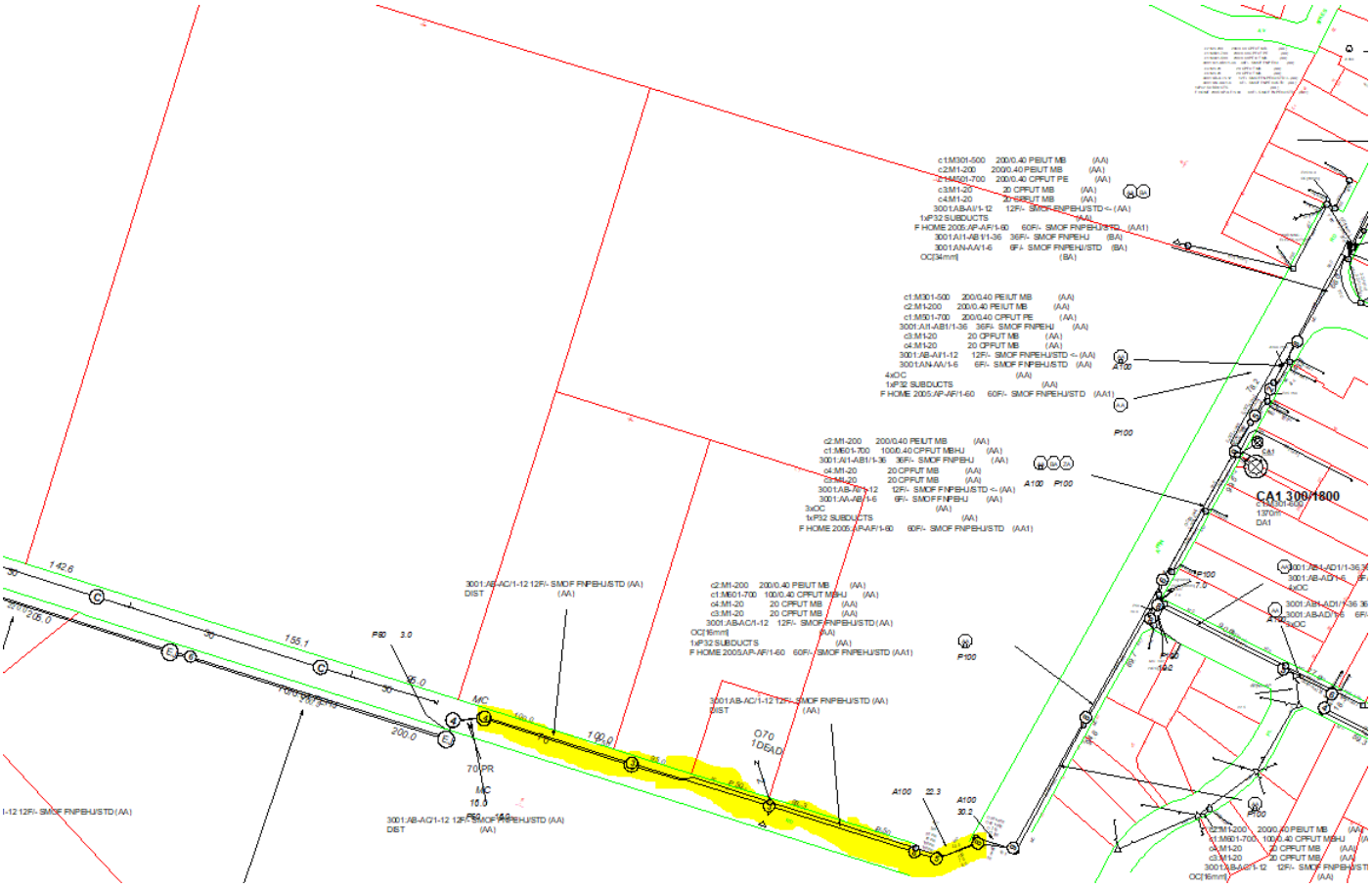
Potential Telstra Relocations:

If the existing Telstra pit and pipe needs to be relocated to a new alignment, depth or location, this will need to be quoted directly by Telstra.

If the Telstra pit and pipe network along the frontage of Brooks Point Appin road requires relocation, it is estimated to cost up within the vicinity of $50K if the new trenching is supplied by the Developers civil contractor.

Allow a minimum of 6 months to relocate the Telstra network along Brooks Point Road.

Figure 3 - Telstra Dial Before You Dig plan showing network along Brooks Point & Appin Rd's – Dated 13th July 2022.



Report Completed by Peter Rule at Comex: 13th October 2022.

Peter Rule

0409 164 251

peter@comex.net.au

Communication Excavations