



## **Servicing Due Diligence Report Yellow Rock Re-zoning**

**Lots 15, 16, 17 & 25, DP 111195 – Yellow Rock Road (Dunster Farm); and Lot 1, DP724362, Lot 1, DP 1089387, & Lot 11, DP 1124665 – Yellow Rock Road (Kemister Property)**

**REPORT**

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# REPORT

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## Activity Schedule

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# 1. INTRODUCTION

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## 1.1 Executive Summary

Northrop Consulting Engineers have been engaged by Urbanco Group on behalf of landowners Bruce and Kemister to prepare a Services Due Diligence Report to support assessment of potential development of a site defined as Lots 15, 16, 17 & 25, DP 111195 – Yellow Rock Road (Dunster Farm); and Lot 1, DP724362, Lot 1, DP 1089387, & Lot 11, DP 1124665 – Yellow Rock Road (Kemister Property).

The investigations for this Engineering Due Diligence Report primarily focused on the following objectives:

- Identify potential opportunities and site constraints;
- Identify the location, size and capacity of all existing services within the vicinity of the proposed site;
- Identify utility confirmation for the subject site.
- Identify options to service the site to support the proposed development.

## 1.2 Limitations and Exclusions

- Our assessment is based upon Dial Before You Dig (DBYD) documentation as well as correspondence with Authorities, and documentation provided by the Client.
- The calculations found in this report are based on the conceptual plans provided by the client.

## 1.3 Abbreviations

- |  |                                     |
|--|-------------------------------------|
| • AAAC – All Aluminium Alloy Conductor | • kVA – Kilovolt Ampere             |
| • AAC – Aerial Aluminium Conductor     | • LV – Low Voltage                  |
| • DBYD – Dial Before You Dig           | • MJ – Mega Joule                   |
| • DN – Diameter Nominal                | • NY – Nylon                        |
| • EE – Endeavour Energy                | • OH – Overhead                     |
| • HV – High Voltage                    | • WSC – Water Servicing Coordinator |
| • kPa – Kilopascals                    |                                     |

## 2. EXISTING SITE DESCRIPTION

The study site is located at Lots 15, 16, 17 & 25, DP 111195 – Yellow Rock Road (Dunster Farm); and Lot 1, DP724362, Lot 1, DP 1089387, & Lot 11, DP 1124665 – Yellow Rock Road (Kemister Property) and is situated within the Shellharbour City LGA. The subject site has an area of approximately 160Ha and is anticipated to accommodate 200-250 large lots and environmental living lots.

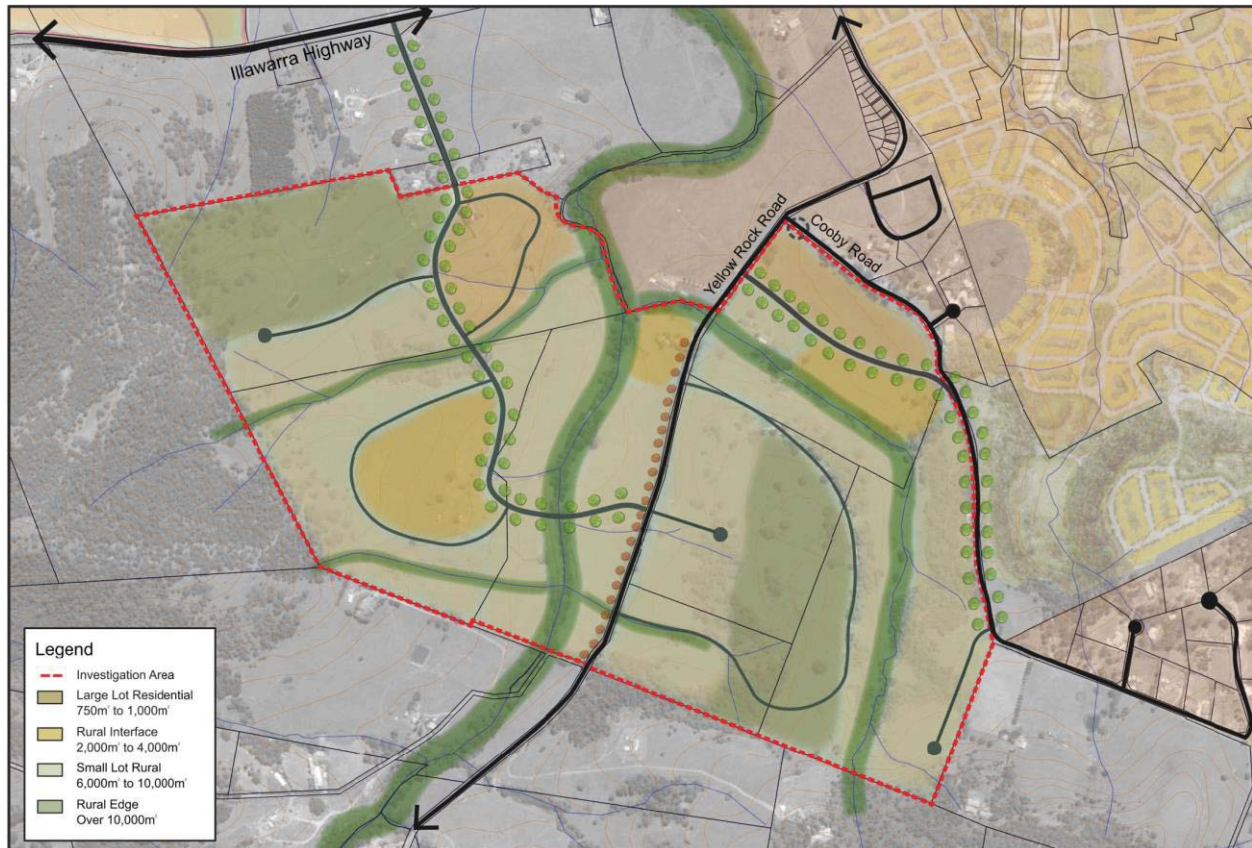


Figure 1: Site Location

### 3. EXISTING INFRASTRUCTURE

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Northrop has performed desktop investigations in regards to the existing site conditions and additional loading from the proposed development onto the existing utility infrastructure available for connection to the site.

Our assessment has been based on information provided by the relevant water, sewer, natural gas, and electricity utility authorities.

#### 3.1 Existing Sewer Infrastructure

Existing Sydney Water sewer assets do not currently extend to the subject site, as follows:

- DN150 Sydney Water sewer main terminates within 84 Yellow Rock Road, Tullimbah at the rear of the site.
- DN225 Sydney Water sewer main within the corner of Yellow Rock Road and Illawara Highway.

Refer Appendix A for details.

#### 3.2 Existing Water Infrastructure

Existing Sydney Water assets do not currently extend to the subject site, as follows:

- DN100 Sydney Water main terminates within Yellow Rock Road outside the north-eastern boundary of the site.

Refer Appendix A for details.

#### 3.3 Existing Natural Gas Infrastructure

Existing Jemena natural gas assets do not currently extend to the subject site, as follows:

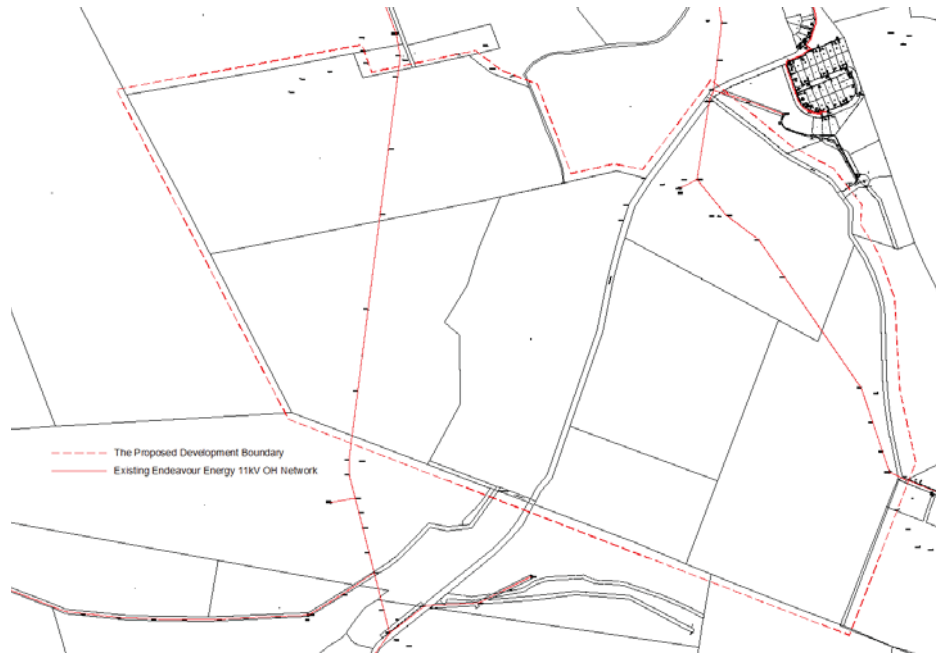
- A DN32 NY 210kPa Jemena natural gas main terminating at the corner of Yellow Rock Road and Prop Road.

Refer Appendix B for details.

#### 3.4 Existing Power Supply Infrastructure

The site is not encumbered by any high voltage transmission line, which would normally require an assessment.

There is an existing power infrastructure which is owned and maintained by Endeavour Energy as shown in figure 2.



*Figure 2: 11kV Network Overview*

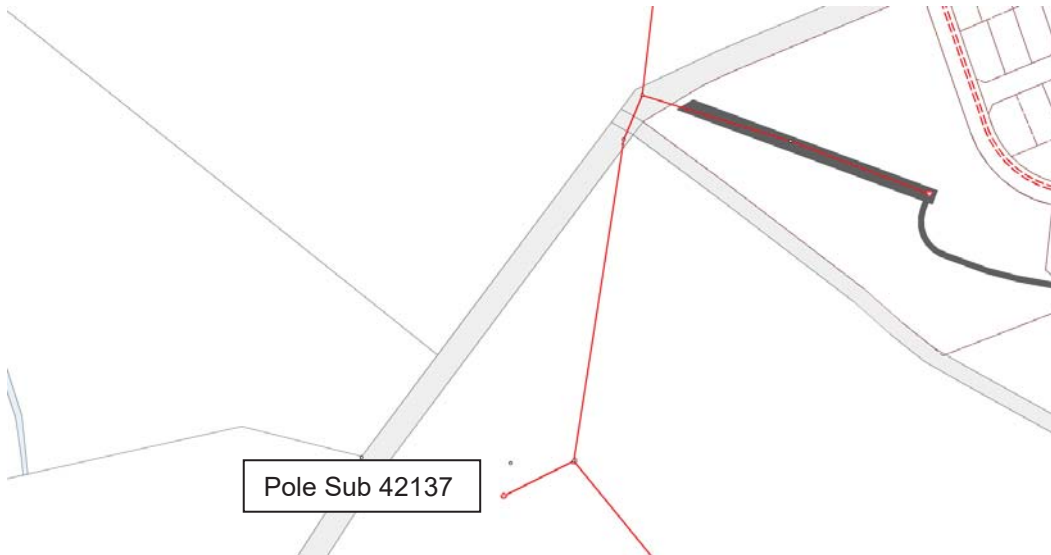
Figure 2 shows that there are two sets of existing 11kV overhead mains running across the proposed development site, both HV mains are part of the HV Feeder “ALBION PARK - Albion Pk Wst (APC2/A) & Jamberoo Rd (APC2/B) - APC2 “.

The conductor type of the OH HV mains running from Tullimbar Ln towards south to Green Mountain Rd is “7/4.50 AAC (7/0.173) Mercury (Wasp)”. There are no other HV assets with OH mains within proposed development site.

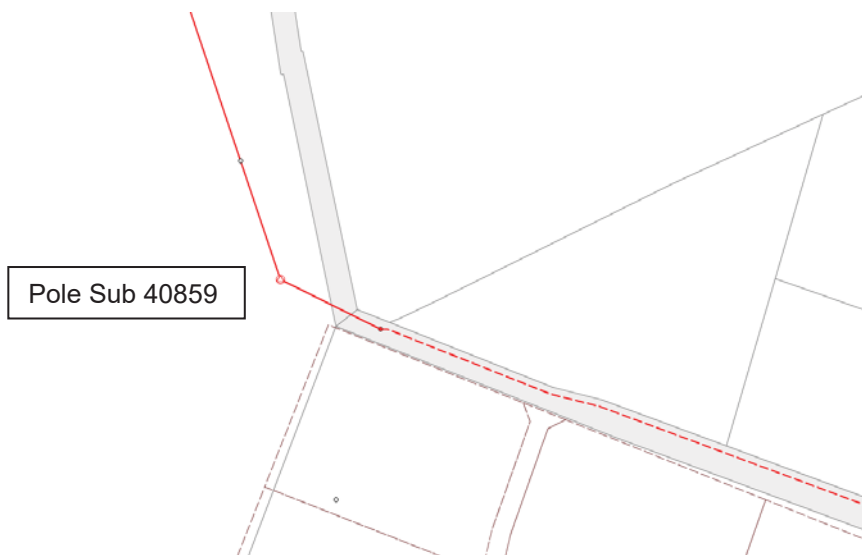
The conductor type of the OH HV mains running from corner of Yellow Rock Rd & Cooby Rd towards south is “7/1.75 HDCU (7/0.064) (OH)”, there are some HV assets exist with OH mains within the proposed development site, as follows:

1. HV Drop Out Fuse A1777 on pole 4GD013 near corner of Yellow Rock Rd & Cooby Rd (Figure 3)
2. Pole top Substation 42137 (approx. 260m south from corner of Yellow Rock Rd & Cooby Rd) (Figure 4) - transformer size to be confirmed by Endeavour Energy (typical rural pole sub transformer size is less than 200kVA)
3. Pole-top Substation 40859 (near 121 Cooby Rd corner) – transformer size to be confirmed by Endeavour Energy (Figure 4)





*Figure 3: Pole-top Substation 42137 HV Network*



*Figure 4: Pole-top Substation 40859 HV Network*



## 4. DEMAND CALCULATIONS

The anticipated demand is based upon the expected water, gas and sewer drainage loads for the proposed 250 lot development. The calculations factor in probable simultaneous demands of fixture usage during peak periods.

Electrical Power Supply		
No. of Lots	Total Demand*	Supply Size Required
250	1,750 kVA	Approx. 4 x 500 kVA Substation

Sanitary Plumbing and Drainage		
No. of Lots	Total Demand*	Supply Size Required
250	4550 Fixture Units*	DN225

\*Note: Sydney Water's requirement for 20% diversity factor has been allowed for.

Potable Cold Water		
No. of Lots	Total Demand*	Supply Size Required
250	14.70 L/sec*	DN200

\*Note: Sydney Water's requirement for 20% diversity factor has been allowed for.

Natural Gas		
No. of Lots	Total Demand*	Supply Size Required
250	5,000 MJ/hr*	DN32 at 210 kPa

\*Note: Jemena's requirement for 20% diversity factor has been allowed for.

Refer to Appendix C for further details of demand calculations.

## 5. PROPOSED SERVICES

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Section 3 of this report identifies the existing infrastructure and services within the vicinity of the subject site at this point in time. We note that the adjoining land holdings to the east along Yellow Rock Road have recently been rezoned for residential development. Existing servicing infrastructure would most likely be extended to service the proposed residential development within these properties subject to authority approval.

The proposed servicing strategy outlined below is based on this existing services infrastructure. However the proposed extension of services to the adjoining land holdings, subject to authority approval would enable direct servicing of the lots in the future.

### 5.1 Sewer Infrastructure

Further to demand calculations in Section 4 and extracts from WSA-02, it is evident that a DN225 Sydney Water sewer main is required to service the proposed subdivision. There are three options to service the proposed subdivision as described in 5.1.1 to 5.1.3:

#### 5.1.1 Augmentation of Sydney Water Sewer Main

The DN225 Sydney Water sewer main within Yellow Rock road could be extended to service the proposed subdivision. This is subject to a Sydney Water Section 73 application to be lodged with Sydney Water post DA.

A Sydney Water accredited Water Servicing Coordinator (WSC) would need to be engaged to undertake the design of the sewer main. This design would depend on the invert level of the existing sewer main within Yellow Rock Road and the general site contour to confirm if sewer drainage can be achieved by gravity.

The implication of services crossing the riparian zone needs to be considered. It is likely that the sewer drainage from the lots towards the west of Yellow Rock Creek would need to be pumped.

#### 5.1.2 On-site Wastewater Management

An on-site sewer management system may be adopted for the subdivision. This On-site Sewage and Wastewater Strategy should encompass all single dwelling domestic on-site wastewater disposal systems within the subdivision and will be in accordance with Council requirements.

#### 5.1.3 Sewer Rising Main

A sewer holding tank with 4 hours of emergency storage could be designed for the entire subdivision. All single dwellings would discharge to sewer via gravity to the central sewer holding tank. This would be pumped into the DN225 Sydney Water sewer main within Yellow Rock Road. This is subject to a Sydney Water Section 73 application to be lodged with Sydney Water, post DA.

A Sydney Water accredited Water Servicing Coordinator (WSC) would need to be engaged to undertake the design of the sewer rising main from the subdivision to the Sydney Water sewer main within Yellow Rock Road.

### 5.2 Potable Water Infrastructure

Further to demand calculations in Section 4 and extracts from WSA-03, it is evident that a DN200 Sydney Water water main is required to service the proposed subdivision.

A new DN200 Sydney Water water main, connected into the DN250 Sydney Water water main within Wongawilli Street, could be extended through Yellow Rock Road to service the subject site. This is subject to a Sydney Water Section 73 application to be lodged with Sydney Water, post DA.

A Sydney Water accredited Water Servicing Coordinator (WSC) would need to be engaged to undertake the design of the sewer rising main from the subdivision to the Sydney Water sewer main within Yellow Rock Road.

### 5.3 Gas Infrastructure

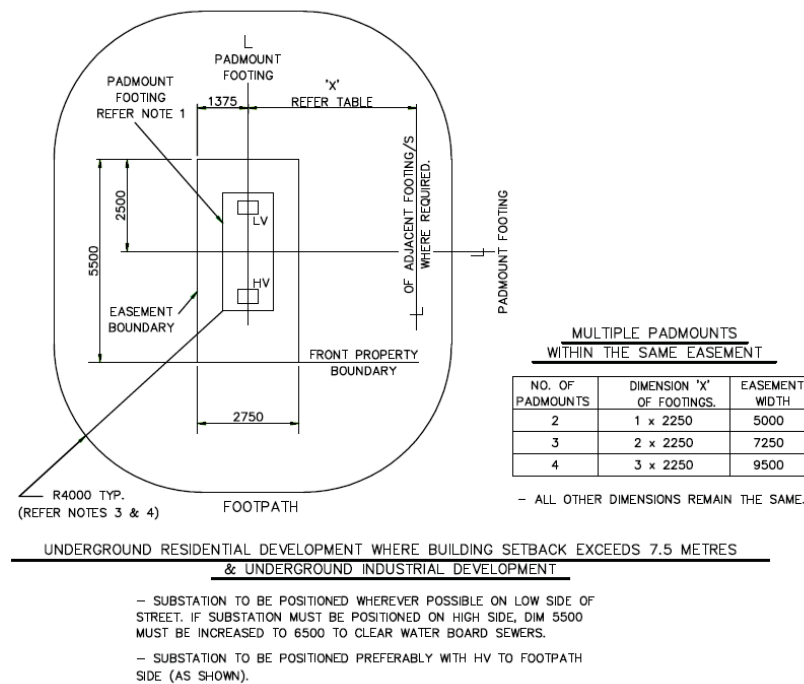
The 110PE 210kPa Jemena natural gas main within the corner of Yellow Rock Road and Prop Road appears to have adequate capacity to service the proposed development / subdivision.

A final application to Jemena will be required to extend natural gas supply to the subdivision.

### 5.4 Power supply

To supply the new development site, approximately four 500kVA substations are required within the development site. The actual substation number will be subject to electrical building services final maximum demand calculation.

For Greenfield subdivision development, Endeavour Energy request to use standard 500kVA Padmount type substations. Below Figure 8 shows the spatial requirement for a typical 500kVA Padmount substation.



*Figure 8: Padmount Substation Easement Layout*

Endeavour Energy prefer to locate substations right adjacent to the development front boundary. However, if the new substations are located further into the development, a typical 2m wide cable easement and 4.5m wide substation right of way are required.

The existing Endeavour Energy zone substation “Albion Park 2” located at the corner of Russell St and Terry St is currently supplying the entire HV network to surrounding suburbs. The existing HV underground network has been extended to the nearby residential development. Therefore the proposed development may extend the existing nearby HV network to the site, and it is unlikely Endeavour Energy will request an initial HV feeder from Zone substation to the proposed development site.

## 6. CONCLUSIONS

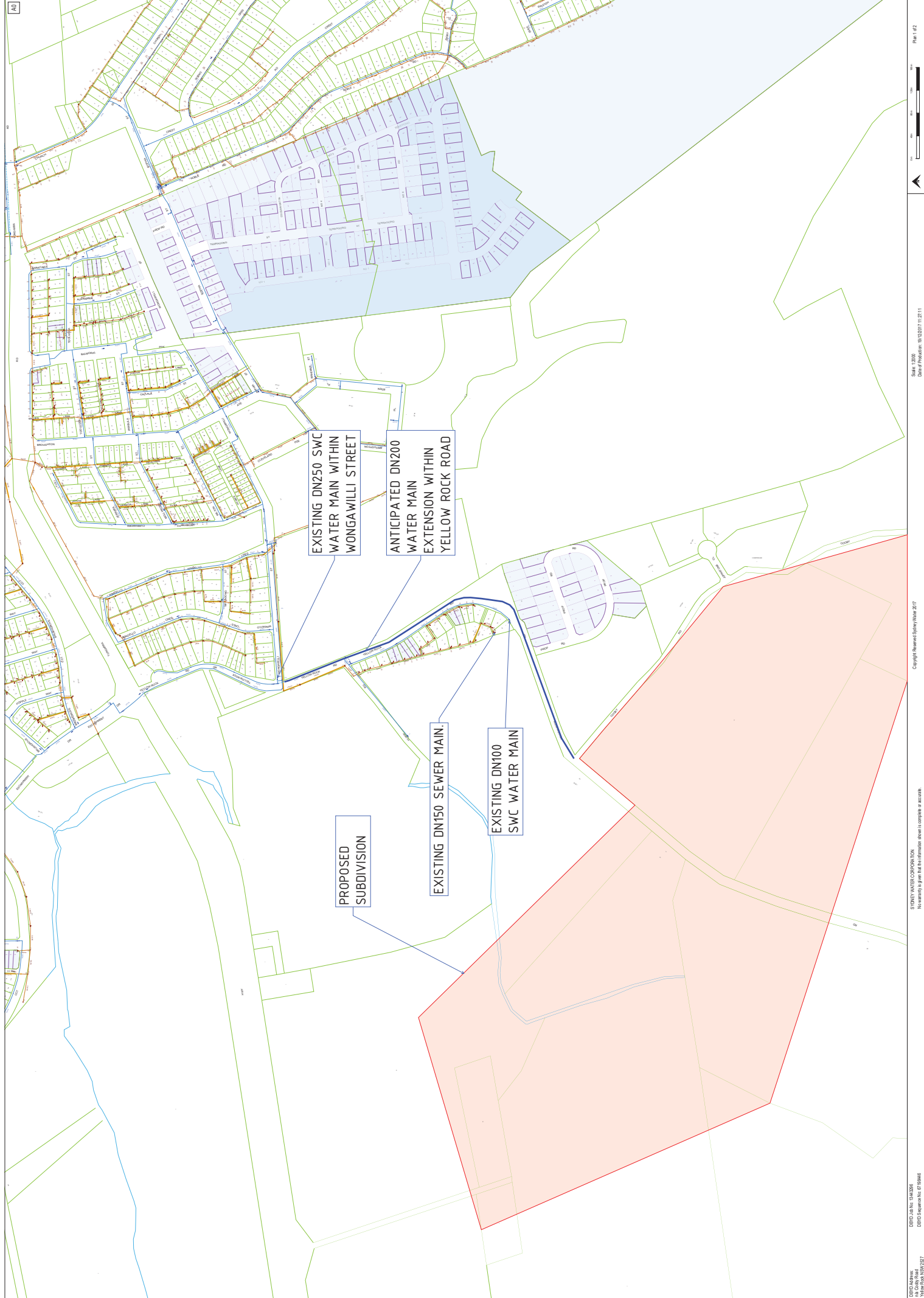
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In summary, this report demonstrates that the subject land is capable of being serviced through augmentation and amplification of the existing infrastructure subject to authority approval as follows:

- Sewer Infrastructure - Northrop has described three possible sewer management options, as follows:
  1. Augmentation of Sydney Water sewer Main – Extension of the existing Sydney Water mains within Wongawilli Street and Yellow Rock road will enable servicing of the site subject to Sydney Water approval;
  2. On-site Wastewater Management – We note that the large environmental allotments would have sufficient land area to allow on-site wastewater management if required;
  3. Sewer Rising Main – Installation of a Sewer holding tank and rising main will enable servicing of the subject site.
- Water Infrastructure – Extension of the existing Sydney Water mains within Wongawilli Street will enable servicing of the subject land subject to Sydney Water approval
- Gas Infrastructure – Extension of the existing Jemena Gas main within Yellow Rock Road will enable servicing of the subject land.
- Power Infrastructure - Undergrounding of the existing overhead HV Network as part of the road network installation of approximately four 500kVA substations will enable servicing of the subject land.

## 7. APPENDIX A – SYDNEY WATER INFRASTRUCTURE

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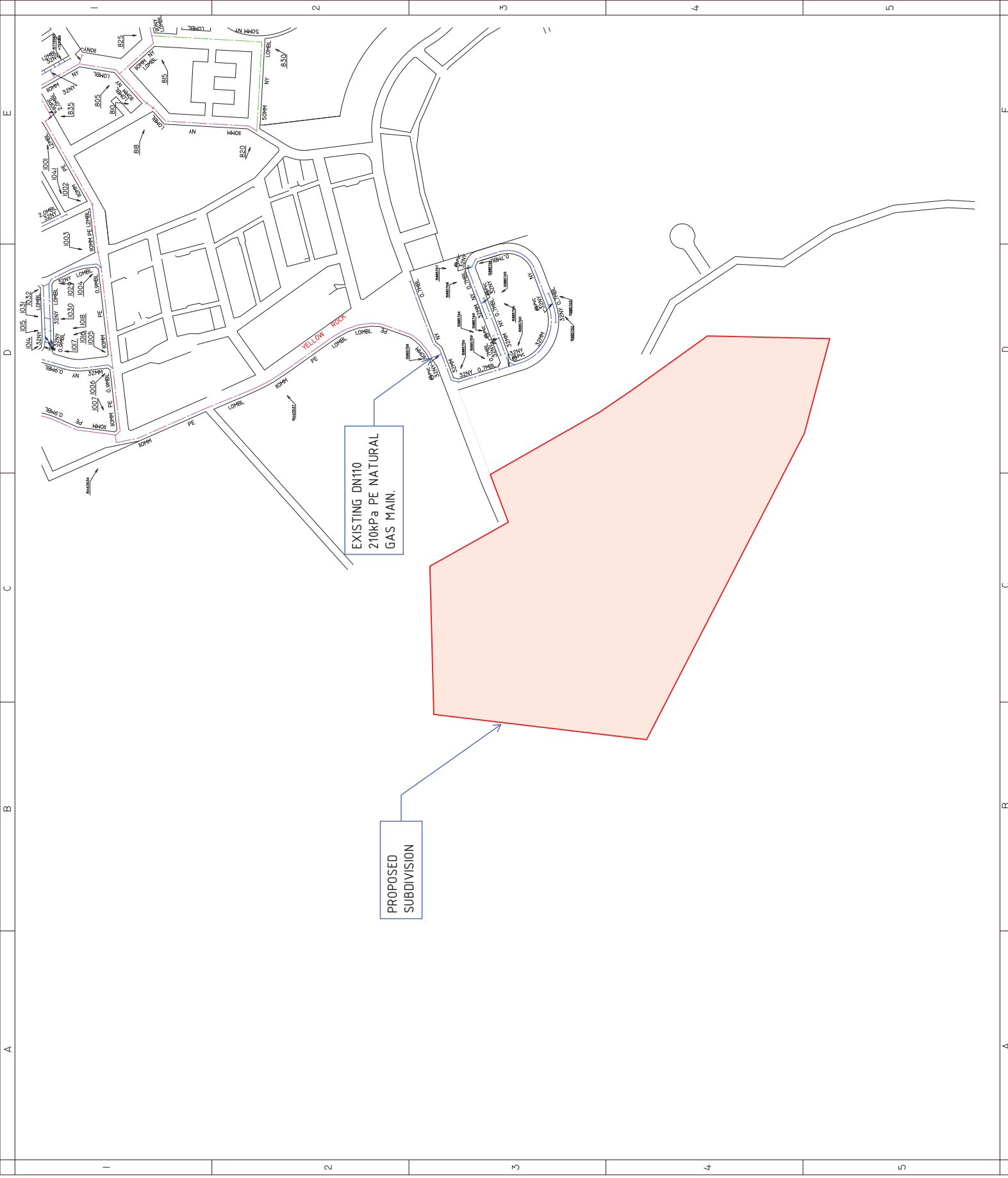


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## 8. APPENDIX B – JEMENA NATURAL GAS INFRASTRUCTURE

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ALBION PARK  
8A



THIS MAP UPDATED ON 20/09/2007  
THIS PLAN IS DIAGRAMATIC ONLY. DISTANCES  
SCALED FROM THIS PLAN MAY NOT BE ACCURATE.  
DATE ALTERED:..... BY:.....

AL4D	AL5C	AL5D
AL7B	AL8A	AL8B
AL7D	AL8C	AL8D

ADJOINING MAPS

926	SHELLHARBOUR
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NETWORK AREA MUNICIPALITY AREA

Jemena

KEY

MAX ALLOWABLE OPERATING PRESSURE

T	TRUNK PIPELINE	7000 kPa
P	PRIMARY MAIN	3500 kPa
S	SECONDARY MAIN	1050 kPa
400	NETWORK MAIN	400 kPa
300	NETWORK MAIN	300 kPa
200	NETWORK MAIN	200 kPa
100	NETWORK MAIN	100 kPa
50	NETWORK MAIN	50 kPa
	NETWORK MAIN	2 kPa
	NETWORK MAIN WITH MAIN STUBS	2 kPa
	PROPOSED MAINS	

PR 1-2 3

STEEL MAIN PROJECT NUMBER

PRESSURE MONITORING STATION

VALVE

SYSTEM PRESSURE REGULATOR

SIPHON

NETWORK NODE

NETWORK VALVE NODE

VALVE NUMBER

6 INCH CAST IRON MAIN

150MM STEEL MAIN

100MM PE/NY

100MM POLYETHYLENE/NYLON MAIN

50MM NYLON INSERTED INTO

60B MAIN CAST IRON MAIN

12MEL

1957

BOUNDARY LINE

MUNICIPALITY BOUNDARY

NETWORK BOUNDARY

HOUSE NUMBER

ALBION PARK 8A

## 9. APPENDIX C – DEMAND CALCULATIONS

### 9.1 Sanitary Plumbing and Drainage

Obtained from WSA 02-2002-2.2 Sewerage Code of Australia

#### A2 ESTIMATION METHOD

Equivalent population (EP) should be calculated as the sum of the residential, commercial and industrial loadings of the proposed development:

$$EP = \sum (EP_{\text{Residential}} + EP_{\text{Commercial}} + EP_{\text{Industrial}})$$

Table A1 provides estimates of contributions to EP from residential and commercial developments and special cases such as schools, parks and clubs.

#### A2.1 Residential component

##### A2.1.1 Single occupancy lots

The contribution to EP should be taken as 3.5 per single occupancy lot i.e. a single residence or dwelling (Refer also to Clause 5.5).

**TABLE 4.4**  
**EP CAPACITY LIMITATIONS FOR RETICULATION SEWERS**

Pipe size DN	Maximum allowable EP
150	600
225	1600
300	3200

### 9.2 Potable Cold Water

Obtained from WSA 03-2011-3.1 Water Supply Code of Australia

**TABLE 3.2**  
**EMPIRICAL GUIDE FOR PIPE SIZING**

Nominal size of main DN		Capacity of main (single direction feed only)			
Cast iron outside diameter series	ISO series	Residential (lots)	Rural residential (lots)	General/light industrial (ha)	High usage industrial (ha)
100	125	40	10	N/A	N/A
150	180	160	125	23	N/A
200	250	400	290	52	10
225	280	550	370	66	18
250	315	650	470	84	24