



# Residential Market Assessment

584, 586, 590, 600, 602, 606, 618 & 626 Old  
Northern Road and 7, 11, 21 & 27 Derriwong Road,  
Dural

February 2016

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# Executive Summary

Urbis has been commissioned to undertake a residential market assessment in respect of a planning proposal to develop residential dwellings on the sites at The Old Northern Road and Derriwong Road, Dural. The report also considers potential ancillary commercial uses on the site.

Key points to note from our residential analysis include:

- Medium density dwellings in the area continue to attract interest mainly from downsizers and retirees who are looking to move from acreage properties in the local area, typically at least one to two acres in size. The rural setting offered in Dural still appeals to these people and hence they don't want to move out of the area
- There has also been some demand for larger residential lots with detached dwellings. Demand is often driven by buyers who were looking in the Castle Hill/ Kellyville areas but have sought better value properties in Dural where the price increases have not been as significant

Overall, there is a need to provide a broader range of residential dwellings in Dural, providing more variety in terms of lot and dwelling size, and cost. The type of residential product in demand ranges from some larger residential lots to more medium density type stock such as townhouses and larger apartments. By providing a range of dwelling types on the site and in the broader area, this will ensure that the needs of the local market are met and that there is sufficient take-up of the residential product.

A variety of dwelling types will also ensure that the residential product in Dural does not become homogenous. The larger lots and detached dwellings dispersed throughout the medium density dwellings will ensure the character of Dural is maintained without contiguous lots of higher density buildings.

The suggested dwelling mix across the site is summarised in the table on the following page. Both low and high density options have been provided in the table, with the higher density option carrying more risk in terms of market supportability.

The majority of the dwellings on the subject site should be detached dwellings and townhouses, with the provision of some apartments. The internal size of the dwellings recommended for the subject site are generously proportioned with mostly three to four bedrooms.

The residential analysis also considers seniors living dwellings. There is a range of seniors living facilities available, often differentiated by the target age groups and the level of care provided. The three broad categories include over 55s facilities, Independent Living Units (ILUs) and aged care facilities. Our analysis indicates that there is likely to be demand in the medium term for seniors living in the local Dural area, more so for ILU and aged care facilities, provided that no other facilities are built prior.

Urbis has also considered the current and future supply of service station, gymnasium, child care centres, recreational facilities and ancillary retail associated with a day surgery/medical centre within the area in order to assess the demand for these types of facilities at the subject site.

Due to current provision, there is expected to be limited demand for service station or commercial gym uses at the site. There is also a significant provision of recreational facilities within the catchment area and considering the relatively limited population in the local area, there is unlikely to be significant demand for further facilities in the near future. Any future open spaces would, however, further improve the amenity for the surrounding and future residents.

In view of the current extensive supply of child care spaces, any proposed new centre should be targeted at meeting the needs of new residents on the site. In this regard, it would be prudent to wait until the residential development is established and to carefully monitor the household profile of new residents to determine whether this generates a demand for child care facilities.

The amount of ancillary retail sustainable within a future day surgery/medical centre on the site depends on the scale and function of the day surgery/medical centre itself. It is likely that a café (catering to staff, patients and visitors) and pharmacy would be supportable, with potentially a florist. A higher provision of beds could generate demand for more services.

## Residential Mix Option

### SUBJECT SITE

#### Southern Site

| Dwelling Type | Number of Bedrooms | % of Total Dwellings |                       | % of Dwellings by type |
|---------------|--------------------|----------------------|-----------------------|------------------------|
|               |                    | Lower Density Option | Higher Density Option |                        |
| Apartment     | 2                  |                      |                       | 30%                    |
|               | 3                  |                      |                       | <u>70%</u>             |
|               |                    | 30%                  | 30%                   | 100%                   |
| Townhouse     | 2                  |                      |                       | 10%                    |
|               | 3                  |                      |                       | 60%                    |
|               | 4                  |                      |                       | <u>30%</u>             |
|               |                    | 35%                  | 70%                   | 100%                   |
| Detached      | 3                  |                      |                       | 20%                    |
|               | 4                  |                      |                       | <u>80%</u>             |
|               |                    | 35%                  |                       | 100%                   |
|               |                    | <b>100%</b>          | <b>100%</b>           |                        |

#### Northern Site

| Dwelling Type     | Number of Bedrooms | % of Total Dwellings |                       | % of Dwellings by type |
|-------------------|--------------------|----------------------|-----------------------|------------------------|
|                   |                    | Lower Density Option | Higher Density Option |                        |
| Townhouse         | 2                  |                      |                       | 10%                    |
|                   | 3                  |                      |                       | 60%                    |
|                   | 4                  |                      |                       | <u>30%</u>             |
|                   |                    | 10%                  | 20%                   | 100%                   |
| Detached Dwelling | 3                  |                      |                       | 20%                    |
|                   | 4                  |                      |                       | <u>80%</u>             |
|                   |                    | 90%                  | 80%                   | 100%                   |
|                   |                    | <b>100%</b>          | <b>100%</b>           |                        |

*\*Based on current sale prices*

Source : Urbis

# Introduction

Urbis has been commissioned to undertake a residential and ancillary commercial market assessment in support of a planning proposal to rezone land at Old Northern and Derriwong Roads, Dural to permit a mix of residential and commercial development.

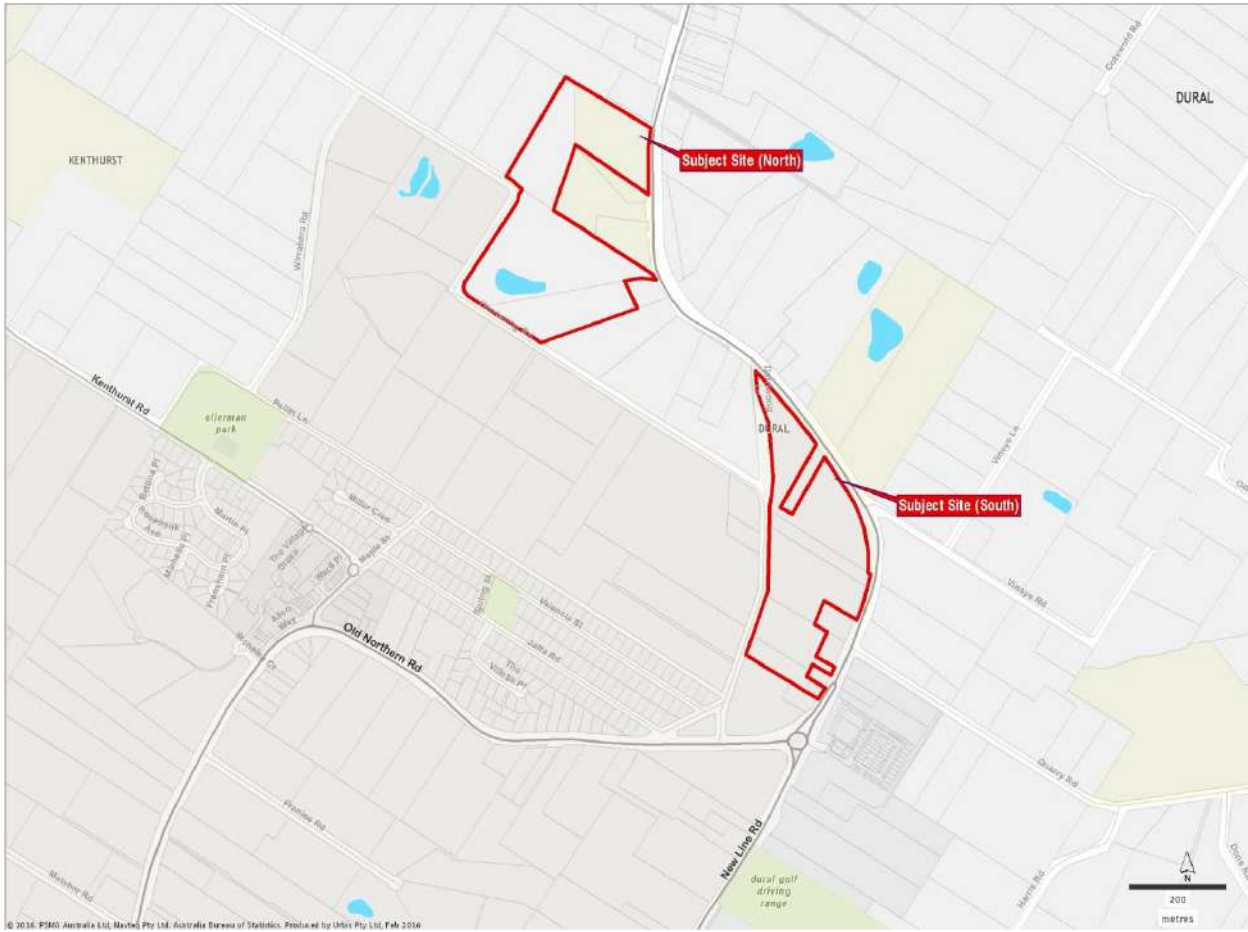
The subject site collectively includes the following land parcels:

- 584 Old Northern Road, Dural
- 586 Old Northern Road, Dural
- 590 Old Northern Road, Dural
- 600 Old Northern Road, Dural
- 602 Old Northern Road, Dural
- 606 Old Northern Road, Dural
- 618 Old Northern Road, Dural (also known as No. 25 Derriwong Road)
- 626 Old Northern Road, Dural
- 7 Derriwong Road, Dural
- 11 Derriwong Road (also known as 600A Old Northern Road), Dural
- 21 Derriwong Road, Dural
- 27 Derriwong Road, Dural

The subject site (referenced as the northern and southern sites throughout this report) is shown on Map 1.1 on the following page.

The remainder of this report is structured as follows:

- Section one provides a residential market analysis considering the local population, existing and proposed supply, the local residential sales market and residential demand drivers. Implications are drawn from this analysis to suggest the most suitable residential product for the subject site. This section also includes an analysis of the local seniors living market and the likely demand for this type of product in the local area.
- Section two provides an overview of the competitive environment for other potential commercial uses at the site, including service stations, gyms, child care centres, recreational facilities and ancillary retail uses associated with day surgery/medical centre uses. We note that a demand assessment for medical facilities is being undertaken separately.



# 1 Residential Market Analysis

This section provides an overview of the residential market in the Dural region.

## 1.1 RESIDENTIAL CATCHMENT ANALYSIS

This section examines the current demographic profile of the residential catchment for Dural in order to gain an insight into potential purchasers of residential dwellings at the subject site.

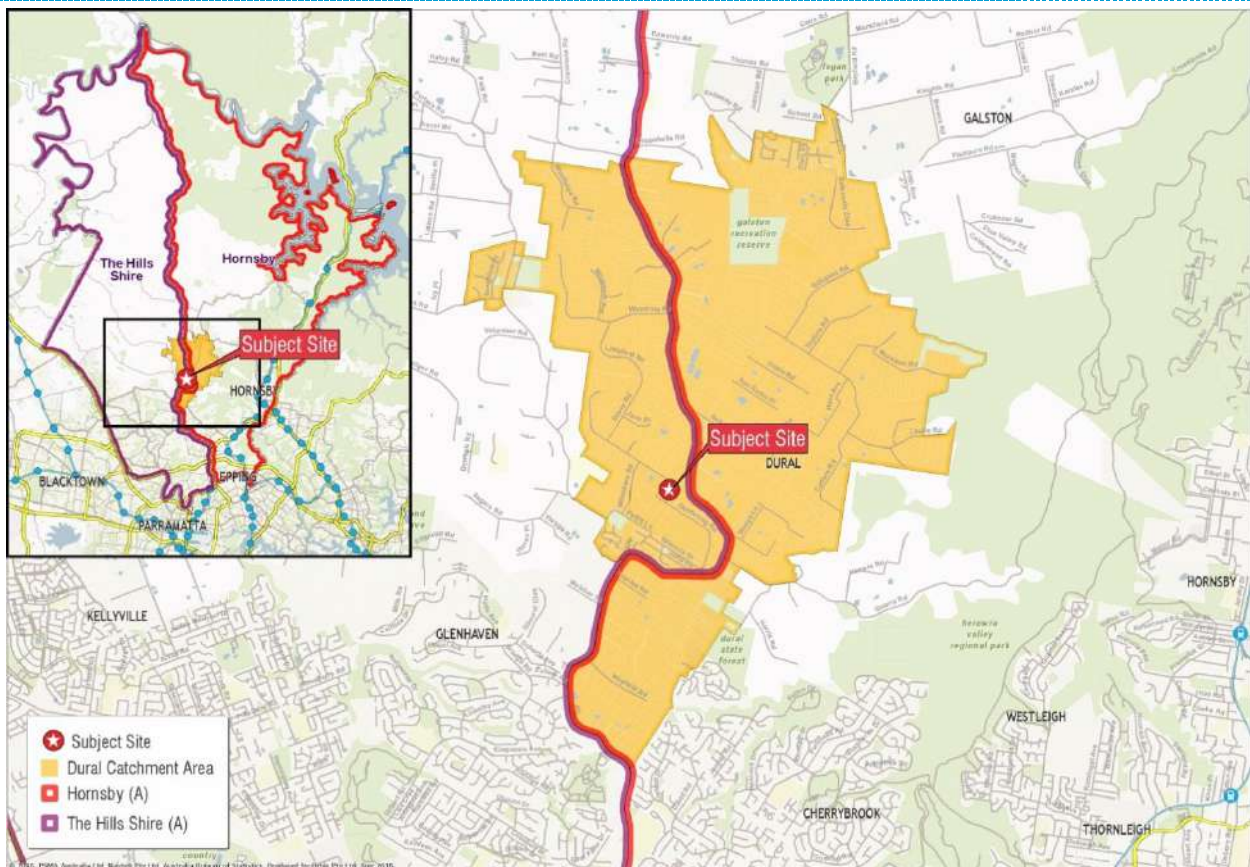
The residential catchment is defined by amalgamating Statistical Area Level 1 geographic areas (SA1s) surrounding the subject site in order to define an area which:

- Includes the subject site and environs to include Dural, Middle Dural to the north, Glenhaven to the south, Kenthurst to the west and Galston to the east
- Ensures that the geographic extent is sufficient to be able to capture areas where recent house building has occurred. Analysis of data from areas of recent house building activity provides the best guide as to the future buyer profile for the subject site.

The residential catchment area is shown in Map 1.1 below.

DURAL CATCHMENT AREA

MAP 1.1



## POPULATION FORECASTS

The population of the Dural Catchment Area was approximately 5,800 as at the 2011 Census, after growing by approximately 1,300 persons from 2006 figures. This represented annual growth of 5.2% over the five year period, which was significantly higher than the annual population growth in The Hills Shire LGA (1.5%) and the Hornsby LGA (less than one per cent).

The catchment area is projected to have lower overall growth than both the Hills Shire and Hornsby LGAs moving forward. This is to be expected as the catchment area is less urbanised and has less planned development activity than other areas in the LGAs. Between 2016 and 2021 in the Dural Catchment Area, the population is projected to grow by 344 residents, to 6,100. The annual growth rate over this period is 1.2%, before tapering off to 0.3% to 0.4% to 2031.

Official population projections suggest that the Hills Shire LGA's population will achieve annual growth of 1.5% or above between 2011 and 2026, with growth underpinned by the development as part of the North West Growth Centre, before tapering off to 1.2% between 2026 and 2031.

The Hornsby LGA is projected to experience strong growth from 2011 to 2016 (1.8%) before declining to 0.6% per annum between 2026 and 2031.

## Estimated Resident Population

DURAL CATCHMENT AREA, HILLS SHIRE LGA AND HORNSBY LGA

TABLE 1.1

|                                 | 2001           | 2006           | 2011           | 2016           | 2021           | 2026           | 2031           |
|---------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>Dural Catchment Area</b>     | <b>4,483</b>   | <b>4,468</b>   | <b>5,756</b>   | <b>5,742</b>   | <b>6,086</b>   | <b>6,191</b>   | <b>6,302</b>   |
| Additional Residents            | -              | -15            | 1,288          | -14            | 344            | 105            | 111            |
| Average Annual Change (Nominal) | -              | -3             | 258            | -3             | 69             | 21             | 22             |
| Average Annual Change (Percent) | -              | -0.1%          | 5.2%           | 0.0%           | 1.2%           | 0.3%           | 0.4%           |
| <b>The Hills Shire LGA</b>      | <b>146,045</b> | <b>165,143</b> | <b>177,536</b> | <b>193,793</b> | <b>210,190</b> | <b>226,191</b> | <b>239,597</b> |
| Additional Residents            | -              | 19,098         | 12,393         | 16,257         | 16,397         | 16,001         | 13,406         |
| Average Annual Change (Nominal) | -              | 3,820          | 2,479          | 3,251          | 3,279          | 3,200          | 2,681          |
| Average Annual Change (Percent) | -              | 2.5%           | 1.5%           | 1.8%           | 1.6%           | 1.5%           | 1.2%           |
| <b>Hornsby LGA</b>              | <b>153,197</b> | <b>156,808</b> | <b>157,017</b> | <b>171,883</b> | <b>180,206</b> | <b>186,590</b> | <b>192,048</b> |
| Additional Residents            | -              | 3,611          | 209            | 14,866         | 8,323          | 6,384          | 5,458          |
| Average Annual Change (Nominal) | -              | 722            | 42             | 2,973          | 1,665          | 1,277          | 1,092          |
| Average Annual Change (Percent) | -              | 0.5%           | 0.0%           | 1.8%           | 1.0%           | 0.7%           | 0.6%           |

Source: ABS 2011 Census; SA Fi population forecasts; Urbis

## DEMOGRAPHIC OVERVIEW

This section analyses the key socio demographic characteristics of the catchment of relevance to the assessment of residential uses on the subject site. The following table provides a summary of the key findings from the socioeconomic analysis, with the relevant charts provided on the subsequent pages.



## Dural Residential Catchment – Key Demographic Indicators

SUMMARY (BASED ON 2011 CENSUS DATA)

TABLE 1.2

| INDICATOR                                      | VALUE                      | IMPLICATION   |
|--|----------------------------|---|
| Average age                                    | 41.6 years                 | An older population compared to Hills Shire, Hornsby and Greater Sydney benchmarks. Residential development needs to be appropriately designed to cater to an older demographic                                       |
| Average household income                       | \$102,189 p.a.             | Higher household income than Sydney, but below both benchmark LGAs suggesting the need for a medium quality product   |
| Most common dwelling structure                 | Detached dwellings         | Low and medium density development with larger dwelling sizes continues to be the prevailing dwelling type in the area  |
| Most common dwelling tenure type               | Own home outright (42%)    | High proportion of home ownership and limited investor activity   |
| Average household size                         | 2.7 persons                | In line with Sydney average but below LGA benchmarks suggesting the need for a mix of dwelling sizes  |
| Most common number of cars owned per household | 2 cars (38% of households) | The catchment is located on the edge of an urban area and has limited public transport infrastructure resulting in higher private transport dependence. Garage provision will therefore be an important selling point |

**Age distribution:** The average age for the residents of the Dural Catchment Area is 41.6 years, which is considerably higher than both the Hills Shire and Hornsby LGAs, at 36.7 and 38.6 years respectively. The average age of residents in the catchment area is also significantly higher than the average age across the broader Sydney area, which was 37.1 years as at the 2011 Census.

Within the catchment area, 33% of the population is aged over 55 years. This is compared to just 24% in the Hills Shire LGA, 26% in the Hornsby LGA and 24% across the greater Sydney area. This indicates an older population within the catchment area.

**Household income profile:** The average household income for the catchment area as at 2011 was \$102,189, which is 8.2% above the Sydney average of \$94,428. The average for the catchment area was, however, below the average across the Hills Shire and Hornsby LGAs which were \$119,428 and \$110,487 respectively.

The highest proportion of residents in the catchment area fall within the \$130,000 - \$156,000 income bracket (15%). The income distribution chart however shows that there is a higher than average proportion of residents with incomes between \$15,600 and \$41,600. Lower incomes in this region could be suggestive of part time employment, which given the age distribution could be attributed to retirees, as well as to teenagers.

**Dwelling structure:** As at 2011, detached houses made up the majority of dwellings in the catchment area, as well as in the Hills Shire and Hornsby LGAs; and across greater Sydney. The catchment area has a significantly higher proportion of detached houses than the Sydney average, with limited higher density dwellings.

The Dural Catchment Area has a much higher proportion of dwellings with four or more bedrooms (47%) than the Sydney average (30%). This is marginally higher than the proportion in the Hornsby LGA (44%), however below the proportion within the Hills Shire LGA (63%). Dwellings with three bedrooms were the second most common dwelling type in the catchment area, making up 34% of dwellings.

**Dwelling tenure:** The proportion of residents who own their home outright in the catchment area (42%) is higher than the Hills Shire and Hornsby LGAs (36% and 37% respectively) and significantly higher than the Sydney average (31%).

The proportion of catchment area residents who are in the process of purchasing and therefore have a mortgage (37%) is below the average across the Hills Shire and Hornsby LGAs, however marginally higher than the Sydney average.

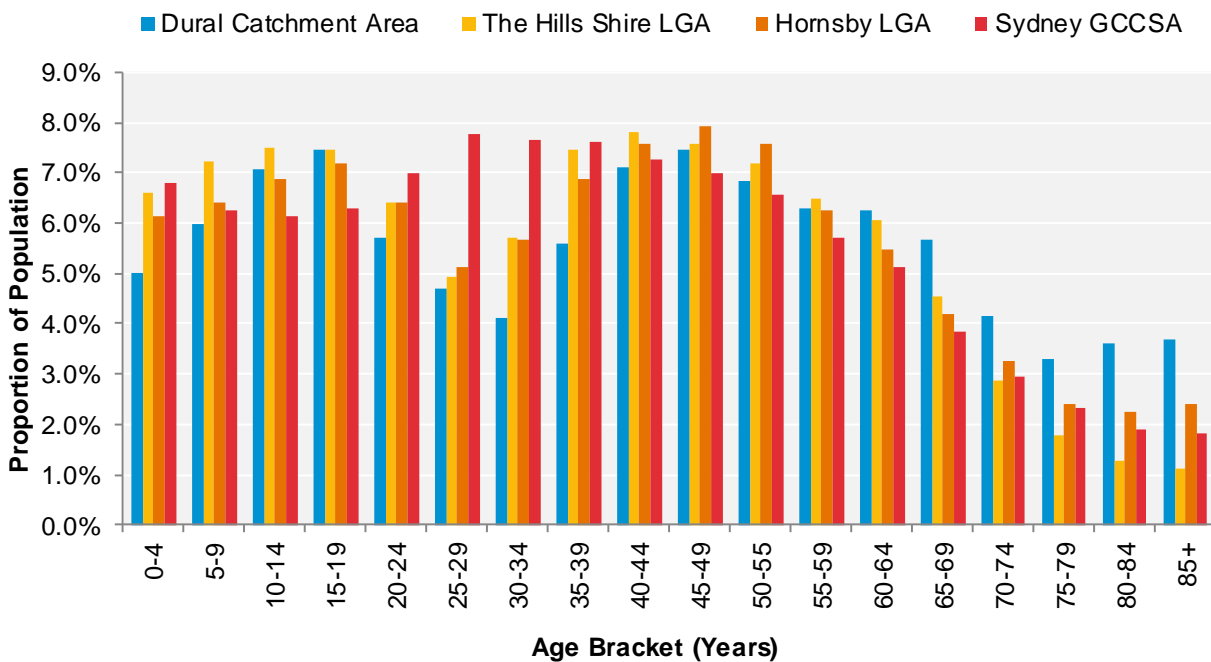
**Family size and composition:** The average household size for the Dural Catchment Area of 2.7 persons per dwelling is below that of the Hills Shire LGA (3.1 persons) and the Hornsby LGA (2.8 persons), however is in line with the Sydney average.

In terms of family types, couple families with no children is the most common family type within the catchment area (35%), which could represent younger couples without children or older couples who are empty nesters. This category is followed by couple families with children under 15 years of age (31%) which represents the young family households.

**Number of cars per household:** The majority of dwellings within the catchment area (38%) have two cars. The catchment area also has a higher than average proportion of dwellings with four or more cars (13%). This reflects the location of the catchment area on the edge of an urban area and the limited public transport infrastructure.

## Age Distribution

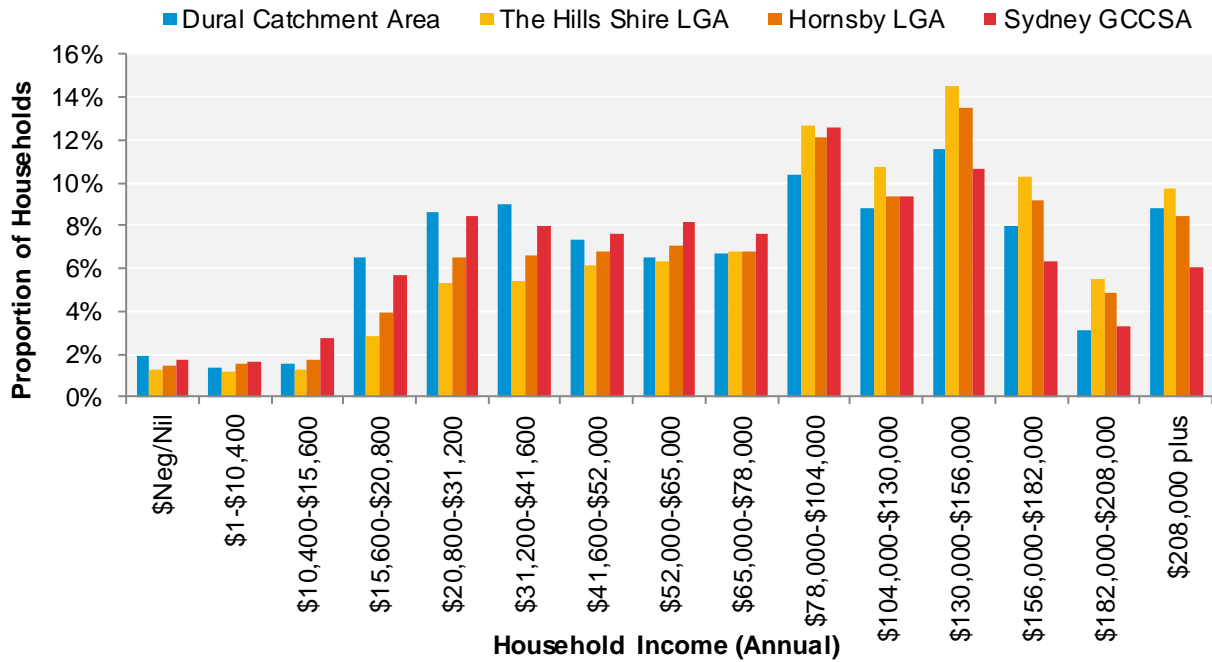
DURAL CATCHMENT AREA, HILLS SHIRE LGA, HORNSBY LGA AND SYDNEY GCCSA CHART 1.1



Source: Australian Bureau of Statistics 2011 Census; Urbis

## Household Income

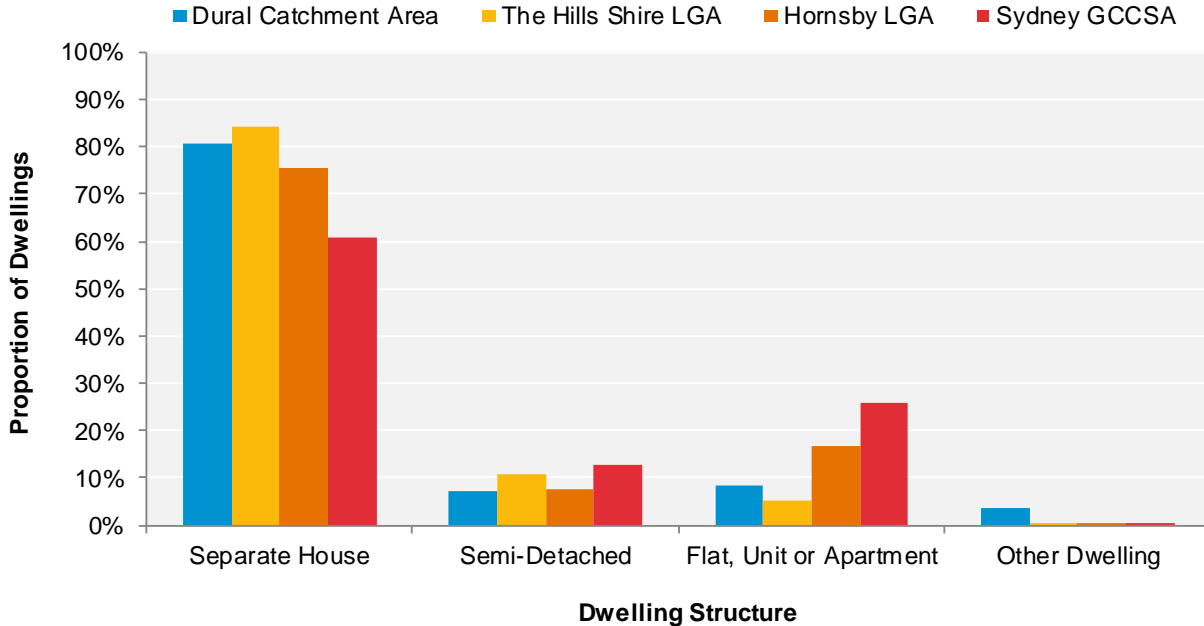
DURAL CATCHMENT AREA, HILLS SHIRE LGA, HORNSBY LGA AND SYDNEY GCCSA CHART 1.2



Source: Australian Bureau of Statistics 2011 Census; Urbis

## Dwelling Structure

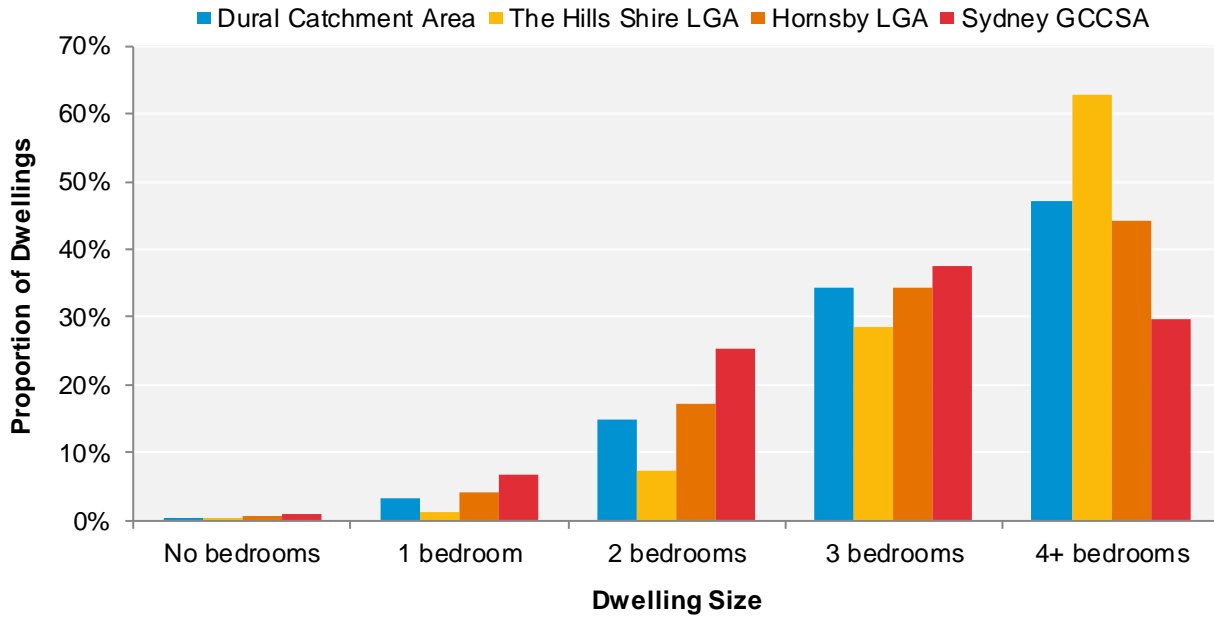
DURAL CATCHMENT AREA, HILLS SHIRE LGA, HORNSBY LGA AND SYDNEY GCCSA CHART 1.3



Source: Australian Bureau of Statistics 2011 Census; Urbis

## Dwelling Size

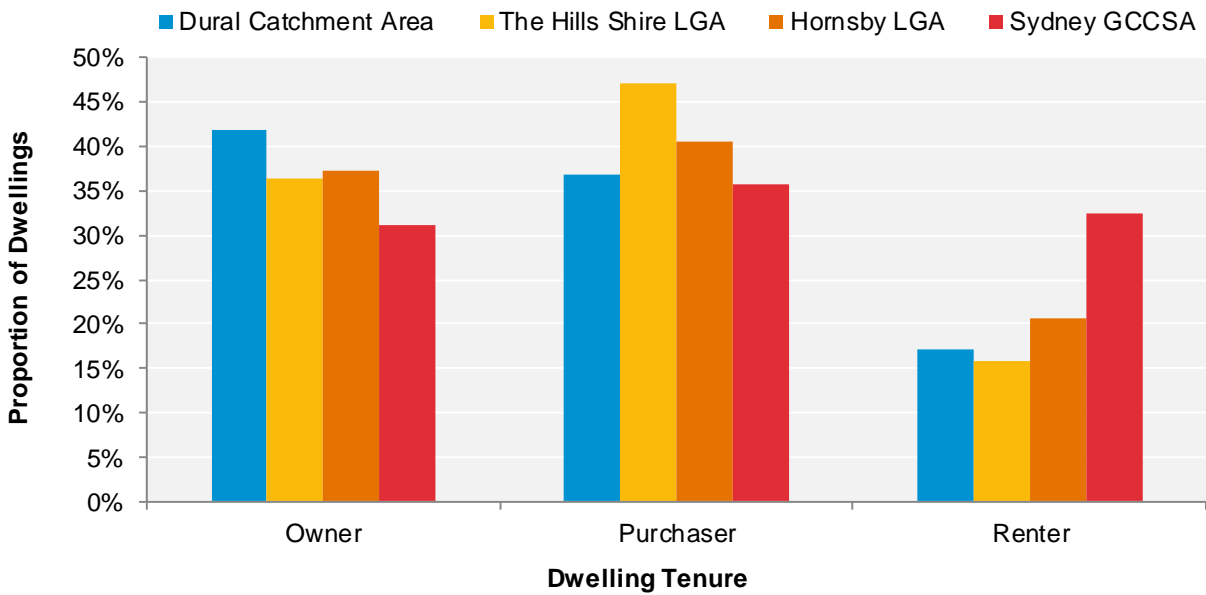
DURAL CATCHMENT AREA, HILLS SHIRE LGA, HORNSBY LGA AND SYDNEY GCCSA CHART 1.4



Source: Australian Bureau of Statistics 2011 Census; Urbis

## Dwelling Tenure

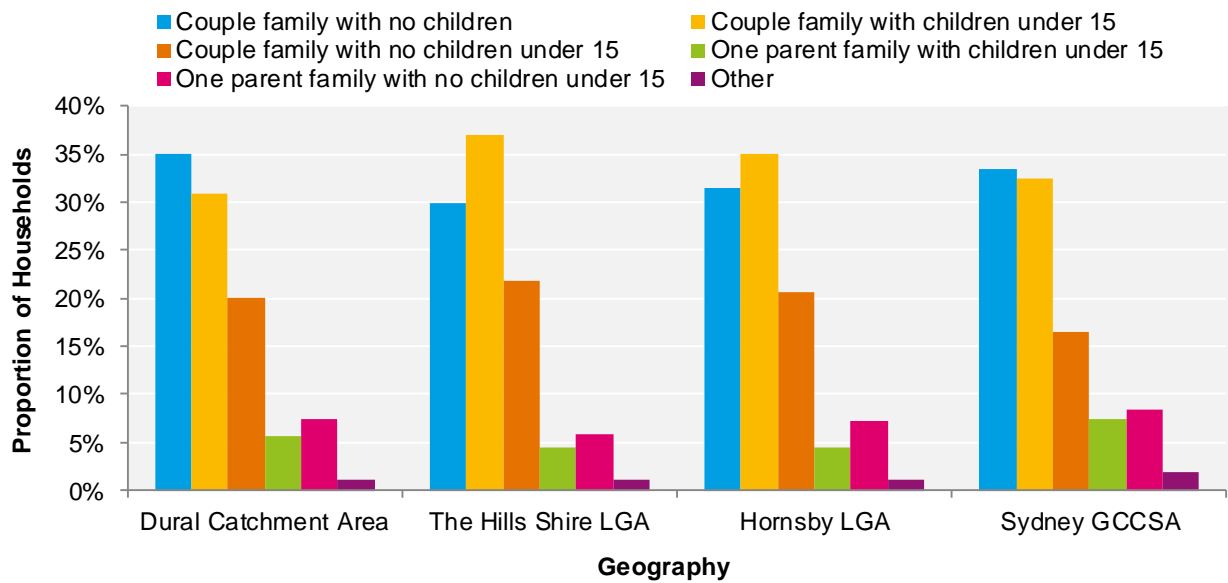
DURAL CATCHMENT AREA, HILLS SHIRE LGA, HORNSBY LGA AND SYDNEY GCCSA CHART 1.5



Source: Australian Bureau of Statistics 2011 Census; Urbis

## Family Composition

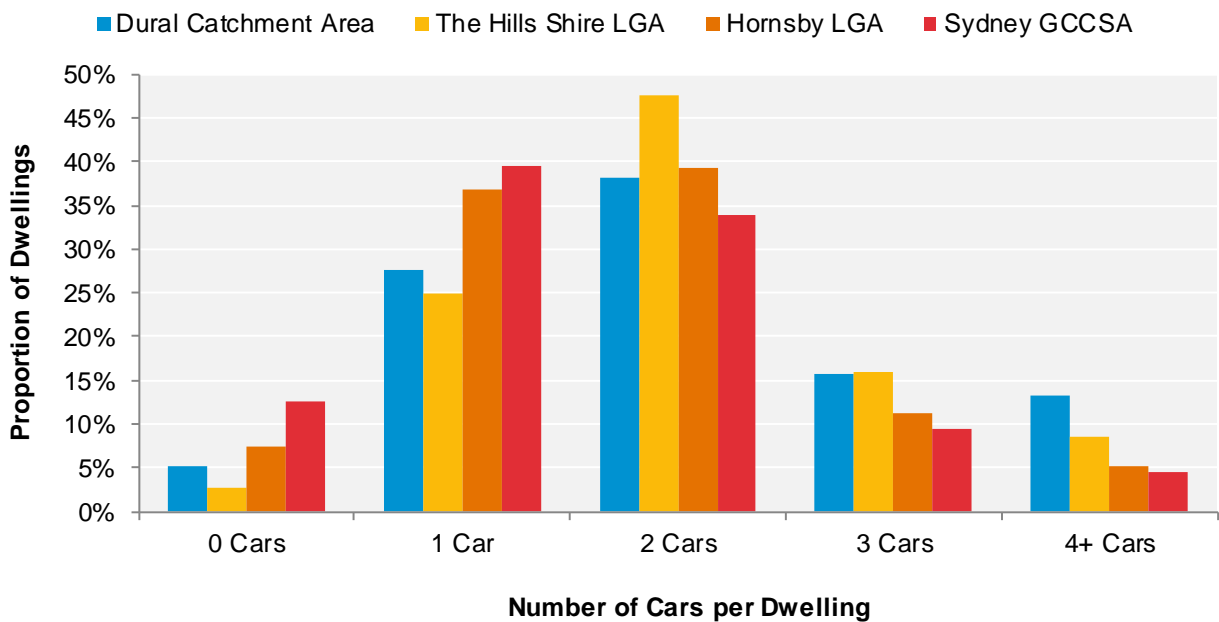
DURAL CATCHMENT AREA, HILLS SHIRE LGA, HORNSBY LGA AND SYDNEY GCCSA CHART 1.6



Source: Australian Bureau of Statistics 2011 Census; Urbis

## Number of Cars

DURAL CATCHMENT AREA, HILLS SHIRE LGA, HORNSBY LGA AND SYDNEY GCCSA CHART 1.7



Source: Australian Bureau of Statistics 2011 Census; Urbis

## MIGRATION ANALYSIS

For the purpose of a residential assessment, it is important to consider where residents have moved from and hence the type of market that residential dwelling products should be aimed at.

Chart 1.8 below shows the top ten SA2 Statistical Areas where residents of the Dural Catchment Area lived five years prior to the 2011 Census.

The majority of residents lived in the Dural-Kenthurst-Wisemans Ferry SA2 (2,620 residents), the Galston-Laughtondale SA2 (884 residents) and the Glenhaven SA2 (163 residents) five years ago. As the Dural Catchment Area overlaps parts of these three SA2s, these figures would include residents who had not moved or those who had moved locally between 2006 and 2011.

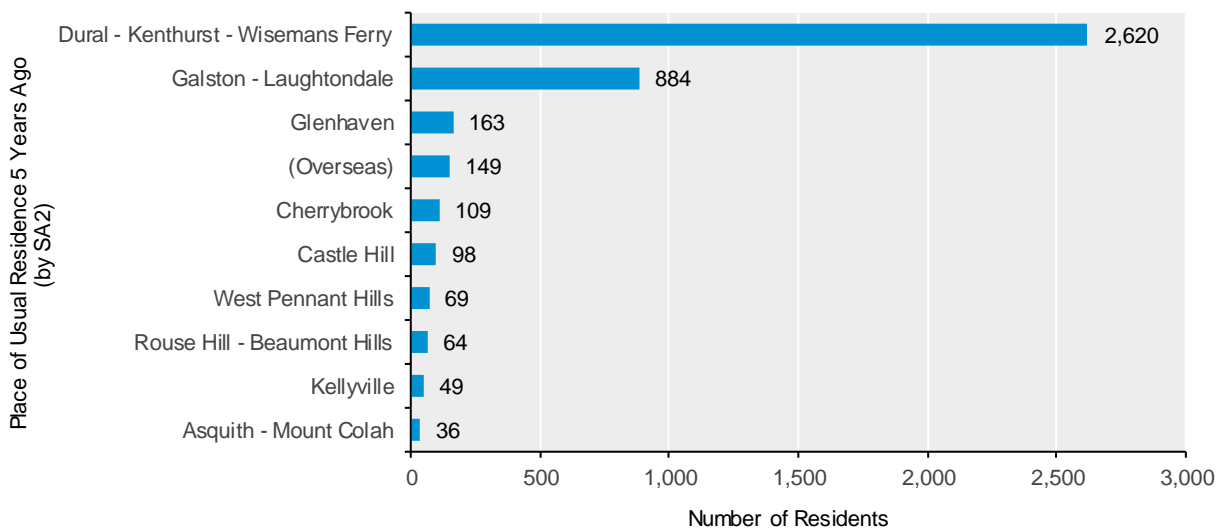
The chart also shows that a significant number of residents (almost 150) lived overseas five years prior to the 2011 Census before residing in the Dural Catchment Area. This is further evidenced in the demographics of the catchment area residents which show that approximately 6% of residents were born in the United Kingdom and 29% have British ancestry.

The remaining SA2s of usual residence are concentrated within the areas surrounding the Dural Catchment Area, such as Cherrybrook, Castle Hill and West Pennant Hills, highlighting that the majority of residents are from a relatively localised region.

### Place of Usual Residence

DURAL CATCHMENT AREA, FIVE YEARS AGO (2011 CENSUS)

CHART 1.8



Source : Australian Bureau of Statistics, 2011 Census; Urbis



## NEW DWELLING APPROVALS

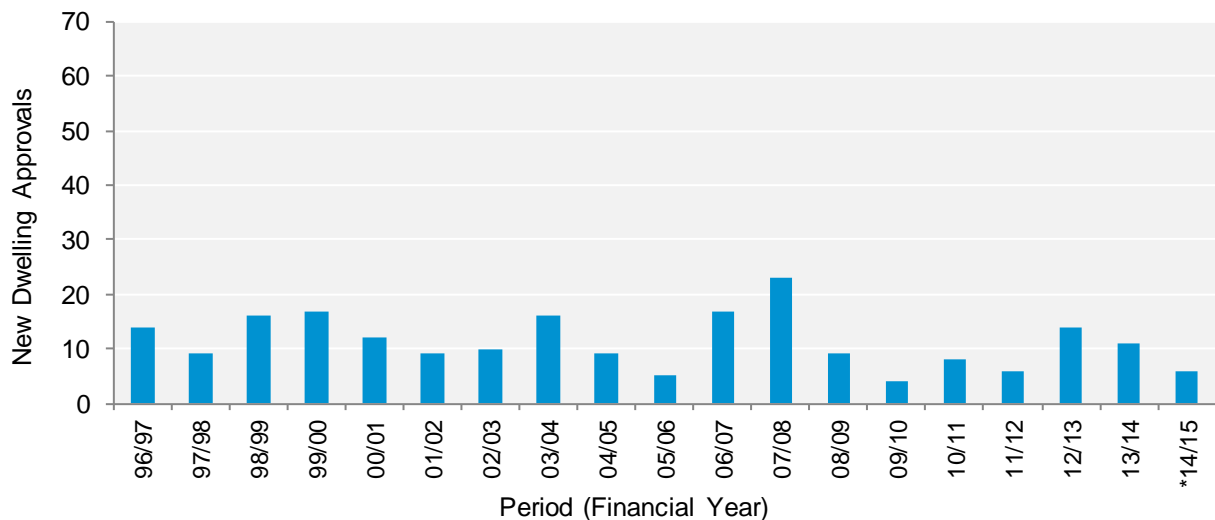
Chart 1.9 and Chart 1.10 show the new dwelling approvals (NDAs) for both houses and 'other dwellings' (including semi-detached, row, or terrace houses or townhouses; flats, units or apartments) within the Dural Catchment Area between 1996 and 2015. The key observations from these charts include:

- The number of NDAs for houses has been more consistent across the period than for other dwellings. The number of other dwelling NDAs has been more sporadic however this is likely to be due to the nature of such developments, whereby multiple dwellings are built in a single development.
- There is no clear preference or growing trend towards a particular dwelling type over the period, with the NDAs for both dwelling types fluctuating significantly.

### New Dwelling Approvals – Houses

DURAL CATCHMENT AREA (1996 – 2015)

CHART 1.9

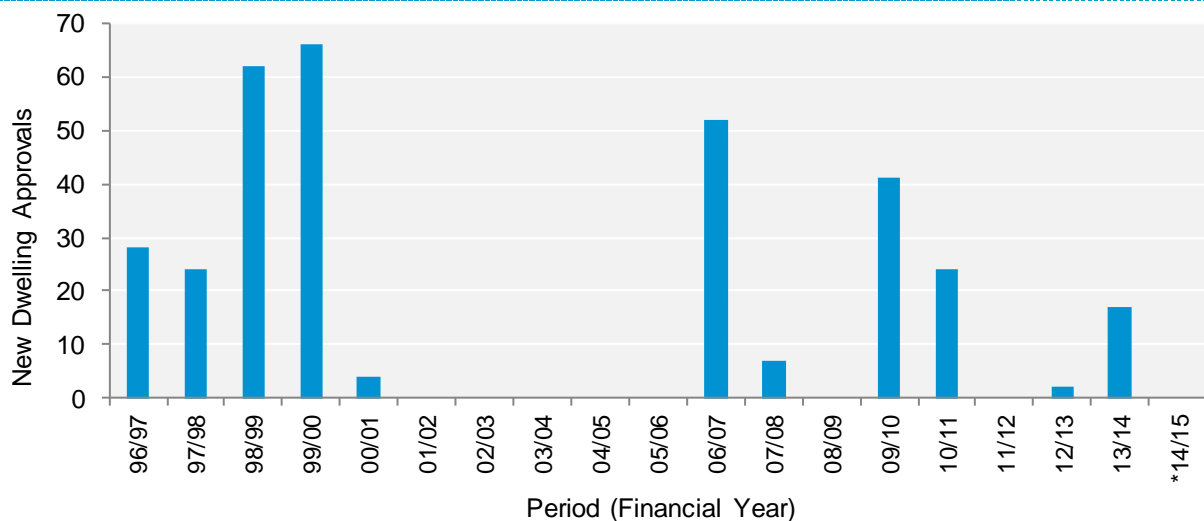


\*Note: 2014/15 data is for three quarters only. 2011 data onwards is based on the new 2011 SA1 geography  
Source: Australian Bureau of Statistics Census 1996, 2001, 2006 and 2011; Urbis

### New Dwelling Approvals – Other Dwellings

DURAL CATCHMENT AREA (1996 – 2015)

CHART 1.10



\*Note: 2014/15 data is for three quarters only. 2011 data onwards is based on the new 2011 SA1 geography  
Source: Australian Bureau of Statistics Census 1996, 2001, 2006 and 2011; Urbis

## IMPLICATIONS FOR THE SUBJECT SITE

The following implications can be drawn out in relation to the development potential on the subject site:

**Age distribution:** The age distribution of the Dural Catchment Area reflects that of an older population and suggests that there is a high proportion of retirees. This has implications for a potential development on the site which would need to accommodate older residents, with accessibility being important. This also suggests the potential need for seniors living dwellings on the subject site and this will be considered later in this report.

**Household income profile:** The household income characteristics can have significant implications when considering the pitch and quality of offer of residential uses on the site. The average household income for the Dural Catchment Area is above the Sydney average but below that of the Hills Shire and Hornsby LGA averages.

Lower household incomes in this area could be a reflection of the employment sectors in which people work. Equally however, it could also signify a proportion of households containing retirees and therefore not deriving an income.

The pricing of housing should therefore be pitched towards a medium quality product and have considerable regard to historic and current pricing being achieved within the local market.

**Family size and composition:** Couple families with no children make up the highest proportion of households in the Dural Catchment Area, indicative of the retiree and empty nester markets. Couple families with children under 15 years are the second most common family type, which indicate a significant young family market.

This implies that residential development on the subject site needs to cater to varying markets, with dwelling sizes ranging from two to four bedrooms, and a mix of dwellings types be more heavily weighted towards lower density dwellings such as detached and semi-detached (e.g. townhouses).

**Dwelling structure:** Detached houses are the most common dwelling type within the Dural Catchment Area, with semi-detached and unit dwellings making up less than 16% of the total dwellings combined. Furthermore, the average household size for the catchment area is comparatively large, with a high proportion of dwellings with four or more bedrooms (47%).

The region is still a predominantly detached housing market, but strategic planning is making increasing provisions for higher density around town centres (such as Rouse Hill Town Centre). This trend is further being fuelled by housing affordability issues where semi-detached or apartment dwellings are generally more affordable than detached dwellings on large lots of land.

In our view the dwelling mix on the subject site could contain a combination of dwellings types including detached, semi-detached and apartments, with higher density dwelling located closest to retail and services. There should be a high proportion of larger dwellings, to cater to the high average household sizes.

**Number of cars per household:** Car ownership within the Dural Catchment Area is high and hence this needs to be considered in the provision of car spaces that are provided with the residential dwellings. The socio demographic data suggests that most dwellings on the subject site should have two car spaces.

**Migration analysis:** The migration analysis suggests that the majority of residents are moving into the Dural Catchment Area from the local area and hence are generally accustomed to larger dwelling sizes and enjoy the lifestyle and amenity offered in this area of Sydney.

## 1.2 RESIDENTIAL SUPPLY ASSESSMENT

This section considers the existing and proposed supply of residential dwellings in the region surrounding the subject site in suburbs such as Dural, Galston, Glenhaven, Glenorie and Arcadia. Due to the limited amount of residential development activity occurring in the Dural area within the past decade, we have extended the analysis to the surrounding areas to get a better understanding of the residential trends.

### MAJOR RESIDENTIAL DEVELOPMENT PROFILES

This section provides a summary of selected completed major residential developments relevant to the subject site. These profiles provide examples of the types of residential developments occurring in the region and consider characteristics such as location, mix, size and sale price, where available.

The table below shows a summary of the major developments selected for profiling, with the detailed development profiles on the subsequent pages and a map showing their location below.

#### Summary of Selected Major Developments

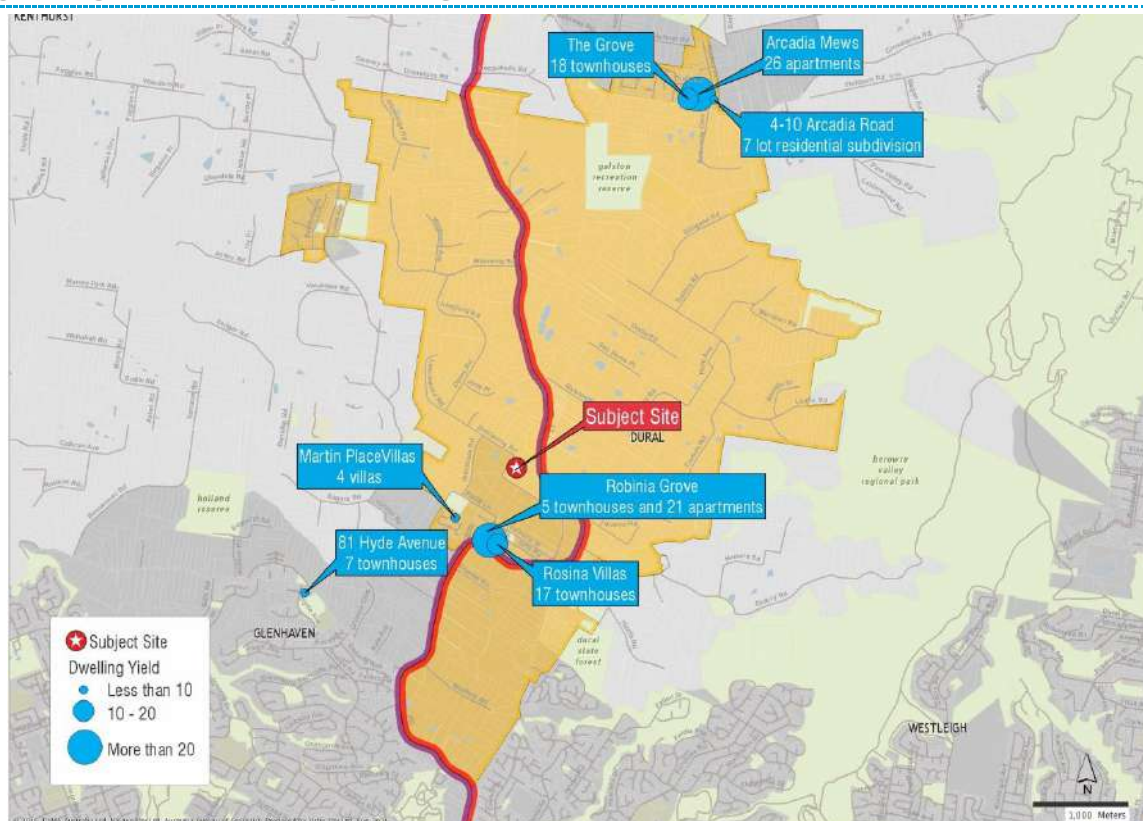
DURAL, GALSTON, GLENHAVEN, GLENORIE AND ARCADIA SUBURBS

TABLE 1.3

| DEVELOPMENT         | ADDRESS                          | YIELD                          |
|---------------------|----------------------------------|--------------------------------|
| Arcadia Mews        | 5 Arcadia Road, Galston          | 26 apartments                  |
| Martin Place Villas | 6 Martin Place, Dural            | 4 villas                       |
| Rosina Villas       | 550 Old Northern Road, Dural     | 17 townhouses                  |
| n.a.                | 4-10 Arcadia Road, Galston       | 7 lot residential subdivision  |
| n.a.                | 81 Hyde Avenue, Glenhaven        | 7 townhouses                   |
| Robinia Grove       | 542-544 Old Northern Road, Dural | 5 townhouses and 21 apartments |
| The Grove           | 364-368 Galston Road, Galston    | 18 townhouses                  |

### LOCAL RESIDENTIAL DEVELOPMENTS

MAP 1.2



|                    |   |
|--------------------|---|
| PROJECT NAME       | Arcadia Mews  |
| ADDRESS            | 5 Arcadia Road, Galston   |
| DEVELOPER          | Marana Developments Pty Ltd   |
| YEAR BUILT         | 2010  |
| YIELD              | 26 apartments   |
| PRODUCT MIX        | 2 bed: 5 apartments (19%)<br>3 bed: 21 apartments (81%)   |
| SIZES              | 2 bed: 80-88 sq.m<br>3 bed: 92 - 100 sq.m   |
| PRICES             | Unit 10 (3 bedroom apartment): Initially sold for \$429,000 in May 2010 and most recently resold in November 2014 for \$470,000<br><br>Unit 18 (3 bedroom apartment): Initially sold for \$429,000 in June 2010 and most recently resold in April 2015 for \$628,500<br><br>Unit 21 (2 bedroom apartment): Initially sold for \$382,000 in February 2010 and most recently resold in March 2015 for \$585,000 |
| APARTMENT FEATURES | - 2 bathrooms per apartment<br><br>- 2 secure car spaces per apartment and store rooms in most apartments   |



Source: realestate.com.au; RPData; Urbis

|              |  |
|--------------|--|
| PROJECT NAME | Martin Place Villas  |
| ADDRESS      | 6 Martin Place   |
| DEVELOPER    | Elim Constructions   |
| YEAR BUILT   | 2011   |
| YIELD        | 4 villas   |
| PRODUCT MIX  | 1 x 1 bedroom, 1 x 2 bedroom, 1 x 3 bedroom and 1 x 4 bedroom villas   |
| SIZES        | Unit 1: 57 sq.m<br>Unit 2: 87 sq.m<br>Unit 3: 123 sq.m<br>Unit 4: 229 sq.m   |
| PRICES       | Unit 1 (1 bedroom villa): Initially sold for \$430,000 in July 2012 and most recently resold in May 2014 for \$495,000<br><br>Unit 2 (2 bedroom villa): Initially sold for \$535,000 in May 2012 and has not been resold since<br><br>Unit 3 (3 bedroom villa): Initially sold for \$638,000 in August 2011 and has not been resold since<br><br>Unit 4 (4 bedroom villa): Initially sold for \$680,000 in July 2011 and has not been resold since |
| FEATURES     | - Each villa has 2 car spaces  |



Source: realestate.com.au; RPData; Urbis



|              |  |
|--------------|--|
| PROJECT NAME | Rosina Villas  |
| ADDRESS      | 550 Old Northern Road, Dural   |
| DEVELOPER    | Hardenbergia Pty Ltd   |
| YEAR BUILT   | 2011   |
| YIELD        | 17 villas  |
| PRODUCT MIX  | 17 x 3 bedroom villas  |
| SIZES        | Each villa is approximately 120 sq.m   |
| PRICES       | Villas initially sold for \$637,500 to \$655,000 in 2012/ 2013.<br>Unit 15 recently resold in September 2014 for \$782,000 |
| FEATURES     | <ul style="list-style-type: none"> <li>- 3 bathrooms</li> <li>- 2 car garage</li> </ul>                                    |



Source: realestate.com.au; RPData; Urbis



|              |   |
|--------------|---|
| PROJECT NAME | n.a.  |
| ADDRESS      | 4-10 Arcadia Road, Galston  |
| DEVELOPER    | n.a.  |
| YEAR BUILT   | 2013  |
| YIELD        | 7 lot residential subdivision (house and land packages)   |
| PRODUCT MIX  | House and land packages, mostly 4 bedroom homes   |
| SIZES        | Lot 2: 550 sq.m (land size)<br>Lot 4: 523 sq.m (land size), 272 sq.m (building size)<br>Lot 5: 525 sq.m (land size), 272 sq.m (building size) |
| PRICES       | Lot 2: \$648,800 (March 2012)<br>Lot 4: \$694,850 (Feb 2014)<br>Lot 5: \$673,995 (March 2012)   |
| FEATURES     | - 3 bathrooms<br>- 2 car garage   |



Source: realestate.com.au; RPData; Urbis

|              |  |
|--------------|--|
| PROJECT NAME | n.a.   |
| ADDRESS      | 81 Hyde Avenue, Glenhaven  |
| DEVELOPER    | Australand Holdings  |
| YEAR BUILT   | 2005   |
| YIELD        | 7 townhouses   |
| PRODUCT MIX  | 3 and 4 bedroom townhouses   |
| SIZES        | Unit 4: 156 sq.m (total floor area)<br>Unit 6: 150 sq.m (total floor area)   |
| PRICES       | Unit 1 (4 bedroom townhouse): Initially sold for \$500,000 in July 2005 and most recently resold in February 2013 for \$630,000<br><br>Unit 4 (4 bedroom townhouse): Initially sold for \$480,000 in February 2007 and most recently resold in June 2014 for \$820,000<br><br>Unit 6 (3 bedroom townhouse): Initially sold for \$499,000 in June 2006 and most recently resold in May 2013 for \$624,400<br><br>Unit 7 (3 bedroom townhouse): Initially sold for \$485,000 in December 2005 and most recently resold in May 2013 for \$636,000 |
| FEATURES     | <ul style="list-style-type: none"> <li>- 2 bathrooms</li> <li>- 2 car garage</li> </ul>  |



Source: realestate.com.au; RPData; Urbis

|              |  |
|--------------|--|
| PROJECT NAME | Robinia Grove  |
| ADDRESS      | 542-544 Old Northern Road Dural  |
| DEVELOPER    | Yorkcove Pty Ltd   |
| YEAR BUILT   | 2000   |
| YIELD        | 26 townhouses and apartments   |
| PRODUCT MIX  | 5 townhouses (2 x 2 bed, 3 x 3 bed)<br>21 units (8 x 2 bed, 13 x 3 bed)  |
| SIZES        | Unit 9 (2 bedroom unit): 135 sq.m (including garage)   |
| PRICES       | Unit 4 (3 bedroom townhouse): Initially sold for \$179,000 in March 1998 and most recently resold in March 2015 for \$775,000<br><br>Unit 6 (3 bedroom townhouse): Initially sold for \$361,000 in July 2001 and most recently resold in August 2014 for \$735,000<br><br>Unit 9 (2 bedroom apartment): Initially sold for \$252,000 in December 1999 and most recently resold in March 2015 for \$650,000<br><br>Unit 18 (2 bedroom apartment): Initially sold for \$245,000 in October 1999 and most recently resold in January 2015 for \$665,000 |
| FEATURES     | - 2 bathrooms<br><br>- 1 car space for 2 bedroom dwellings, 2 car spaces for 3 bedroom dwellings   |



Source: realestate.com.au; RPData; Urbis

|              |  |
|--------------|--|
| PROJECT NAME | The Grove  |
| ADDRESS      | 364-368 Galston Road, Galston  |
| DEVELOPER    | Tristar Ventures Pty Ltd   |
| YEAR BUILT   | 2001   |
| YIELD        | 18 townhouses  |
| PRODUCT MIX  | 18 x 3 bedroom townhouses  |
| SIZES        | Approx. 114 – 166 sq.m (total floor area)  |
| PRICES       | <p>Unit 2 (3 bedroom townhouse): Initially sold for \$300,000 in October 2001 and most recently resold in December 2014 for \$620,000</p> <p>Unit 4 (3 bedroom townhouse): Initially sold for \$280,000 in August 2001 and most recently resold in November 2014 for \$610,000</p> <p>Unit 5 (3 bedroom townhouse): Initially sold for \$290,000 in August 2001 and most recently resold in August 2013 for \$530,500</p> <p>Unit 17 (3 bedroom townhouse): Initially sold for \$290,000 in November 2001 and most recently resold in October 2013 for \$525,000</p> |
| FEATURES     | <ul style="list-style-type: none"> <li>- 2 bathrooms</li> <li>- 2 car garage</li> </ul>  |



Source: realestate.com.au; RPData; Urbis

## PROPOSED RESIDENTIAL DEVELOPMENTS

There is limited residential development activity proposed within the region surrounding the subject site. Table 1.4 below provides a summary of the developments that are proposed within the suburbs of Dural, Galston, Glenhaven, Glenorie and Arcadia.

Two of these proposed developments are residential subdivisions, one of which is a rural residential subdivision which is not directly relevant to the subject site because of the large scale of the lots proposed (4,022 sq.m to 7,099 sq.m).

The Skyline Dural development presents the most significant competition to the development of the subject site if the project is to go ahead. This development is approximately 1.4 kilometres from the subject site along Old Northern Road and proposes a significant number of residential dwellings in addition to other potential competing land uses such as retail and commercial uses.

The Cascades development also presents potential competition to the development of the subject site. The Cascades site is just 250 metres to the north of the subject site and proposes a range of land uses such as residential, retail and commercial uses which may also compete with a development on the subject site.

For the purposes of our analysis, we have assumed that the South Dural precinct development will not proceed within the timeframe considered. We are advised that fragmented land ownership and infrastructure servicing costs are currently limiting the ability for the land to be brought forward for residential development.

### Proposed Residential Developments

DURAL, GALSTON, GLENHAVEN, GLENORIE AND ARCADIA SUBURBS

TABLE 1.4

| Project Title              | Address   | Yield                           | Estimated Completion | Stage                                    | Description   |
|----------------------------|---|---------------------------------|----------------------|--|---|
| South Dural Subdivision    | Bound by Old Northern, New Line & Hastings Roads, Dural | 3,000 lots                      | 2025                 | Rezoning application                     | Proposed residential subdivision of 3,000 lots with sizes ranging from 250sq.m to 2,000sq.m and to include 3-5 storey dwellings, townhouses & terraces, detached dwellings and large lots   |
| Skyline Dural              | 488-494 Old Northern Road, Dural                        | 80 apartments and 21 townhouses | 2019                 | Rezoning application                     | Planning proposal to facilitate the development of a part 4/ part 5 storey residential flat building containing 80 apartments and ground floor retail uses on the southern portion of site. The concept also includes a retail/ commercial building at northern end comprising a supermarket, specialty stores, office suites and 3 levels of basement parking. The proposal also includes 21 townhouses at rear of development |
| Cascades                   | 636 Old Northern Road, Dural                            | 17 units                        | 2017                 | Contract let and preferred builder named | Proposed mixed use development with 17 residential apartments (6 x 2 bed, 10 x 3 bed and 1 x 4 bed), a variety of business uses (business premises, shops, restaurants, childcare centre and medical consulting rooms), restaurant and cafes, childcare centre and multi-purpose hall facility  |
| Horizon Estate Subdivision | 3050 Old Northern Road, Dural                           | 10 lots                         | 2015                 | Subdivision approval                     | Proposed rural residential subdivision of 10 community title lots with lot sizes ranging from 4,022 sq.m to 7,099 sq.m  |

Source : Cordell Connect; Urbis

### 1.3 RESIDENTIAL SALES MARKET

This section considers the number of transactions and median sale prices for residential properties (both houses and apartments) in the suburbs surrounding the subject site in order to provide insight into the state of the local residential property market. There is also consideration of the market drivers that are impacting the Sydney residential property market.

#### INCREASING PRICE GAP BETWEEN HOUSES AND APARTMENTS

Australian's dream of a white picket fence home is slipping away for a large proportion of the population. The key driver affecting this shift in housing choices and location is affordability.

The chart below demonstrates a major driver behind the shift of dwelling alternatives and the rise of infill development across the country. The graph demonstrates the average price gap between housing and apartments over the past thirty, ten, five and one year periods for Brisbane, Sydney and Melbourne.

#### Apartment vs. House Price Gap

BRISBANE LGA, MELBOURNE GCCSA, AND SYDNEY GCCSA

CHART 1.11



Source: RP Data; Urbis

- Sydney has one of the largest price gaps on the eastern seaboard of Australia. This is most likely due to it currently having one of the highest median house prices in comparison to Brisbane and Melbourne; and
- A combination of population growth, centralisation and geography has structured the cost of land within Sydney to rise based on scarcity of demand.
- The cost of traditional housing in Sydney is becoming increasingly expensive, and as such still provides a key driver promoting the development of infill or density development as alternative dwelling options.
- The increased costs of housing and demographic shifts are also combining to create a demand for rental accommodation which has further driven the demand for higher density development.
- The housing market within Dural offers a point of difference in that it provides residents with a semi-rural lifestyle whilst being located on the edge of an urban area, as well as offering some more affordable housing options. Residents that choose to live in this area are often motivated by lifestyle choices.



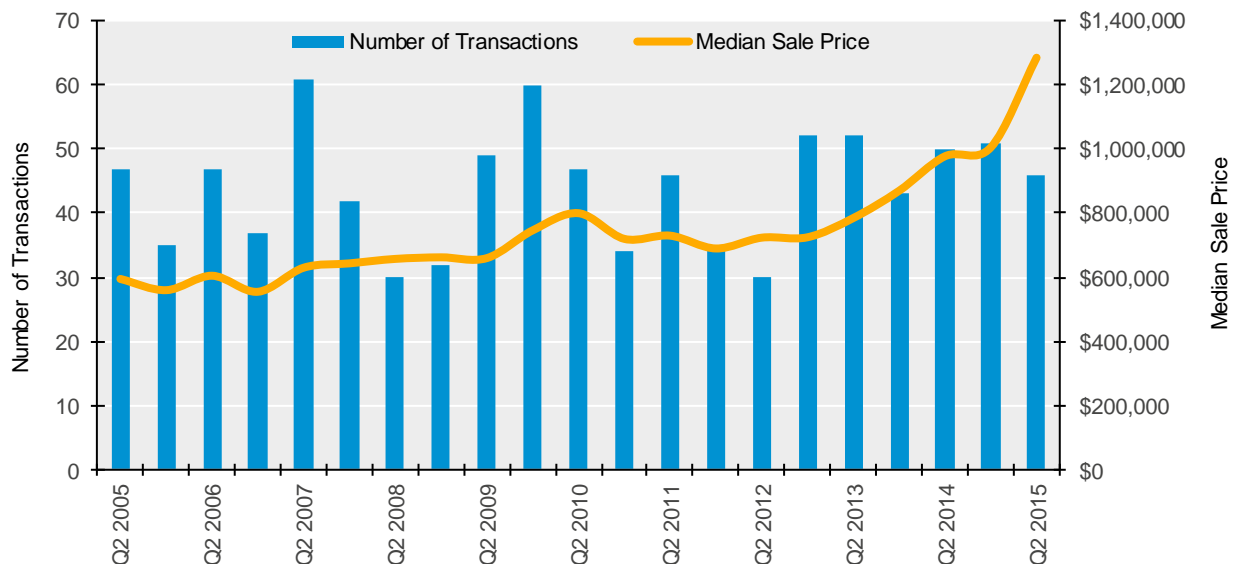
## DURAL REGION SALES CYCLE – HOUSES

The sales cycle below depicts the sales volume and median sale price for houses every second and fourth quarter from 2005 to 2015 within the Dural region (i.e. the suburbs of Dural, Galston, Glenhaven, Glenorie and Arcadia).

### House Sales Cycle – Q2 2005 to Q2 2015

DURAL, GALSTON, GLENHAVEN, GLENORIE AND ARCADIA SUBURBS

CHART 1.12



Note: Data is based on single residential dwellings

Source : RPData; Urbis

- The median sale price for houses in the Dural region was recorded at \$1,285,000 in the second quarter of 2015, based on 46 settled transactions
- The median price has shown an upward trend since 2012 (despite a small plateau in 2014), recording growth of 78% between the second quarter of 2012 and 2015
- Sydney experienced a period of decline during the Global Financial Crisis from 2008. In an attempt to stabilise the Australian economy, government stimulus packages paid to households prompted investors to capitalise on a subdued housing market, leading the median sale price to increase momentarily in 2009/2010
- Prior to the strong growth from 2012 onwards, the median sale price achieved relatively subdued growth. More recently however, the housing market has been underpinned by the Reserve Bank of Australia keeping the cash rate at historically low levels, with investors accounting for a significant amount of home loans.
- The number of house transactions in the Dural region is relatively limited, with significant fluctuations over the 10 year period. Over the period, the number of transactions in any quarter has ranged from 30 (Q2 2008) to 61 (Q2 2007).
- The median sale price of houses in the local area is elevated by the sale of large residential lots (up to five acres in size).

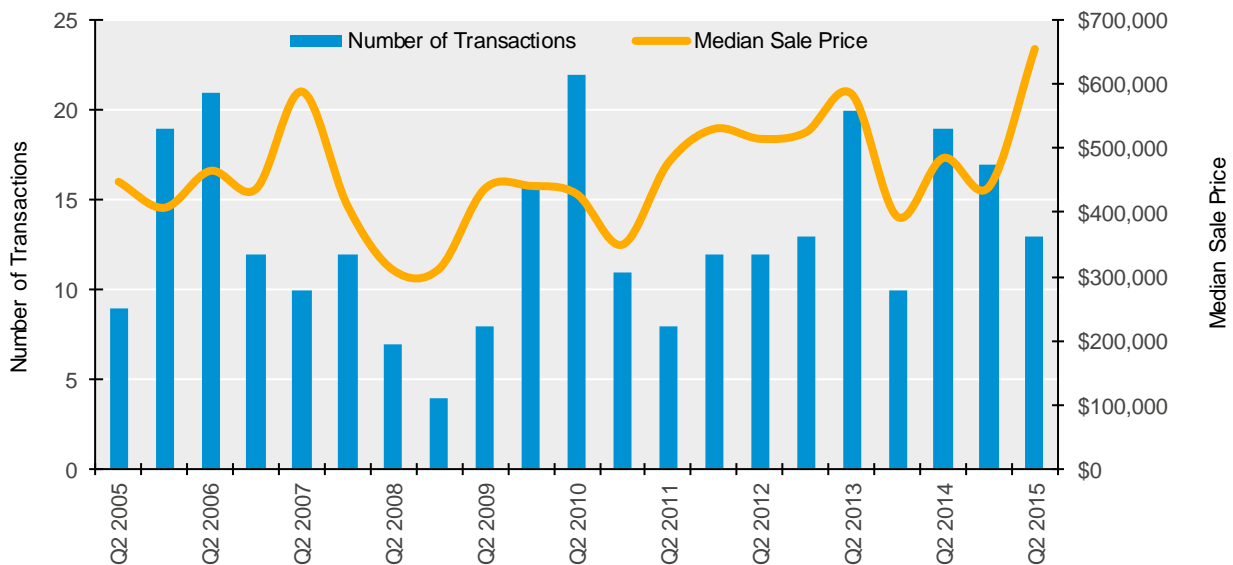
## DURAL REGION SALES CYCLE – APARTMENTS

The sales cycle below depicts the sales volume and median sale price for apartments every second and fourth quarter from 2005 to 2015 within the Dural catchment.

### Apartment Sales Cycle – Q2 2005 to Q2 2015

DURAL, GALSTON, GLENHAVEN, GLENORIE AND ARCADIA SUBURBS

CHART 1.13



Note: Data is based on residential strata units and multiple residential dwellings

Source : RPData; Urbis

- The median sale price for apartments in the Dural region was recorded at \$655,000 in the second quarter of 2015, based on 13 settled transactions. Over the 10 year period, the highest median sale price was \$755,000 (Q3 2014), also based on 13 transactions
- The median sale price has experienced strong growth over the last half year, however has experienced significant fluctuations over the 10 year period displayed in the chart
- Similarly, the number of transactions has also varied significantly over the period, ranging from just four transactions in Q3 2007 and Q4 2008 to 22 transactions in Q2 2010
- Over this decade, the number of house transactions has exceeded the number of apartment transactions.

## RESIDENTIAL DEMAND DRIVERS

We have identified five key drivers of residential housing demand relevant to the subject sites (both the northern and southern sites). These key drivers include access to amenities and employment, transport and infrastructure, population growth and competing supply. The following table provides a brief description of these drivers and implications for the subject sites.

| FACTORS             | COMMENTS  | IMPLICATIONS FOR THE SUBJECT SITE  |
|---------------------|---|--|
| Access to amenities | Locations that have easy access to shops, public transport, parks, entertainment and dining options, medical facilities and schools will be highly demanded as residential locations. These factors remain high on the priority lists of those looking to rent or buy | <ul style="list-style-type: none"> <li>▪ Residents will have access to the retail offer at Dural Mall (including a Woolworths supermarket) and the Dural IGA to the north).</li> <li>▪ For the northern portion of the site additional convenience and food retail options will be available at the possible Cascades development at 636 Old Northern Road and the Skyline development at 488 Old Northern Road.</li> <li>▪ A range of bulky goods retailers, service providers and fast food restaurants also exist near the intersection of Old Northern Road and New Line Road which is adjacent to the subject site.</li> <li>▪ The site is located opposite Redfield College, with Dural Public School located approximately 600 metres north-west along Old Northern Road</li> <li>▪ The site is located approximately 4.7 -5.1 kilometres from Castle Towers Shopping Centre, which is the closest regional shopping centre providing a large discretionary offer for residents.</li> <li>▪ Residents on the southern site will have direct access to the proposed medical centre/ private day surgery/medical centre on the site. The Round Corner Medical Practice is also located adjacent to the Dural Mall.</li> </ul> |

| FACTORS                      | COMMENTS  | IMPLICATIONS FOR THE SUBJECT SITE   |
|------------------------------|---|---|
| Access to employment         | Residents often prefer to live close to work, enabling them to minimise travel times and improve work life balance  | <ul style="list-style-type: none"> <li>▪ The nearest major employment centre is the Norwest Business Park</li> <li>▪ There are existing employment opportunities within the retail/ commercial centres in Dural and its environs (including Round Corner)</li> <li>▪ Employment options in the local area are generally restricted to the neighbouring retailers, such as the local supermarkets and convenience and bulky goods retailers</li> </ul> |
| Transport and Infrastructure | <ul style="list-style-type: none"> <li>▪ Access to good public transport and road infrastructure are important to potential purchasers and renters. Particularly, linkages to the CBD, airport and major employment centres.</li> <li>▪ Future infrastructure projects can revitalise areas, improve connectivity and linkages, create new jobs and reshape the existing community</li> </ul> | <ul style="list-style-type: none"> <li>▪ The Sydney Metro Northwest will include a station with park and ride facilities at Cherrybrook. This will enhance connections to key employment nodes across Sydney</li> <li>▪ The Sydney CBD, a major employment node, is marginally more accessible from the southern site due to the bus service that runs from near the intersection of Old Northern Road and New Line Road.</li> </ul>                  |
| Population growth            | <ul style="list-style-type: none"> <li>▪ Population growth is a key indicator of demand for residential dwellings</li> </ul>  | <ul style="list-style-type: none"> <li>▪ The population of the Dural Catchment Area is expected to experience marginal growth between 2011 and 2031, increasing by a projected 550 residents. The growth rates for the catchment area are generally below the averages seen across the Hills Shire and Hornsby LGAs.</li> </ul>   |

| FACTORS          | COMMENTS  | IMPLICATIONS FOR THE SUBJECT SITE   |
|------------------|---|---|
| Competing supply | <ul style="list-style-type: none"> <li>▪ Competing residential developments provide an indication of market preferences in terms of price points, size, mix and scale of development.</li> <li>▪ The amount of competing supply, quality and location of other developments in the area can influence demand on the subject site</li> </ul> | <ul style="list-style-type: none"> <li>▪ The trend in residential dwellings in the Dural Catchment Area shows a clear preference for larger, detached dwellings. It is a lifestyle trend for residents to move to areas like Dural for a semi-rural lifestyle on a large block of land</li> <li>▪ Some recent developments have been small developments of units and townhouses (or a combination of both). These developments don't generally exceed 30 dwellings however the proposed Skyline development will (80 units and 21 townhouses)</li> <li>▪ These unit and townhouse developments cater to the residents who enjoy the lifestyle of living in Dural, however choose to downsize so the maintenance of their property is minimised</li> <li>▪ Recent developments have shown a preference for dwellings of 3-4 bedrooms</li> <li>▪ Most dwellings, regardless of dwelling type, tend to have at 2 car spaces due to the high usage of private transport (which is a result of the limited public transport infrastructure)</li> <li>▪ The median house price in the Dural region has recorded strong growth in recent years; however the median apartment prices have experienced more volatility.</li> <li>▪ Furthermore, the number of house transactions in the local area has generally exceeded the number of apartment transactions.</li> </ul> |

In summary, the following elements will influence demand for, and type of, residential dwellings on the subject site:

- The southern site is better positioned to accommodate higher density residential dwellings (smaller detached lots, townhouses and apartments) due to its closer proximity to existing and planned amenities as part of the development concept for the land
- Employment options within the local area are somewhat limited; however the choice to move to the Dural area is usually based on lifestyle factors. The Sydney Metro Northwest will improve access to employment with the station located at Cherrybrook which is to include a park and ride facility.
- Public transport infrastructure is limited within the local area, with only bus services being provided. Consequently, most residents will use private motor vehicles and hence most dwellings should include two car spaces.
- Official population growth projections suggest that future population growth within the Dural Catchment Area is moderate and this needs to be considered in the scale of development on the subject sites
- The majority of the dwelling stock within the Dural area is larger detached dwellings with some higher density townhouses. Most of the dwellings have 3 to 4 bedrooms to suit the large family market.
- From discussions with local real estate agents, it is apparent that the majority of people moving into or enquiring about the Dural area are owner occupiers, most of which are young families. These families are often second home buyers.
- There has also been demand from retirees looking to move into the area; however affordability is becoming an increasing barrier for these buyers in the Dural area. According to the local agents, the residential lots of around one acre have been selling for approximately \$1.1 to \$1.7 million, with the five acre lots selling for \$2 to \$3 million. Therefore there is likely to be demand for more affordable residential options within the local area.

## 1.4 RESIDENTIAL RECOMMENDATIONS

The following section provides a summary of the key recommendations for the proposed development of the subject site in terms of the residential component.

The recommendations are based on the following:

- Demographic trends of those in the Dural region
- Recent sales in the local area
- Recent developments that have occurred or are expected to occur in the local area
- Discussions with local real estate agents.

Table 1.5 following provides a summary of the recommendations for the mix, size and pricing of the residential dwellings on the subject site. Both low and high density options have been provided in the table, with the higher density option carrying more risk in terms of market supportability. Key points to note from our analysis include:

- The majority of the dwellings should be detached dwellings and townhouses. There could also be some smaller dwellings in the form of apartments. As the majority of residents moving into the area are from the local area, they are used to larger dwellings and hence the internal size of the dwellings recommended for the subject site are generously proportioned with mostly three to four bedrooms.
- The southern site should contain a greater proportion of medium density dwellings as these dwellings will be located closer to amenities, which is regarded as a trade-off for individual property sizes
- The demographics also suggest that there is a significant retiree market within the Dural area, many of whom are downsizers and empty nesters. Despite the smaller dwelling size requirements of retirees, it is common for them to want an additional bedroom for family members and friends to stay with them or to accommodate other uses such as studies.
- The pricing of the dwellings is reflective of similar dwellings currently available or recently sold within the local area, as well agents' advice given the current state of the market
- The growing residential population in the Dural region will strengthen the retail spending market in the area, further supporting the existing retailers and service providers at Dural/ Round Corner
- The Dural region is still a predominantly detached housing market, but strategic planning is making increasing provisions for higher density around town centres (such as Rouse Hill Town Centre). This trend is further being fuelled by housing affordability issues where semi-detached or apartment dwellings are generally more affordable than detached dwellings.
- The medium density type dwellings have been receiving interest mainly from downsizers and retirees who are looking to move from acreage properties in the local area. The rural setting offered in Dural still appeals to these people and hence they don't want to move out of the area. We note however that despite the interest in these dwellings, there is currently a limited supply of townhouses in the local area.
- There has also been some demand for larger residential lots with detached dwellings. It is believed that this demand is driven by the price increases for smaller properties in the Castle Hill/ Kellyville areas. Buyers will instead look to the larger properties in the Dural area (where the price increases have not been as significant) where they are able to achieve better value.
- Overall, there appears to be a need to provide a broader range of residential dwellings in the local area, providing more variety in terms of lot size, dwelling size and cost. The type of residential product in demand appears to range from some larger rural residential lots to more medium density type stock such as townhouses and larger apartments. By providing a broad range of dwelling types on the site, this will ensure that the needs of the local market are met and the character of the area is maintained.

## Dwelling Mix, Size and Pricing

### SUBJECT SITES

TABLE 1.5

| Dwelling Type | Number of Bedrooms | % of Total Dwellings |                       | % of Dwellings by type | Internal Size (sq.m) | Land Area (sq.m) | Indicative Sale Price*    |
|---------------|--------------------|----------------------|-----------------------|------------------------|----------------------|------------------|---------------------------|
|               |                    | Lower Density Option | Higher Density Option |                        |                      |                  |                           |
| Apartment     | 2                  |                      |                       | 30%                    | 80-100               | n.a.             | \$600,000 - \$650,000     |
|               | 3                  |                      |                       | <u>70%</u>             | 100-120              | n.a.             | \$700,000 - \$750,000     |
|               |                    | 30%                  | 30%                   | 100%                   |                      |                  |                           |
| Townhouse     | 2                  |                      |                       | 10%                    | 100-125              | 125-175          | \$700,000 - \$750,000     |
|               | 3                  |                      |                       | 60%                    | 125-150              | 175-225          | \$750,000 - \$800,000     |
|               | 4                  |                      |                       | <u>30%</u>             | 150-175              | 225-275          | \$800,000 - \$850,000     |
|               |                    | 35%                  | 70%                   | 100%                   |                      |                  |                           |
| Detached      | 3                  |                      |                       | 20%                    | 200-220              | 450-525          | \$950,000 - \$1,100,000   |
|               | 4                  |                      |                       | <u>80%</u>             | 220-240              | 525-600          | \$1,100,000 - \$1,250,000 |
|               |                    | 35%                  |                       | 100%                   |                      |                  |                           |
|               |                    | <b>100%</b>          | <b>100%</b>           |                        |                      |                  |                           |

| Dwelling Type     | Number of Bedrooms | % of Total Dwellings |                       | % of Dwellings by type | Internal Size (sq.m) | Land Area (sq.m) | Indicative Sale Price*    |
|-------------------|--------------------|----------------------|-----------------------|------------------------|----------------------|------------------|---------------------------|
|                   |                    | Lower Density Option | Higher Density Option |                        |                      |                  |                           |
| Townhouse         | 2                  |                      |                       | 10%                    | 100-125              | 125-175          | \$700,000 - \$750,000     |
|                   | 3                  |                      |                       | 60%                    | 125-150              | 175-225          | \$750,000 - \$800,000     |
|                   | 4                  |                      |                       | <u>30%</u>             | 150-175              | 225-275          | \$800,000 - \$850,000     |
|                   |                    | 10%                  | 20%                   | 100%                   |                      |                  |                           |
| Detached Dwelling | 3                  |                      |                       | 20%                    | 200-220              | 450-525          | \$950,000 - \$1,100,000   |
|                   | 4                  |                      |                       | <u>80%</u>             | 220-240              | 525-600          | \$1,100,000 - \$1,250,000 |
|                   |                    | 90%                  | 80%                   | 100%                   |                      |                  |                           |
|                   |                    | <b>100%</b>          | <b>100%</b>           |                        |                      |                  |                           |

\*Based on current sale prices

Source : Urbis



## 1.5 SENIORS LIVING

In addition to analysing the standard residential dwelling market in the Dural catchment, we have also considered the seniors living residential market in the local area.

There is a broad provision of seniors living facilities available, often differentiated by the target age groups and the level of care provided. The three broad categories of seniors living include over 55s facilities, Independent Living Units (ILUs) and aged care facilities, which have been outlined below.

Over 55s facilities are designed to offer a high-quality resort-style of living to those aged over 55 years, often providing larger villas or apartments and facilities such as swimming pools, golf courses, bowling greens, club houses and restaurants. This type of facility is often suited to active retirees who are looking to downsize but do not yet require a facility that provides care or assistance.

ILUs are a form of retirement living which is generally an accommodation unit (more akin to a flat/ studio) designed for independent retirees aged over 65 years who do not require assistance with day-to-day living or particular aged care services but where support services are available when and if required. They are often located in retirement villages with a range of community facilities and services.

Aged care homes (or nursing homes) are facilities aimed at those residents who generally need more help with day-to-day tasks, personal care and nursing care. There are both low and high care facilities, depending on the needs of the resident, however most facilities will provide 24-hour nursing support via a nurse call system for when it is required. These facilities are generally catered and will often have organised activities for the residents. They can also include specialist facilities, for example wards designated for those suffering from Alzheimer's disease.

### EXISTING SENIORS LIVING FACILITIES

Table 1.6 lists the existing seniors living facilities within the local Dural area. The table shows that there is a range of different facilities currently available in the surrounding area, ranging from over 55s facilities to aged care facilities.

#### Existing Seniors Living Facilities

DURAL, AS AT OCTOBER 2015

TABLE 1.6

| Name                                    | Address                      | Type                     | Dwellings        | Beds             |
|---|------------------------------|--------------------------|------------------|------------------|
| Oaktree Lifestyle Resort                | 28 Rosebank Ave, Dural       | Over 55s                 | 72               | n.a.             |
| Mountainview Retreat Retirement Village | 1 Stonelea Ct, Dural         | Over 55s                 | 40-50 (est.)     | 80-100 (est.)    |
| Kentgrove Lodge                         | 116B Kenthurst Rd, Kenthurst | Independent Living Units | 9                | 9                |
| Kentgrove Independent Living Village    | 2C Jones Rd, Kenthurst       | Independent Living Units | 49               | n.a.             |
| Rowland Village                         | 301 Galston Road, Galston    | Independent Living Units | 135              | 200              |
| Bupa Aged Care                          | 1 Stonelea Ct, Dural         | Aged Care                | n.a.             | 102              |
| Lady of Grace Nursing Home              | 454 Old Northern Rd, Dural   | Aged Care                | n.a.             | 52               |
| Mark Donaldson VC House                 | 301 Galston Road, Galston    | Aged Care                | n.a.             | 40               |
| <b>Total</b>                            |                              |                          | <b>305 - 315</b> | <b>483 - 503</b> |

Source : Google Maps, Facility websites; Urbis

## PROPOSED SENIORS LIVING FACILITIES

Table 1.7 outlines proposed seniors living facilities planned for the Dural area.

The Lady of Grace Nursing Home proposal is for additions to the existing facility, which will increase the total number of aged care beds in the catchment by 32.

The other proposal is for a new retirement village facility (independent living units) consisting of 70 two and three bedroom villas and units.

### Proposed Seniors Living Facilities

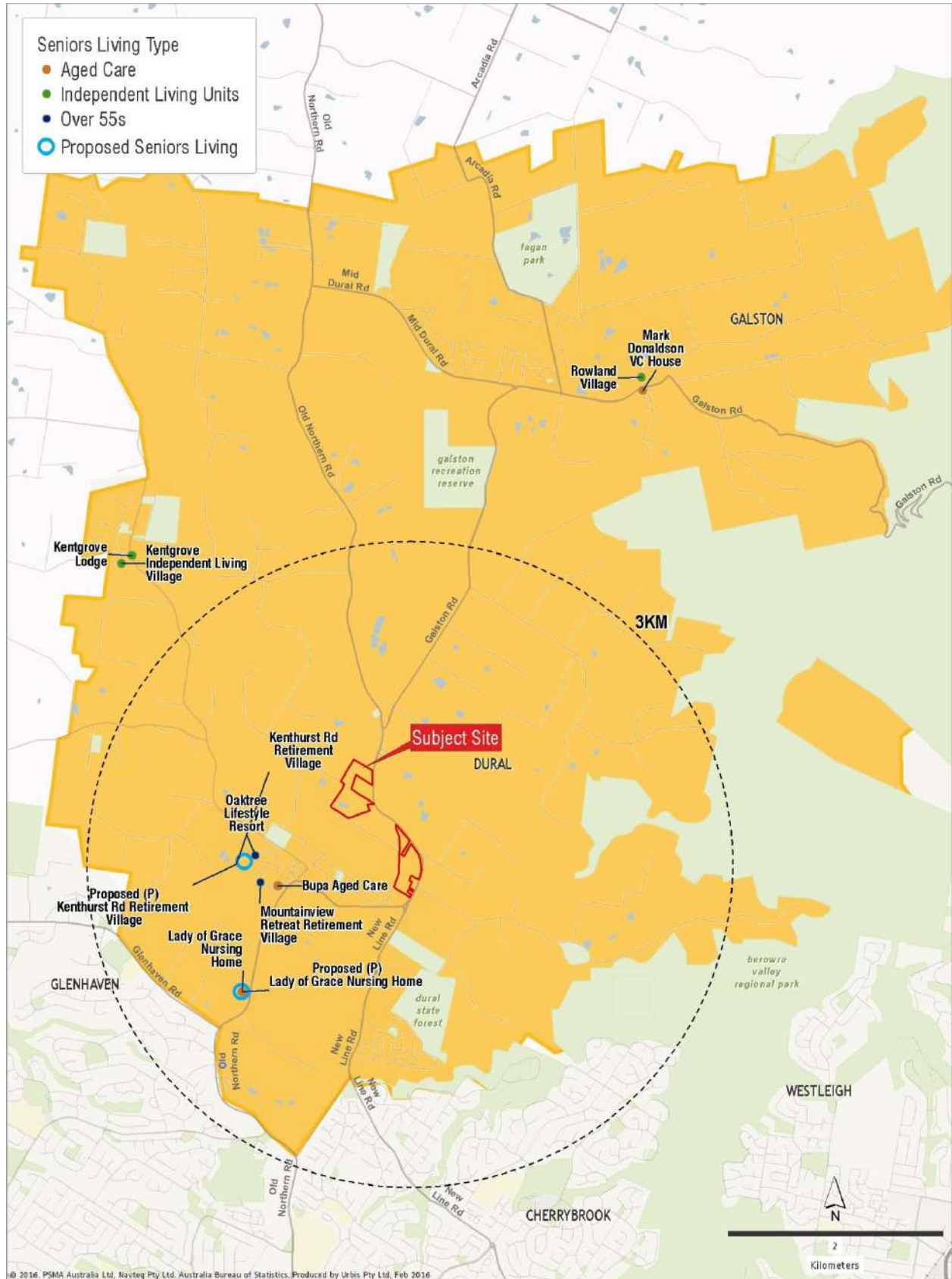
SUBURB OF DURAL, AS AT OCTOBER 2015

TABLE 1.7

| Name                              | Address                      | Description  | Estimated Completion |
|-----------------------------------|------------------------------|--|----------------------|
| Lady of Grace Nursing Home        | 454 Old Northern Road, Dural | Alterations and additions to existing nursing home to increase the number of aged care beds from 52 to 79 plus an additional 5 assisted care units, giving a total of 84 beds.                   | 2017                 |
| Kenthurst Road Retirement Village | 50 Kenthurst Road, Dural     | Construction of a new 70 unit self-care housing development containing 22 x 2/3 bedroom freestanding single storey villas, 48 x 2 bedroom units in 2 storey buildings and additional facilities. | 2016                 |

Source : Cordell Connect; Urbis

The existing and proposed seniors living facilities have been shown on Map 1.3 on the following page. The majority of the facilities are located in the south-western corner of Dural, in close proximity to the subject site. This is also the location of the two proposed facilities, with this area being favourable due to its proximity to amenities and facilities.



## FORECAST DEMAND FOR SENIORS LIVING

In order to assess the likely demand for the different seniors living facilities, we have considered the demand for the over 55s facilities separate to the facilities that provide some level of support/ care (ILUs and aged care). The ILU and aged care facilities are generally for those aged over 65 years.

### Over 55s Facilities:

Table 1.8 summarises the demand projections for over 55s facilities in the Dural area, which is based on the following assumptions:

- As at 2011, 33% of the population was aged over 55 years. This rate has been applied to the population forecasts to determine a conservative view of the potential population of the area aged over 55 years to 2026
- The population of the Dural area aged over 55 years is projected to grow from approximately 3,700 in 2015 to 4,400 by 2026, assuming the proportion of the population in this age group remains unchanged
- At present, there are approximately 112-122 over 55s dwellings in the catchment area, potentially catering for up to approximately 240 residents
- This suggests that just 6.4% of the population aged over 55 years are currently living in over 55s facilities
- If this same rate is applied to the population in 2026, the number of people living in over 55s facilities could reach over 280 residents, suggesting that there is some scope to increase the supply of over 55s dwellings in the local area.

Worth noting is that these projections assume that the proportion of the population aged over 55 years will remain unchanged over the coming years. However, the general trend across the broader Sydney area is of an ageing population which could potentially increase the demand for over 55s dwellings in the local area, particularly as the Dural area is seen as an attractive area for retirees.

## Population Aged 55+ Years

DURAL

TABLE 1.8

|  | 2011   | 2015     | 2016     | 2021      | 2026      |
|--|--------|----------|----------|-----------|-----------|
| Total Population                                       | 10,700 | 11,200   | 11,300   | 12,700    | 13,200    |
| Population aged 55+ years (%)                          | 33%    | 33%      | 33%      | 33%       | 33%       |
| Population aged 55+ years (no.)                        | 3,579  | 3,746    | 3,780    | 4,248     | 4,415     |
| Population aged 55+ years in existing facilities (no.) |        | 240      | 240      | 240       | 240       |
| Population aged 55+ years in existing facilities (%)   |        | 6.4%     | 6.4%     | 6.4%      | 6.4%      |
| Potential total demand for over 55s facilities         |        | 240      | 242      | 272       | 283       |
| <b>Potential unmet demand</b>                          |        | <b>0</b> | <b>2</b> | <b>32</b> | <b>43</b> |

Source : ABS Census 2011; Urbis

## Independent Living Units and Aged Care:

Residents who live in ILUs and aged care facilities are generally aged over 65 years, with these facilities providing some level of support and/ or care for the residents when and if required.

Table 1.9 summarises the demand projections for ILUs and aged care facilities in the Dural area, which is based on the following assumptions:

- In 2011, approximately 20% of the catchment population was aged over 65 years.
- ABS 2011 Census data suggests that approximately 25% of the population of Dural, Galston, Glenorie, Glenhaven and Arcadia aged over 65 years live in ILUs or aged care. The dwelling types from the Census data included in this analysis include those living in retirement villages, nursing homes and accommodation for the retired or aged (not self-contained).
- This proportion has then been applied to the proportion of the Dural population aged over 65 years, resulting in the number of residents potentially living in ILUs or aged care in the catchment.
- When this is compared to the current and proposed supply of ILUs and aged care places in the catchment, there appears to be a reasonable undersupply at present. With the proposed developments being completed in the coming years, the undersupply is expected to contract noticeably, before growing back up to current levels by 2026. This suggests that there is potential demand for ILU and/or aged care facilities in the local area.

However it should be noted that this is assuming no further supply will enter the market prior to a potential development on the subject site and hence the development pipeline should be monitored appropriately. Furthermore, this demand is based on a consistent proportion of the population aged over 65 years living in ILUs and aged care from 2011 to 2026.

## Potential ILU and Aged Care Demand

DURAL

TABLE 1.9

|  | 2011         | 2015          | 2016         | 2021         | 2026          |
|--|--------------|---------------|--------------|--------------|---------------|
| Total Population                               | 10,700       | 11,200        | 11,300       | 12,700       | 13,200        |
| Population aged 65+ years (%)                  | 20%          | 20%           | 20%          | 20%          | 20%           |
| Population aged 65+ years (no.)                | 2,139        | 2,239         | 2,259        | 2,539        | 2,639         |
| Population aged 65+ in ILUs or aged care (%)   | 25%          | 25%           | 25%          | 25%          | 25%           |
| Population aged 65+ in ILUs or aged care (no.) | 543          | 568           | 573          | 645          | 670           |
| Supply of ILUs and aged care                   | 450-480      | 450-480       | 520-550      | 552-582      | 552-582       |
| <b>Potential unmet demand</b>                  | <b>63-93</b> | <b>88-118</b> | <b>23-53</b> | <b>63-93</b> | <b>88-118</b> |

Source : ABS Census 2011; Google Maps; Facility Websites; Cordell Connect; Urbis

## 2 Ancillary Commercial Uses

In addition to residential uses on the subject site, we have also given consideration to ancillary commercial land uses such as service stations, leisure uses (gyms) and child care centres. We note that the client is undertaking a separate review of the market supportability of a medical centre/ private day surgery/medical centre on the subject site.

### 2.1 SERVICE STATIONS

The subject site is located at Old Northern Road, which is one of the main roads through Dural connecting to Wisemans ferry in the north.

Map 6.1 shows the location of existing service station facilities in relation to the subject site.

As indicated on the map, a service station (Shell branded) is surrounded by the subject site off Old Northern Road. Another service station (BP branded) is located further south along Old Northern Road, approximately 550 metres from the subject site.

There is a Caltex service station close to the intersection with Old Northern Road and Galston Road opposite the Dural Village retail centre. This is located on the southbound lane of Old Northern Road. There is also a Caltex service station at Round Corner.

We are not aware of any other current proposals for additional service stations within Dural at present.

On balance we do not consider that it would be advantageous to include a service station in the development mix for the following reasons:

- The extent of existing competition within the vicinity of the site
- The amount of land-take and access requirements that would be required to accommodate the use on site
- Potential integration issues with other proposed retail, health and residential uses and the need to satisfy the relevant hazard controls
- The fact that land could be better utilised for the higher value uses (residential, medical and ancillary retail).







## 2.2 GYMNASIUMS

Table 6.1 lists the name and address of existing gym facilities located within Dural. Map 2.2 opposite shows the location of these gyms in relation to the subject site.

There are eight commercial gyms located within close proximity to the subject site, catering to a broad range of different users and markets.

Within the local area, gyms are currently therefore being provided at a rate of one gym per 1,400 residents. In 2014, Urbis undertook a review of gym provision in Australia which identified that there were 3,313 gyms in Australia in 2011, equal to one gym per 6,500 people.

Based on this benchmark, gym provision in the catchment exceeds the Australia benchmark by a factor of greater than 4.5:1.

We believe that the market is currently well supplied with gym facilities and that an additional commercial gym on the subject site would not be supportable by the market.

### Existing Gym Facilities

DURAL

TABLE 2.1

| Name                                | Address                        |
|-------------------------------------|--------------------------------|
| F45 Training Dural                  | 7/915 Old Northern Road, Dural |
| Evolution Health and Fitness Studio | 25A Kenthurst Road, Dural      |
| CrossFit Norwest                    | 1/7-9 Kenthurst Road, Dural    |
| Plus Fitness                        | 5/829 Old Northern Road, Dural |
| Anytime Fitness Dural               | 6/288 New Line Road, Dural     |
| Curves Gym Dural                    | 10/288 New Line Road, Dural    |
| Resolution Fitness for Life         | 256 New Line Road, Dural       |
| Gym George Training Studio          | 30/252 New Line Road, Dural    |

Source : Google Maps; Urbis



## 2.3 CHILD CARE CENTRES

Child care centres offer professional care for children aged 0-6 years of age, where the children are generally grouped into rooms according to age and developmental stage.

### EXISTING AND PROPOSED CHILD CARE CENTRES

Map 2.3 following shows the existing child care centres in the context of the subject site and the surrounding areas. Table 2.2 lists the existing child care centres within Dural and shows the number of child care places within each facility.

From Map 2.3 and Table 2.2, the following observations can be made:

- There are 12 existing child care centres that fall within the local area, with a capacity of approximately 650 places
- The largest facility is the Fit Kidz Learning Centre Dural North which can accommodate 98 children
- The majority of the existing facilities are located at the southern end of Dural and are likely to service this part of the local area as well as the adjacent residential areas of Glenhaven and Cherrybrook.

Further to this, we note that there is one proposed child care centre within the local area. This facility will be part of the Cascades mixed use development at 636 Old Northern Road Dural, approximately 200 metres north of the subject site. As part of the mixed use development, the proposal includes a 595 sq.m child care centre for 72 children.

Additionally, another development application was submitted in early 2016 for alterations and additions to an existing dwelling to become a childcare centre for 136 children. This project is to be completed in December 2016 and the childcare centre is to be called Wiggle and Giggles Child Care Centre.

### Existing Child Care Centres

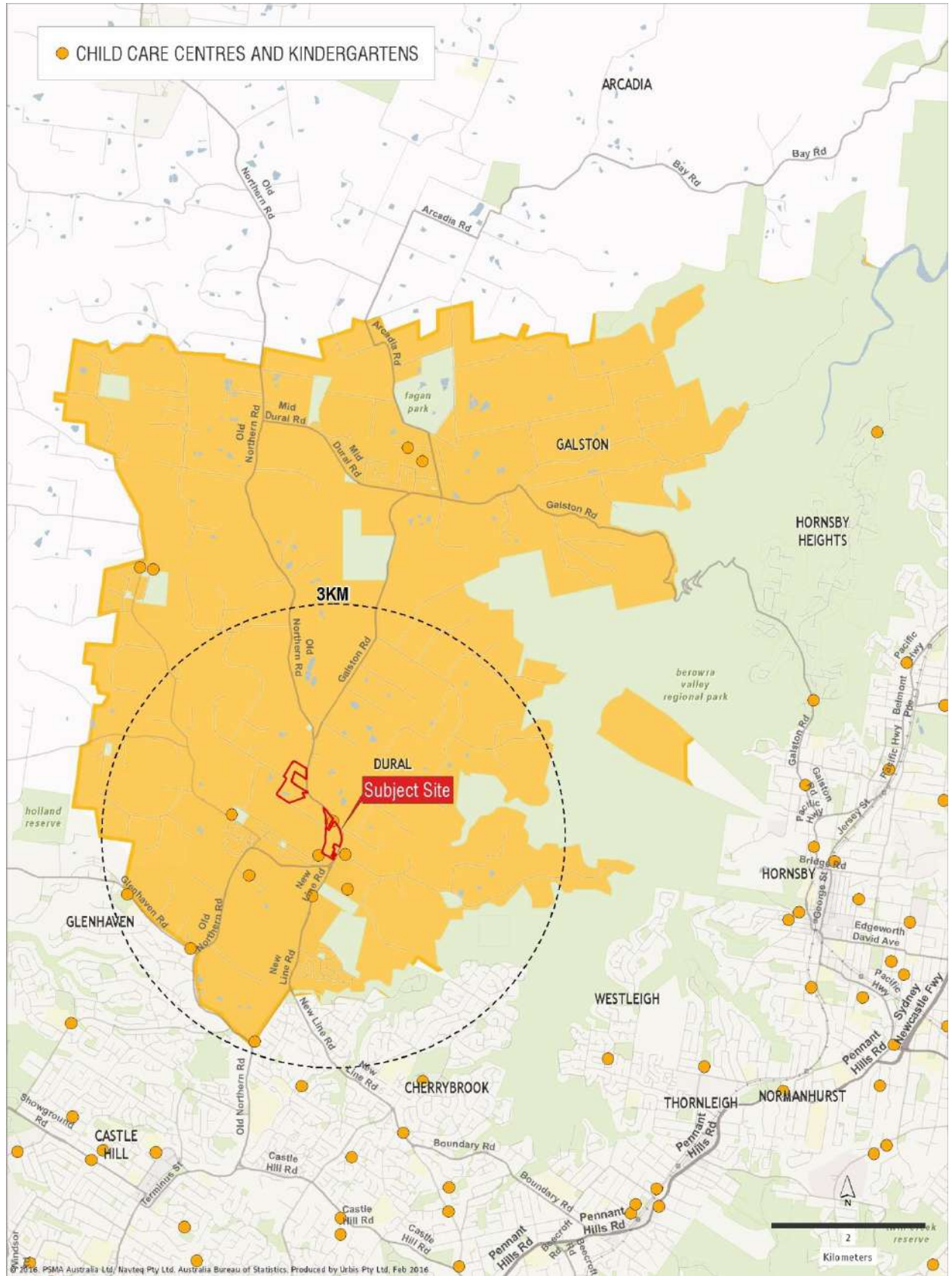
DURAL

TABLE 2.2

| Name  | Number of Places |
|---|------------------|
| Galston Long Day Care Centre                | 40               |
| KU Galston Preschool                        | 40               |
| Elbelle's Early Learning Centre             | 46               |
| Early Childhood Education Centre Child Care | 40               |
| Ellerman Long Day Care Centre               | 40               |
| Fit Kidz Learning Centre Dural North        | 98               |
| Wakefield Children's Early Learning Centre  | 70               |
| Endeavour Early Education                   | 30               |
| First Friends Preschool                     | 39               |
| KU Glenhaven Preschool                      | 43               |
| Kindalin Early Childhood Learning Centre    | 70               |
| Beehive Castle Hill Childcare               | 90               |
| <b>Total</b>                                | <b>646</b>       |

Source : [echildcare.com.au](http://echildcare.com.au); Urbis





## DEMAND ASSESSMENT FOR CHILD CARE CENTRES

Future demand for child care spaces will be driven by population growth, and the proportion of additional children in the 0-6 age category.

Based on the existing population, approximately 7% of the population is aged 0-6 years as at the 2011 Census. This age bracket is the most common user of child care facilities. If this same rate is applied to the population projections, then there could be an additional 140 children of this age in the local area by 2026.

Based on a study conducted by MacroPlan in 2010, 38% of the population aged 0-5 years in the Sydney Statistical Division have all parents working full-time and would require some form of child care. Of these, the report suggests that 73.4% of these children will be placed into formal child care. When this rate is applied to the additional 140 children aged 0-6 year within the area, this would suggest a market of 40 additional children requiring care.

In view of the current extensive supply of child care spaces, any proposed new centre should be targeted at meeting the needs of new residents at the site and its immediate vicinity. In this regard, it would be prudent to wait until the residential development is established and to carefully monitor the household profile of new residents to determine whether this generates a demand for child care facilities. This will also allow the developer to monitor the status of the possible proposed childcare centres mentioned earlier to determine if the market could support additional child care places.

### Market Demand for Additional Child Care Centres

DURAL

TABLE 2.3

| Resident market   | %   | Number    |
|---|-----|-----------|
| Population growth 2015-26   |     | 2,000     |
| Population aged 0-6   | 7%  | 141       |
| Population aged 0-6 with all parents working full time and requiring formal care      | 38% | 54        |
| Population aged 0-6 with all parents working full time who attend long day child care | 73% | 40        |
| <b>Total number of children requiring child care</b>                                  |     | <b>40</b> |

Source: ABS Census 2011; Macroplan; City of Sydney; Cordell Connect; Urbis

## 2.4 RECREATIONAL FACILITIES

'Recreational facilities' is a broad term used to describe a number of indoor and outdoor facilities catering to different sports, activities and interests. Some examples of recreational facilities include sport clubs, bowling centres, parks (local and regional), museums and swimming pools.

Map 2.4 on the following page shows the location of recreational facilities surrounding the subject site.

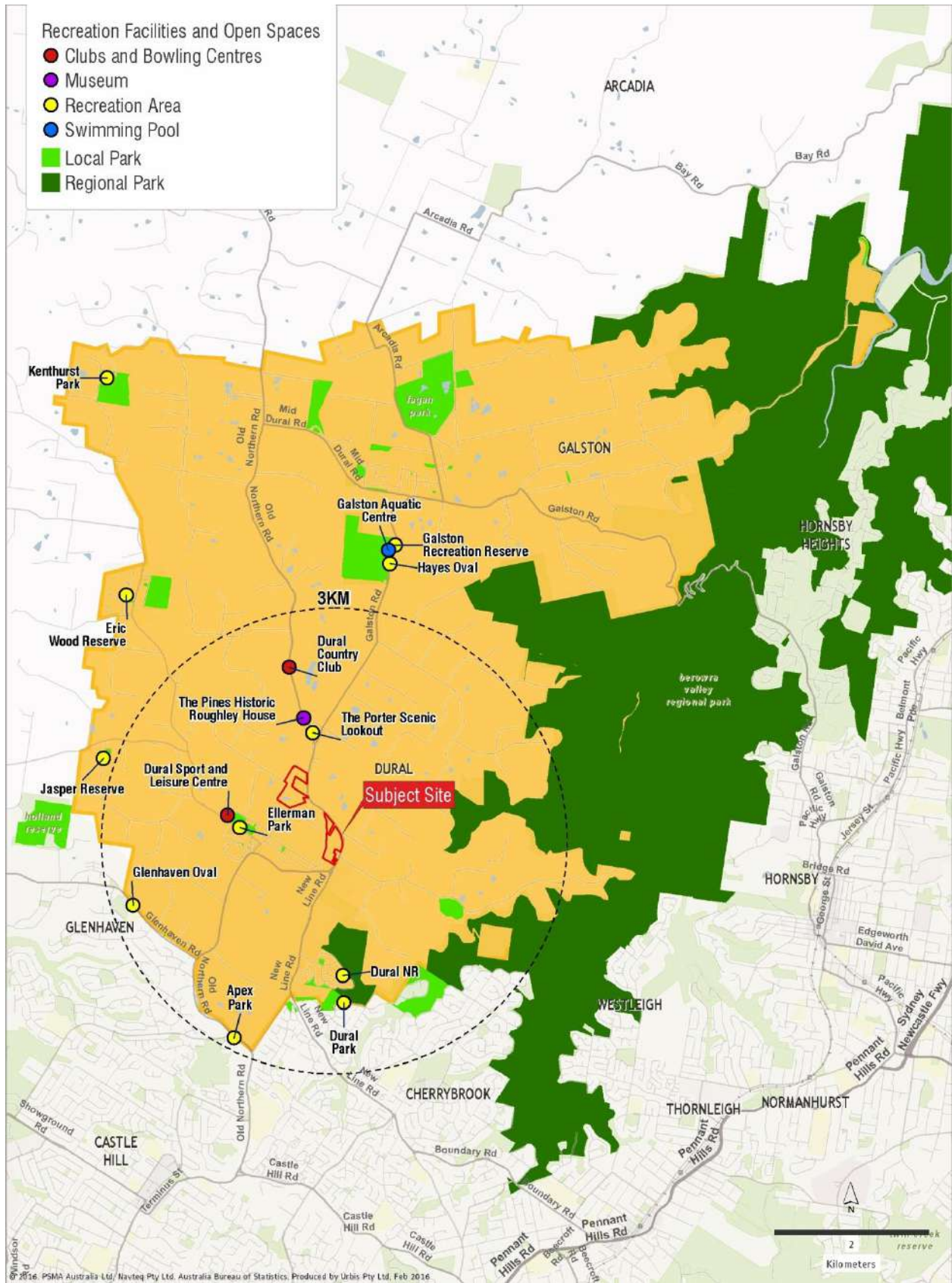
From the map it is evident that there is a significant provision of local/ regional parks and recreation areas within the local area, with the closest being the Porter Scenic Lookout to the north of the subject site and Ellerman Park to the west. The provision of parks and open spaces is relatively high compared to many areas of Sydney and hence there would be limited benefit gained from additional park and open space facilities in the local area.

In terms of swimming pools, the only existing one identified in the local area is the Galston Aquatic Centre, which is approximately 3.1 kilometres north of the subject site. Despite this being the only public swimming pool facility, the local area is still well-provisioned in terms of swimming pools as many retirement villages and seniors living facilities have their own private swimming pools for the use of their residents. This would limit the potential demand for additional swimming pool facilities in the local area.

The only museum identified in the local area is The Pines Historic Roughley House which is located just to the north of the subject site along Old Northern Road. This property is now owned by the Hills Shire Council and is a historic home that is open to the public to see an example of colonial life in the local area. With the relatively small population and limited tourism in the area, it is anticipated that there would be limited demand for an additional museum facility.

The Dural Country Club is one of two clubs/ bowling centres identified within the local area, providing dining, entertainment and function spaces, and lawn bowls. The other facility is the Dural Sport and Leisure Centre that provides a range of sporting venues (catering for futsal, netball, indoor cricket, taekwondo and indoor hockey) and function facilities. On this basis, it is unlikely that an additional club or bowling centre would be supportable given the current provision of such facilities and the relatively limited demand for these facilities in the local area.





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## 2.5 ANCILLARY RETAIL ASSOCIATED WITH DAY SURGERY/MEDICAL CENTRE

As part of the overall concept plan, a day surgery/medical centre is being considered as part of the development on the southern portion of the subject site. The demand for ancillary retailing within the day surgery/medical centre has been considered.

Retailing associated with day surgery/medical centres is primarily focused on the worker, visitor and patient market. The scale of retailing that could be supported would need to be commensurate with the role and scale of the day surgery/medical centre. Due to its association with medical facilities it typically offers less potential to attract spending from a resident market.

Day surgery/medical centres represent a significant opportunity for retail-based activity through providing a captive market of patients, visitors and staff. These groups often have time to spend. In addition, due to the circumstances around being in a day surgery/medical centre, we would expect patients and visitors to typically enjoy good propensity to 'treat' themselves and/or loved ones. If good quality retailing could be provided in high profile locations in day surgery/medical centres, these factors would work very much in favour of retailers.

From our experience of undertaking focus groups with day surgery/medical centre workers in large day surgery/medical centres and users in other locations, the following are regularly identified as desirable facilities:

- **Retail:** pharmacy, newsagency, dry cleaning, supermarket, giftware and food and beverage options.
- **Amenities:** gym, child care centre, bank, post office, medical facilities for staff (GP's allied health etc.) and outdoor areas for relaxation and congregation.

In our analysis of major day surgery/medical centres, retail floorspace per bed is typically provided at a rate of 0.6 sq.m per bed to 3.1 sq.m per bed.

As an example, Nepean Hospital, which in 2014 provided 685 beds only provided around 400 sq.m of retail floorspace (a café, newsagent and volunteer shop). At the other end of the scale, Westmead Hospital, providing 900 beds, contains around 2,800 sq.m of retail floorspace with tenants including a food court under single management, cafes, newsagent/ convenience store, mobile phone/electronic hire store, florist, optometrist, jeweller, pharmacy and hair dresser / beautician.

It is clear therefore that the amount of retail that is sustainable depends on the scale and function of the day surgery/medical centre. It is likely that a café (catering to staff, patients and visitors) and pharmacy would be supportable, with potentially a florist. A higher provision of beds could generate demand for additional services.

### 3 Conclusion

The analysis confirms that there is an underlying demand for additional residential dwellings in the Dural area. The residential dwellings provided on the site should include a variety of dwellings in terms of their lot size, dwelling size and pricing. This could range from larger residential lots with detached dwellings to more medium density type stock such as townhouses and larger apartments. The variety of dwelling types will cater to the diverse demographics of the local residents, whilst also ensuring that all land in the local area is not developed into higher density dwellings and thereby impact the character of the area.

Our analysis also indicates that there is a potential unmet demand for seniors living in the Dural area in the medium term, primarily for ILU and aged care facilities, and for over 55s facilities to a lesser extent.

The current provisioning of service stations and commercial gym uses, combined with the demand for such commercial facilities in the area, suggests that the market would not support additional facilities.

Due to the extensive supply of child care spaces in the local area, the demand for a proposed new centre will predominantly be driven by the needs of the new residents on the site. In this regard, it would be prudent to wait until the residential development is established and to carefully monitor the household profile of new residents to determine whether this generates a demand for child care facilities.

The subject site is also surrounded by recreational facilities and open spaces suggesting that there is unlikely to be significant demand for further facilities in the near future. Any future recreational facilities/open spaces would, however, further improve the amenity for the surrounding residents.

The amount of ancillary retail sustainable within a future day surgery/medical centre on the site depends on the scale and function of the day surgery/medical centre itself. It is likely that a café (catering to staff, patients and visitors) and pharmacy would be supportable, with potentially a florist. A higher provision of beds could generate demand for more services.

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02 November 2016

Ms Clare Brown  
Urbis Pty Ltd  
Level 23, Tower 2, Darling Park  
201 Sussex Street  
SYDNEY NSW 2000

Dear Clare,

## **ASSESSMENT OF NEW AGRICULTURAL ENTERPRISE VIABILITY IN DURAL**

The purpose of this letter is to outline our review of the strategic justification for the subject site located at 584-626 Old Northern Road and 7-27 Derriwong Road, Dural to be rezoned from RU6 Transition to R2 Low Density Residential.

### **SCOPE OF WORK**

This review has been prepared to assist in determining the suitability of the site for residential development having regard to its potential for agricultural purposes as envisaged under the current zoning.

This letter has been prepared to address the Section 117 Directions as they relate to the loss of agricultural zoned land, specifically responding to the terms of Section 117 Direction 1.2.

This assessment will identify:

- Whether the sites characteristics (e.g. topography and size) are incompatible with productive agricultural uses
- Whether the site's existing agricultural use is viable given its potential revenue, rental rate and land value
- Given the outcome of both investigations above, whether the site is viable for the purposes of agricultural production and whether it has any agricultural production value.

### **SUBJECT SITES**

The subject properties are located approximately 27 kilometres north west of the Sydney CBD, on the fringe of the established urban areas of Dural.

The areas to the north general comprise rural residential and small agricultural / horticultural operations, whereas land uses to the south include a broader mix of uses for commercial and retail to low density residential subdivisions.



## SUITABILITY FOR AGRICULTURAL PRODUCTION

Both sites have been cleared of natural vegetation and have relatively few structural improvements, with the northern site including a small irrigation dam. The northern site has an area of 10.848 hectares and the southern site has an area of 10.617 hectares.

With regards to the historic uses of the site:

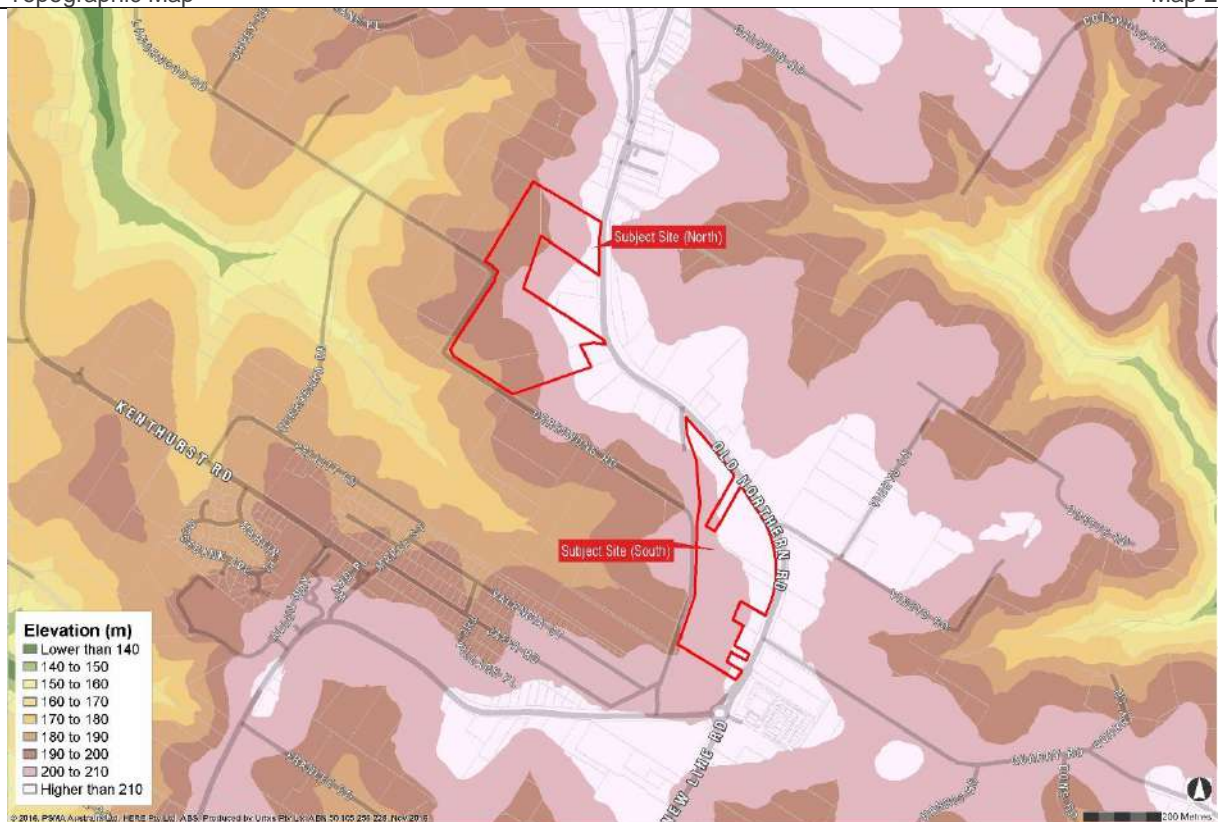
- the northern portion was formerly a peach orchard which ceased operation in mid-2014
- Based on available information, the southern portion has historically been used for rural residential purposes and the keeping of horses, with its northern tip utilised for a small-scale cultivation in late 2009 to mid-2010.

The Southern and Northern sites are characterised by an elevated ridge line along New Line Road, with a cross fall to the west and south. The slope on the sites varies, with some areas of less than 5% fall, however with significant portions of more than 10% and in small pockets over 20%.

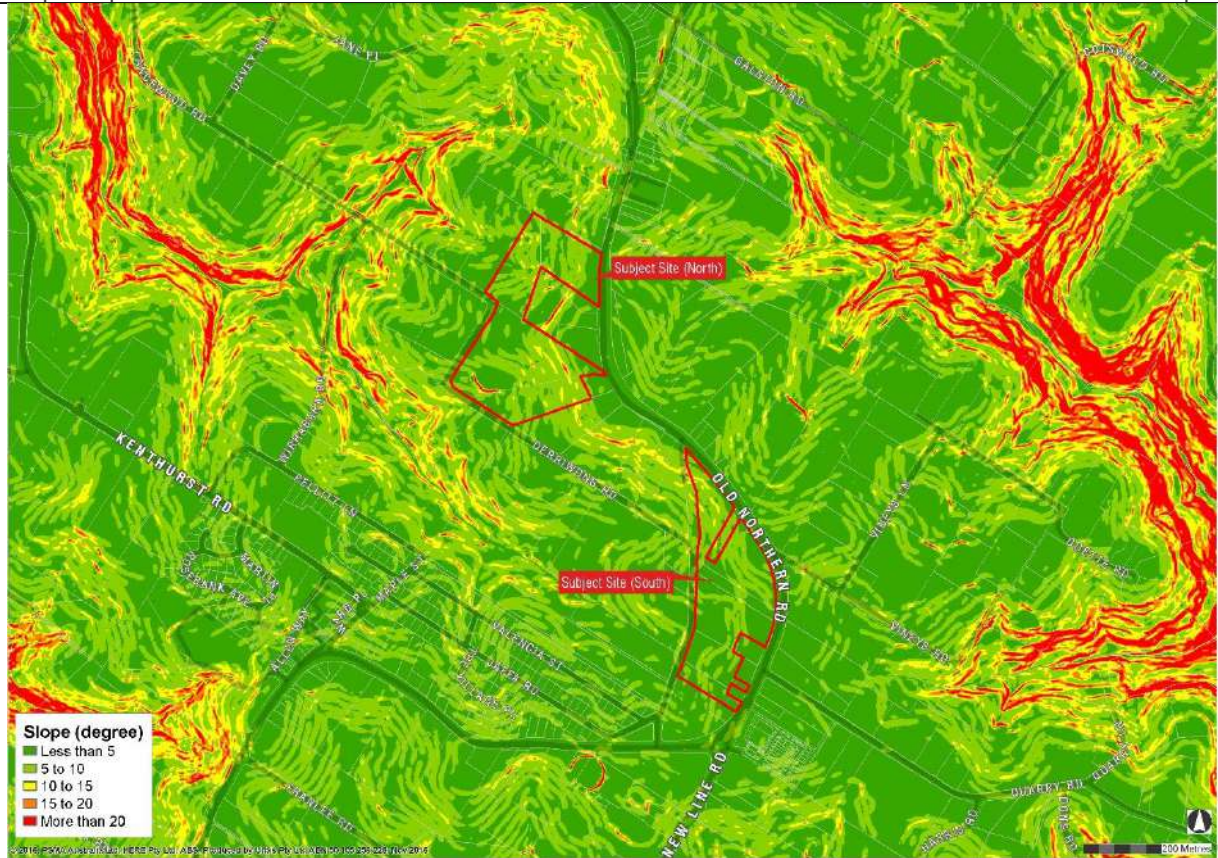
Compared to other land holdings to the immediate north and east, the subject sites have more significant cross falls (See Maps 2 and 3). This is relevant in assessing viability of the site relative to the nature of other lands used for primary production purposes in the area.

Topographic Map

Map 2







Land in NSW is commonly classified per its capability to remain stable under certain land uses. The 8-class classification is shown in Table 1.

Table 1 – Land Capability

| Broad Category  | Class   | Description  |
|---|---------|--|
| Land capable of being regularly cultivated<br><br>(Slope < 10%) | Class 1 | No special soil conservation works or practices necessary  |
|   | Class 2 | Soil conservation practices such as strip cropping, conservation tillage and adequate crop rotation.   |
|   | Class 3 | Structural soil conservation works such as diversion banks, graded banks and waterways, together with soil conservation practices as in Class 2. |
| Land not capable of being regularly cultivated                  | Class 4 | Soil conservation practices such as pasture improvement, stock control, application of fertiliser and minimal                                    |

| Broad Category   | Class   | Description  |
|--|---------|--|
| but suitable for grazing with occasional cultivation<br>(Slope 10% - 25%)      | Class 5 | cultivation for the establishment or re-establishment of permanent pastures.<br><br>Structural soil conservation works such as absorption banks, diversion banks and contour ripping, together with the practices as in Class 4. |
| Land not capable of being cultivated but suitable for grazing<br>(Slope > 25%) | Class 6 | Soil conservation practices including limitation of stock, broadcasting of seed and fertiliser, prevention of fire and destruction of vermin. This class may require some structural works.                                      |
|  | Class 7 | Land best protected by green timber.   |
|  | Class 8 | Cliffs, lakes or swamps and other land incapable of sustaining agricultural or pastoral production.  |

Source: Cunningham et al 1988

As the subject sites don't fall uniformly into Categories 1 to 3, with significant portions of the sites with a slope over 10%, they are more likely to fulfil a definition of Class 4 land, indicating that it is not capable of being regularly cultivated.

It should be noted that the land capability class may not necessarily be associated with land suitability, especially for agricultural land uses that are less soil dependent (e.g. intensive animal industries such as chicken raising, greenhouses) or for permanent tree crops (e.g. horticulture and forestry).

The slope on the subject sites will limit the nature of agricultural operations that could be considered. Based on the nature of the subject site and having regard to local and nearby rural land uses, the following rural land uses could be considered for the subject sites:

- Fruit orchard
- Cattle grazing
- Horse agistment

Other agricultural uses that are located within the Dural area such as vegetable crop production, flower growing, turf farming and wholesale nursery operations require land included in Classes 1 to 3 that have lower level of slope. These uses also generally provide a higher gross margin compared to those uses that are likely to be suitable for the subject site.

The economic value of agricultural land is often assessed as gross margin per hectare (GM/Ha) or similar unit of measurement that allows comparison between enterprises. GM/Ha is calculated as the total gross income from production less the direct costs of production associated with that enterprise. Whilst providing a broad guide, gross margins do not consider total overheads or running and

financing an agricultural business. Furthermore, they do not consider the total return and critical mass required to generate a sustainable income based on the overall investment.

Table 2 summarises the indicative gross margins for a selection of agricultural uses that have relevance to the Dural area. Gross margins are expressed as very low to high based on analysis of gross margins for agricultural enterprises undertaken by NSW Primary Industries. For example, a beef cattle enterprise on improved pastures would have an indicative gross margin income of \$284/Ha at the upper end of the range as at February 2016. For the subject properties, that would produce a gross margin of \$6,077 per year for the 21.4-hectare site. This is a 'low' gross margin that would require supplementary income from other sources to remain viable for a family working this land.

The scale of the operations on a site of just over 20 hectares is unlikely to be sufficient to support a viable agricultural enterprise. This is particularly the case for sites that are unable to engaging in the highest returning enterprises such as greenhouse based activities.

Table 2 – Gross Margins of Indicative Agricultural Enterprises

| Agricultural enterprise                     | Indicative gross margin |
|---|-------------------------|
| Horse agistment                             | Very Low                |
| Beef cattle grazing                         | Low                     |
| Dairy cattle                                | Medium                  |
| Fruit/nut trees                             | Medium to High          |
| Turf farm                                   | High                    |
| Vegetable crops                             | High                    |
| Greenhouses (e.g. herbs and flower growing) | High                    |
| Poultry                                     | High                    |

Source: based on assessment of DPI NSW published gross margin guidance

The nature of agricultural enterprises and the use of irrigation and spray chemicals can require that appropriate buffers are put in place to protect sensitive adjoining land uses. We note that the subject site to the south is located close to residential land uses whereas the northern site wraps around Dural Public School.

Recommended minimum buffer distances between residential areas and selected agricultural industries are shown in Table 3 and are based on recommendations published in *Living and Working in Rural Areas – A handbook for managing land use conflict issues on the NSW North Coast, 2007*.

As indicated, some of the recommended buffer distances would impact on the useable areas of the subject land for agricultural purposes.



Table 3 – Buffer Distances for Primary Industries and Residential Areas

| Industry   | Distance (metres) |
|--|-------------------|
| Grazing of stock                                 | 50                |
| Greenhouse & controlled environment horticulture | 200               |
| Turf farms                                       | 300               |
| Dairy sheds and waste storage                    | 500               |
| Poultry sheds and waste storage                  | 1,000             |

Furthermore, it is noted that climate change is becoming an important factor in the performance of agricultural enterprises. Since 1900, the average daily maximum temperature in Sydney has demonstrated a noticeable upward trend of around 2 degrees Celsius (Appendix A, Chart 1). Precipitation is also important for all agriculture and as demonstrated in Appendix A, Chart 2, the level of precipitation in Dural over the past 43 years has been variable, demonstrating a slight overall downward trend.

The combination of rising temperatures (which increases evaporation rates) and lower rainfall could place further pressure on the viability of agriculture. This is particularly the case on small agricultural land holdings that depend on very high levels of productivity to sustain viability.

## CONCLUSIONS

The combined northern and southern sites are relatively small in scale for agriculture at 10.848 hectares and 10.617 hectares respectively. The sites are also approximately 500 metres apart which reduces the synergies of operating the sites together. The ability to amalgamate these sites with adjoining land holdings to increase the scale of the agricultural enterprise is also constrained by the location of significant vegetation communities on surrounding land (see Appendix B).

The topography of the land is relatively steep in parts and could be classified as Land Capability Class 4. This limits the nature of uses that could be applied to the site, reducing the potential income that can be generated, putting into question the viability of operating the property as an agricultural enterprise.

Development of more intensive agricultural activities will be constrained by its proximity to residential areas to the south and the school immediately adjacent the property to the north, given the need to consider appropriate buffer areas.

As such, despite the loss of agricultural farm land, the rezoning of the site for residential subdivision and development can be justified as future agricultural land uses are unlikely to generate a sufficient return to warrant future investment in agricultural enterprises on the subject land.

If you have any questions please don't hesitate to contact me at [costwald@urbis.com.au](mailto:costwald@urbis.com.au).





Yours sincerely,

A handwritten signature in black ink, appearing to read "C. Oswald".

Clinton Oswald  
National Director

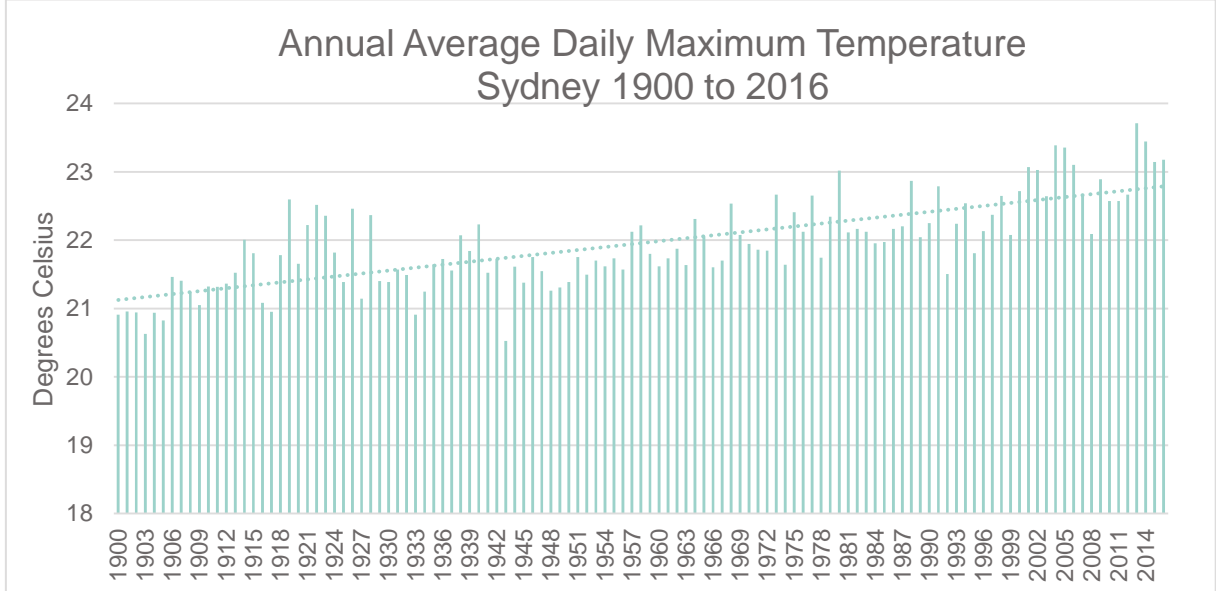


## **APPENDIX A – TEMPERATURE AND PRECIPITATION CHARTS**

### Annual Average Daily Maximum Temperature

Sydney – 1900 to 2016

Chart 1

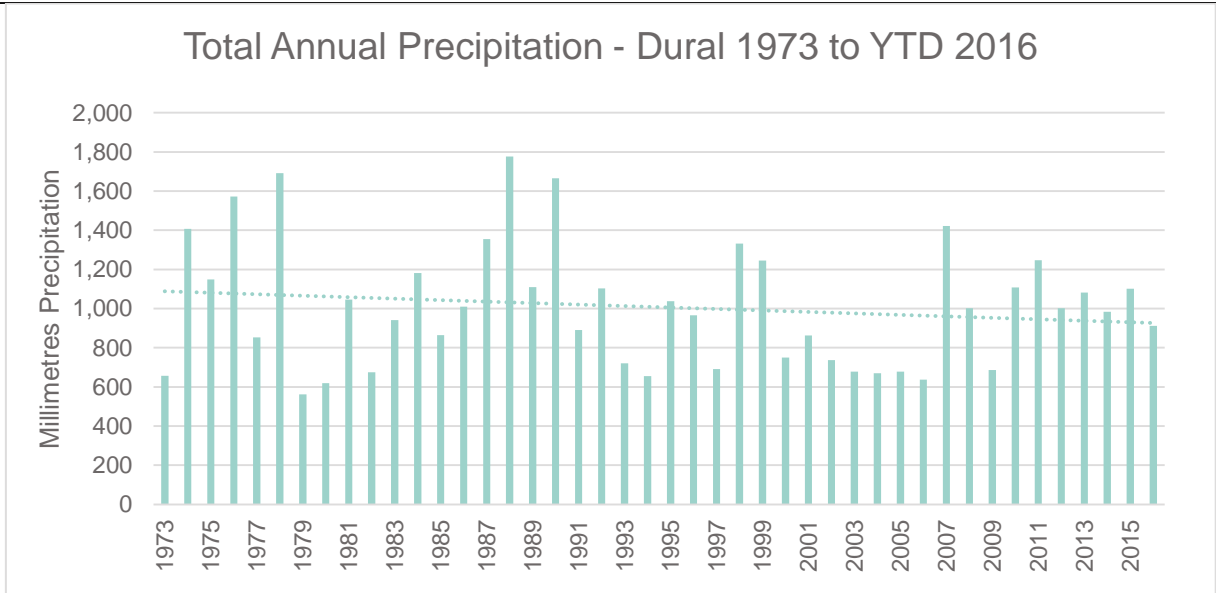


Source: Australian Bureau of Meteorology

### Total Annual Precipitation

Dural 1973 to YTD 2016

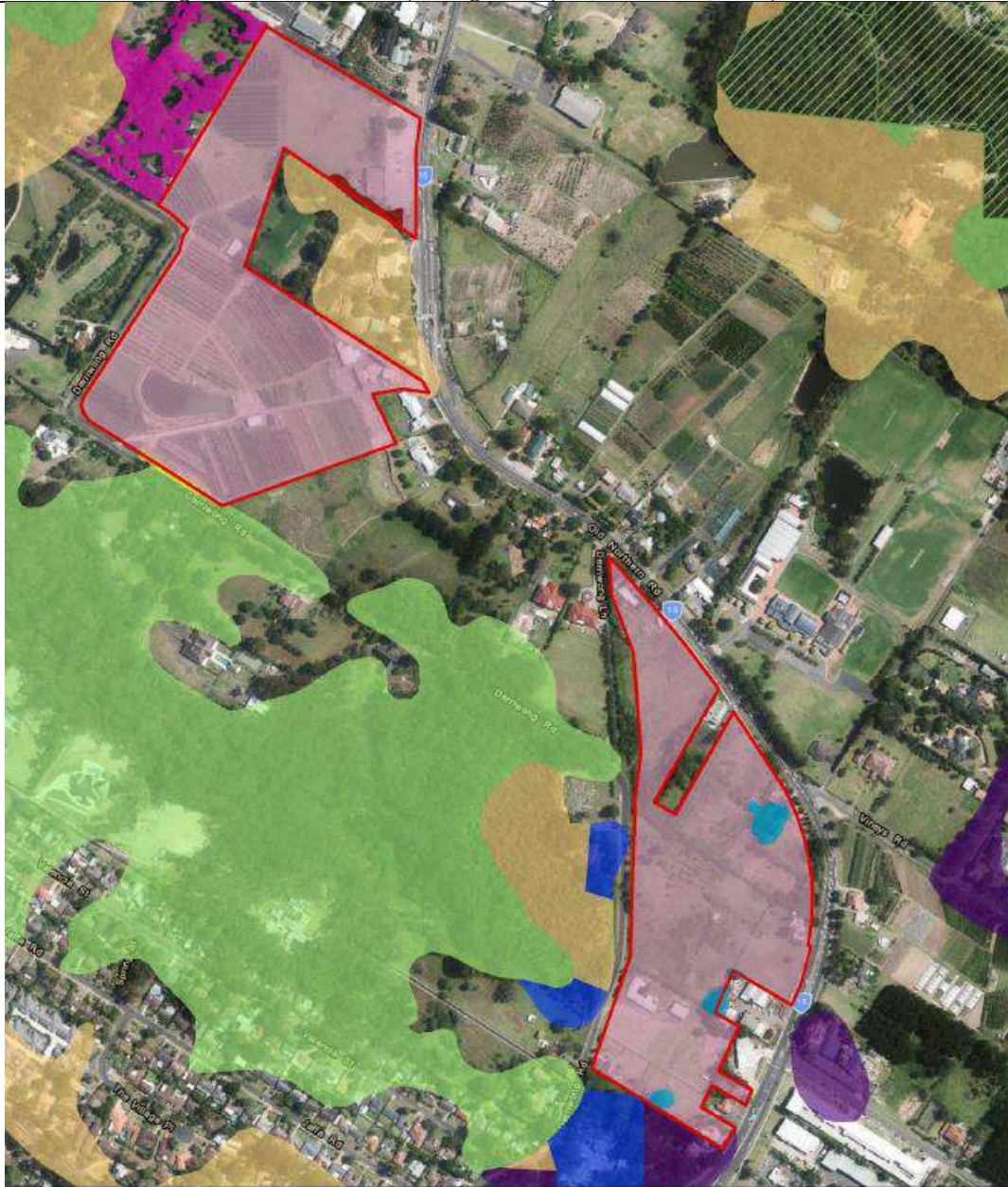
Chart 2



Source: Australian Bureau of Meteorology

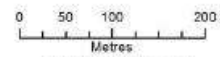


## **APPENDIX B – DISTRIBUTION OF VEGETATION COMMUNITIES**



- Legend**
- Subject Site
  - Validated Vegetation (ELA 2015/2016)**
  - Blue Gum High Forest (low condition)
  - Exotics
  - Native Planted
  - Sydney Turpentine Ironbark Forest

- THSC 2008**
- Sydney Turpentine Ironbark Forest
- NPWS 2002**
- Blue Gum High Forest
- Sydney Turpentine Ironbark Forest
- Turpentine-Ironbark Margin Forest
- Western Sandstone Gully Forest
- Unclassified Vegetation



GDA 1984 MGA Zone 56



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# Dural Planning Proposal

## Traffic Impact Assessment





# Dural Planning Proposal

## Traffic Impact Assessment

Client: Urbis

ABN: 501 052 562 28

### Prepared by

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## Quality Information

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Prepared by    Sarah Ong

Reviewed by    Marcel Cruz

### Revision History

| Revision | Revision Date | Details                      | Authorised                                  |   |
|----------|---------------|------------------------------|---|---|
|          |               |                              | Name/Position                               | Signature   |
| A        | 24-Mar-2016   | Draft Report                 | Andy Yung<br>Associate Director             | Original signed   |
| B        | 05-Apr-2016   | Draft Report                 | Andy Yung<br>Associate Director             | Original signed   |
| C        | 18-Apr-2016   | Final Report                 | Andy Yung<br>Associate Director             | Original signed   |
| D        | 05-May-2016   | Revised Final Report         | Andy Yung<br>Associate Director             | Original signed   |
| E        | 11-Oct-2016   | Updated Revised Final Report | Nick Bernard<br>Principal Transport Planner |  |

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## 1.0 Introduction

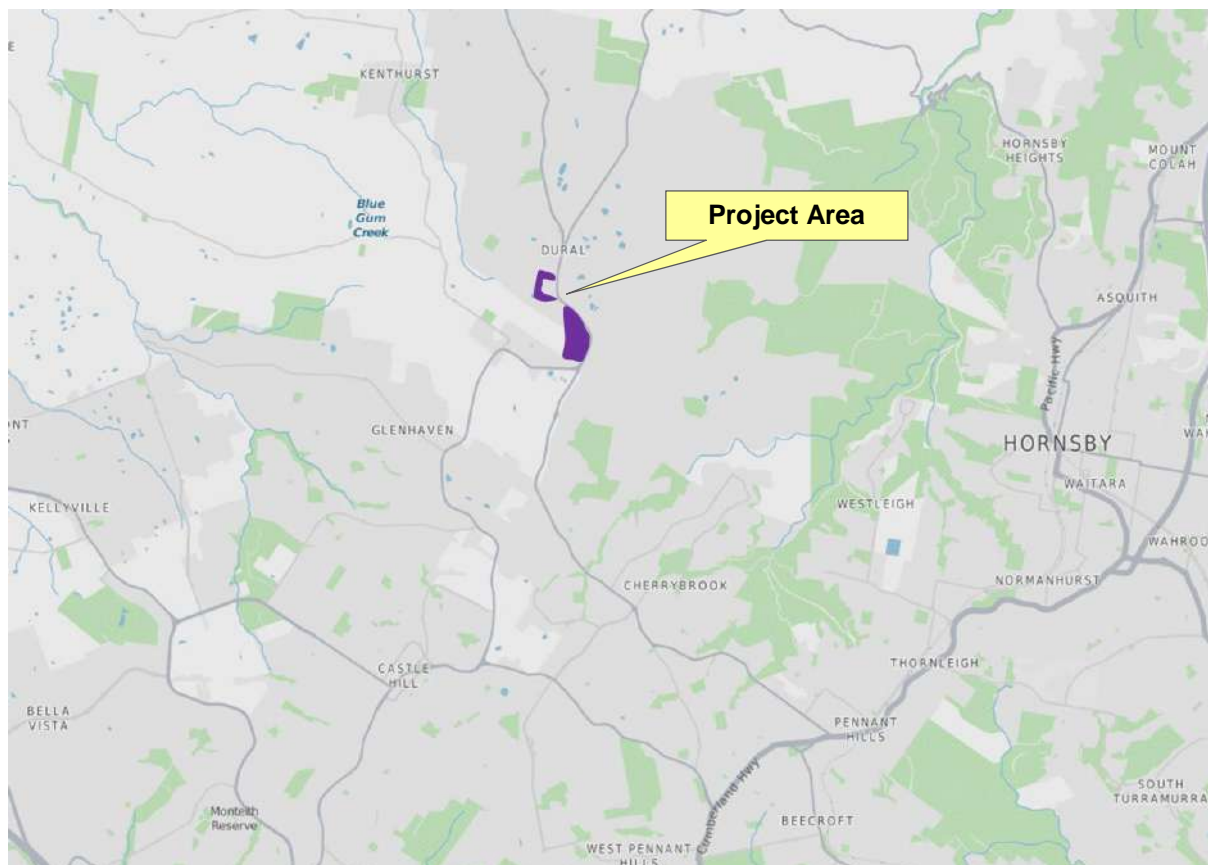
### 1.1 Background

AECOM has been commissioned by Urbis to prepare a Traffic Impact Assessment (TIA) to support the planning proposal for a proposed development in the Dural area, located approximately 39km north-west of Sydney.

The Dural Planning Proposal intends to provide residential dwellings and open space. The subject site has been divided into two areas; the northern site and southern site.

This TIA has been prepared to understand the likely impacts of the vehicular trips generated by the Dural development on the surrounding local road network and the likely infrastructure upgrade required to mitigate the impacts of the proposal.

**Figure 1 Regional context**



Source: AECOM, 2016

### 1.2 Purpose and Scope

The purpose of this report is to provide a review of the potential traffic impacts of the proposed development on the external road network. The assessment involves assessing trip generation of the proposed development within the study area and providing recommendations on the traffic requirements as a result of the development trips.

### 1.3 Report Framework

The report has been structured into the following sections:

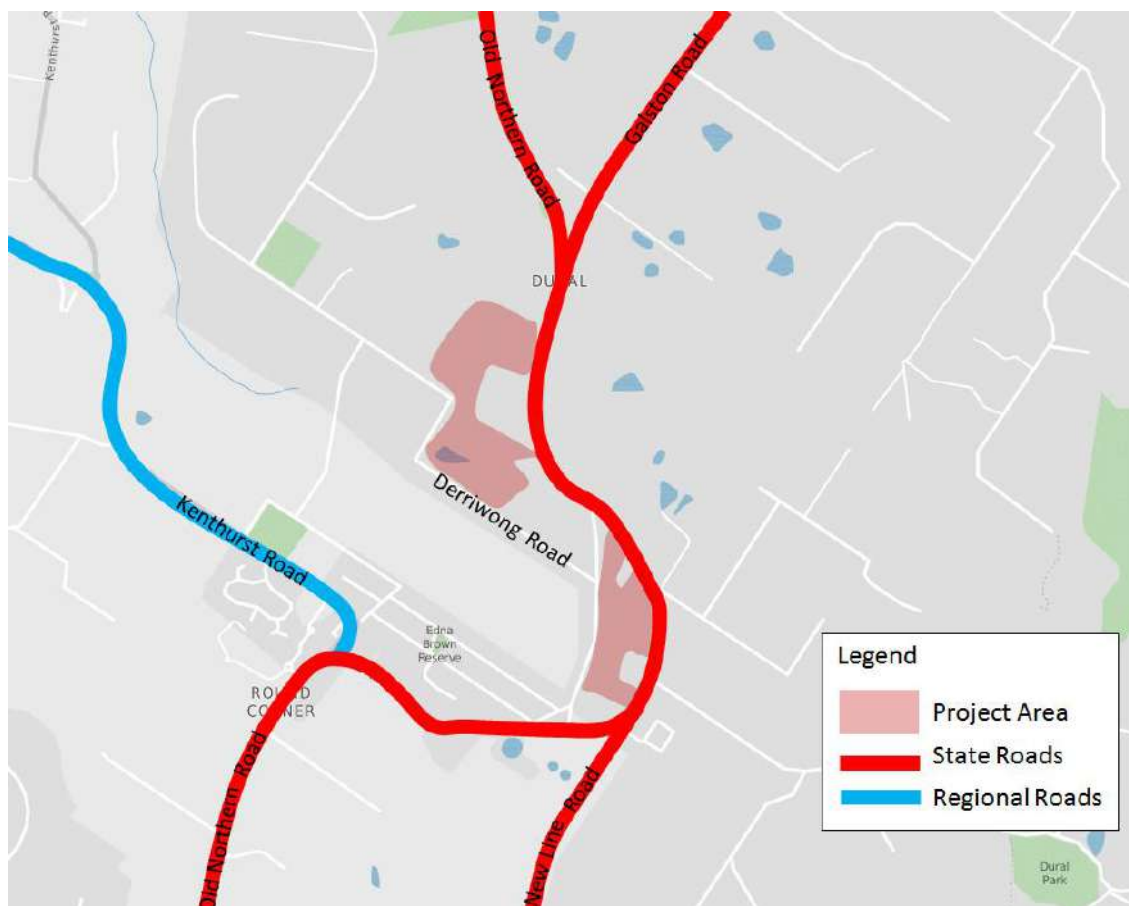
- **Section 2** details the existing transport conditions in the vicinity of the site for all modes of transport.
- **Section 3** reviews the impacts of changes in the traffic flow and road network, prior to the future development being investigated in this assessment.
- **Section 4** describes the details of the proposed development within the study area and the access strategy for the development.
- **Section 5** provides a traffic impact assessment of the proposed development and surrounding road network and identifies appropriate transport infrastructure to cater for the forecast traffic flows.
- **Section 6** provides the summary and conclusions of the report.

## 2.0 Existing Conditions

### 2.1 Site Description

The study area is located in Dural within the Local Government Area (LGA) of The Hills Shire. It is generally bounded by Derriwong Road to the west and Old Northern Road to the east. Old Northern Road forms the boundary for two LGAs, The Hills Shire to the west and Hornsby Shire to the east. The location of the study area and the surrounding road network is shown in **Figure 2**.

**Figure 2** Location



Source: AECOM, 2016

The study area is currently occupied and surrounded by rural residential dwellings with the remaining area being open grass land and woodland. The northern site borders Dural Public School and Dural Local Centre and low residential dwellings are located to the west. Dural Business Park is located to the southeast.

### 2.2 Travel Behaviour

Travel characteristics for NSW residents travelling to work are gathered from the journey-to-work data extracted from the Australian Bureau of Statistics (ABS) 2011 census data (2014 release). Journey-to-work data (JTW) includes details of the origin and destination of trips, together with characteristics of the journey such as mode of travel.

The northern and southern sites are contained within Travel Zone 4310 in Dural. Data from the 2011 Journey to Work (JTW) dataset, accessed via the Bureau of Transport Statistics' JTW explorer, has been analysed to determine indicative existing travel mode share for the sites. The existing land use within Travel Zone 4310 includes rural to semi-rural agricultural and residential, low density residential, low to medium density retail and commercial, recreation, and education.



**Table 1** shows the mode share of trips travelling to and from the study area travel zones and **Table 2** shows the origins and destinations of trips to and from the study area travel zones.

**Table 1 Journey to Work mode split for Travel Zone 4310**

| Mode              | % Mode Share                   |                                   |
|-------------------|--------------------------------|-----------------------------------|
|                   | Origin Trips<br>(from TZ 4310) | Destination Trips<br>(to TZ 4310) |
| Vehicle Driver    | 79%                            | 85%                               |
| Vehicle Passenger | 4%                             | 8%                                |
| Bus               | 6%                             | 2%                                |
| Train             | 4%                             | 1%                                |
| Walked only       | 5%                             | 2%                                |
| Other mode        | 1%                             | 1%                                |
| Not Stated        | 1%                             | 2%                                |

Note: Excludes those who did not go to work.

Source: 2011 Journey to Work data, accessed via the BTS JTW Explorer.

The JTW data shows that the majority of trips to and from the study area travel zone are predominantly made by private car. Approximately 93 per cent of people working in study area arrive by car, and approximately 83 per cent of people living in the study area travel to work by car. The data also shows three per cent of persons working in the travel zone arrive by public transport and approximately 10 per cent of residents travel by public transport. This reflects the study area's proximity to the bus corridor along New Line Road and Old Northern Road with high frequency bus services to the City and major town centres, which has a significant influence in encouraging use of public transport in the study area.

**Table 2 Journey to Work origins and destinations (all modes) for Travel Zone 4310**

| SA3                              | % Mode Share       |                  |
|----------------------------------|--------------------|------------------|
|                                  | Trips from TZ 4310 | Trips to TZ 4310 |
| Dural – Wisemans Ferry           | 27%                | 34%              |
| Baulkham Hills                   | 15%                | 24%              |
| Sydney Inner City                | 8%                 | -                |
| Blacktown – North                | -                  | 6%               |
| Rouse Hill – McGraths Hill       | 3%                 | 5%               |
| Blacktown                        | 3%                 | 4%               |
| Parramatta                       | 5%                 | 3%               |
| Hornsby                          | 4%                 | 2%               |
| Mount Druitt                     | -                  | 2%               |
| Richmond – Windsor               | -                  | 2%               |
| Pennant Hills – Epping           | -                  | 2%               |
| Ryde – Hunters Hill              | 3%                 | -                |
| Strathfield – Burwood – Ashfield | 3%                 | -                |
| Other / no fixed place of work   | 7%                 | 16%              |

Note: Excludes those who did not go to work.

Source: 2011 Journey to Work data, accessed via the BTS JTW Explorer.

A high proportion of trips are to or from SA3 areas within The Hills Shire LGA. Of the total JTW trips departing the travel zone, 42 per cent were trips to destinations within The Hills LGA; 27 per cent to Dural – Wisemans Ferry and 15 per cent to Baulkham Hills. More than half the total number of JTW trips to the travel zone originated from SA3 areas within The Hills Shire, with 34 per cent coming from Dural – Wisemans Ferry SA3, and 24 per cent from Baulkham Hills SA3.

## 2.3 Pedestrian and Cycle Facilities

Pedestrian footpaths are provided intermittently on Old Northern Road, depending on land uses bordering the road. An existing pedestrian footpath extends from Dural Public School to the intersection of Old Northern Road | New Line Road in the south, and continues west along Old Northern Road to the Dural Local Centre at the intersection of Old Northern Road | Kenthurst Road. This footpath provides access between the study area and bus stops along Old Northern Road.

The pedestrian overpass at Dural Public School facilitates the safe crossing of pedestrians over Old Northern Road for the northern site. At the southern site, the signalised intersection at Old Northern Road | Quarry Road provides a signalised crossing for pedestrians on the eastern and southern approaches.

**Figure 3 Pedestrian over pass**

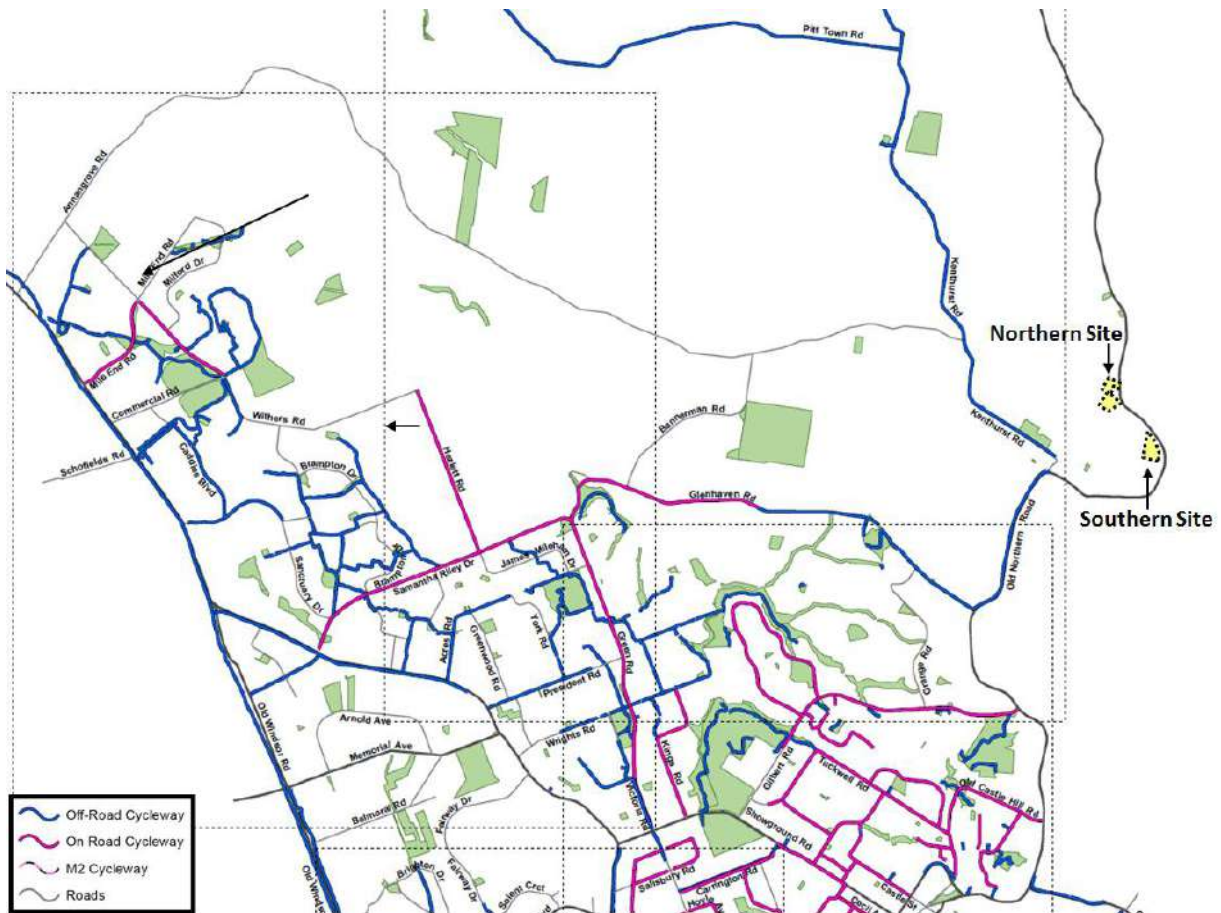


Source: AECOM, 2015

There is currently no footpath provision on Derriwong Road. There are footpath provisions on one side of the residential Jaffa Road and Valencia Street, which are located to the west of the southern site.

In terms of cycling facilities, there are limited cycling links to the study area. The cycle network in the Hills Shire Council, presented in **Figure 4**, shows that there are existing off-road cycle routes near the study area along Kenthurst Road, Old Northern Road between Kenthurst Road and Glenhaven Road, and on Glenhaven Road.

**Figure 4 Hills Shire Council cycle network**

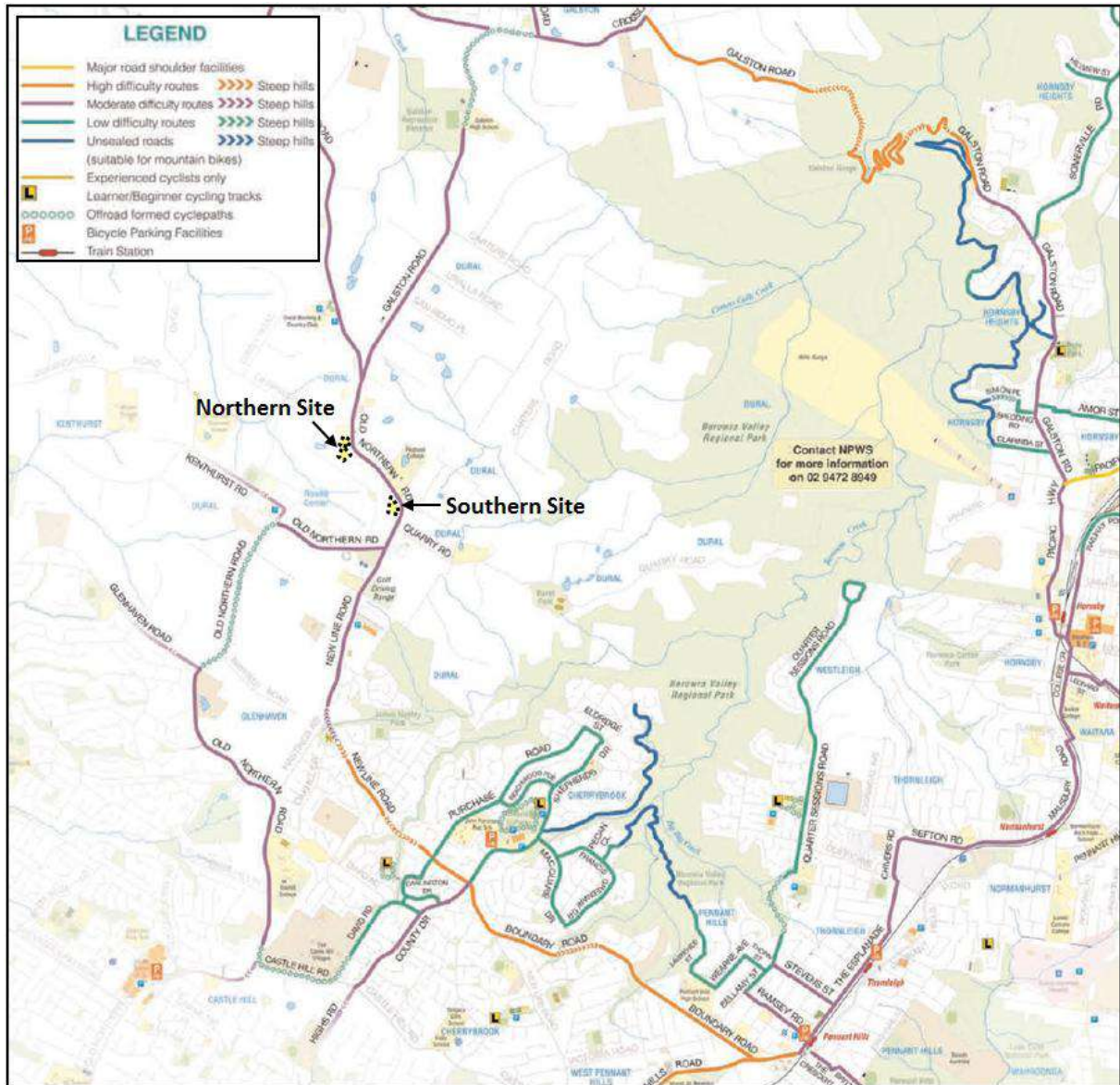


Source: Hills Shire Council Cycleways map.



The Hornsby Shire Council cycle map, shown in **Figure 5**, identifies a moderate/high difficulty cycle route connecting to Pennant Hills Station which is about a 9km cycle from the proposed development sites. This identified route however contains steep hills and much of the route is recommended for experienced cyclists only.

**Figure 5** Hornsby Shire Council cycle network



Source: Hornsby Shire Council Cycling Map, 2008.



**Table 3** summarises the bus route frequencies in close proximity to the study area.

**Table 3 Bus service provision to the proposed development sites**

| Bus Route  | Route Description         | Weekday Frequency (to nearest 5 mins) |                         |                   |
|------------|---------------------------|---------------------------------------|-------------------------|-------------------|
|            |                           | AM Peak<br>7-9 am                     | Off Peak<br>10 am- 3 pm | PM Peak<br>4-6 pm |
| 637        | Glenorie to Castle Hill   | 30                                    | 100                     | 60                |
|            | Castle Hill to Glenorie   | 60                                    | 100                     | 60                |
| 638        | Berrilee to Pennant Hills | 40                                    | -                       | 60                |
|            | Pennant Hills to Berrilee | 1 service                             | 1 service               | 60                |
| 642 / 642X | Dural to City             | 10                                    | 50 <sup>1</sup>         | 60                |
|            | City to Dural             | -                                     | 60 <sup>2</sup>         | 25                |

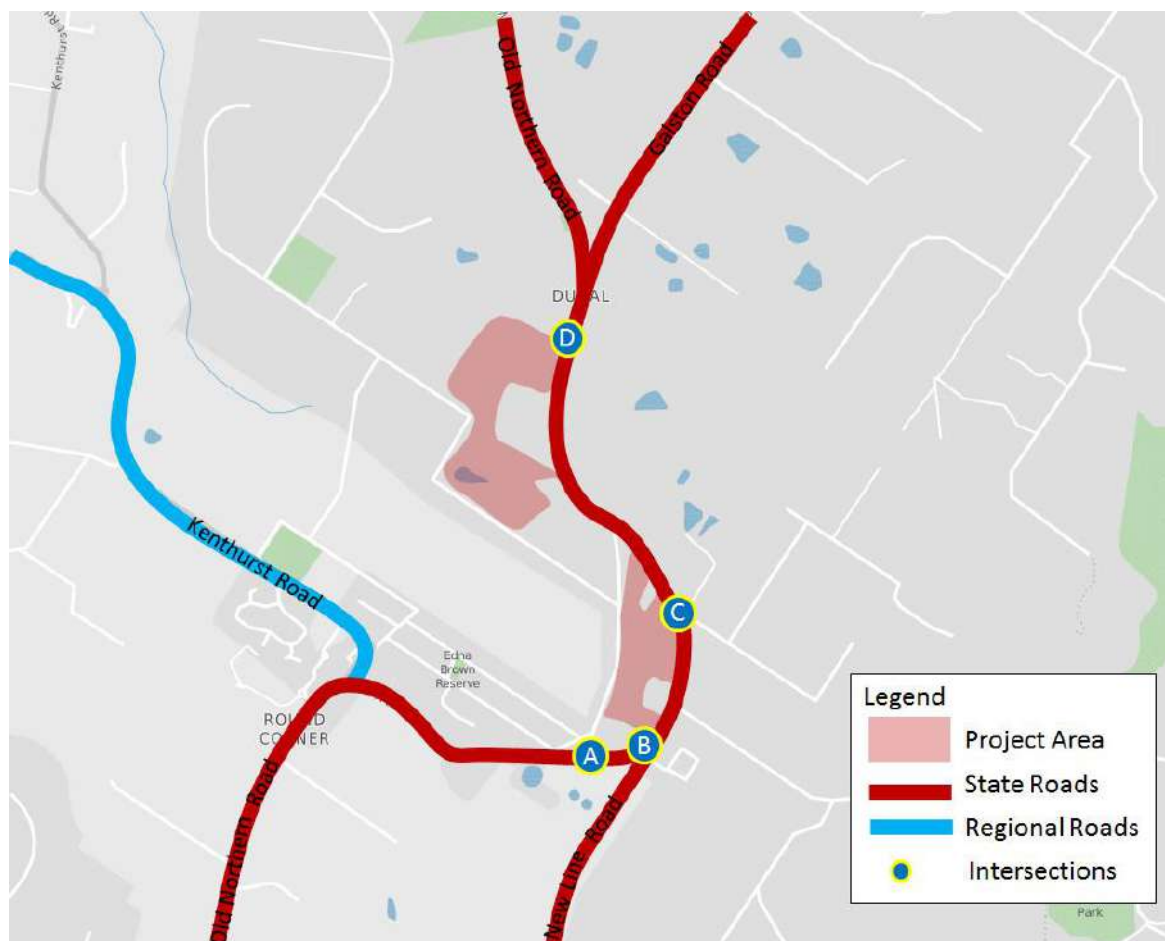
Source: Hillsbus, accessed September 2016.

<sup>1</sup>Last 642 service at 2:41pm

<sup>2</sup>First 642 service at 12:18pm

**Figure 7** highlights existing bus stops are within a 400m walking catchment. Bus stops within the 400m walking catchment are served by local bus routes 637 and 638. Additional walking distance is required for regional bus services 642/X.

**Figure 7 Bus stops**



Source: AECOM, 2016



## 2.5 Rail Network

The closest train station is Pennant Hills Station which is located approximately 8km southeast of the study area. Pennant Hills Station is served by the T1 North Shore Line which runs between Hornsby and the City via Macquarie University. Bus route 638, described in **Section 2.4**, connects the study area to Pennant Hills Station. Rail services operate between Pennant Hills and City at approximately every 15 minutes. On weekdays, services run via Chatswood and the Lower North Shore, and on weekends run via Strathfield. Pennant Hills Station in the context of the existing rail network is shown in **Figure 8**.

Figure 8 Pennant Hills Station in the context of the Sydney Trains network

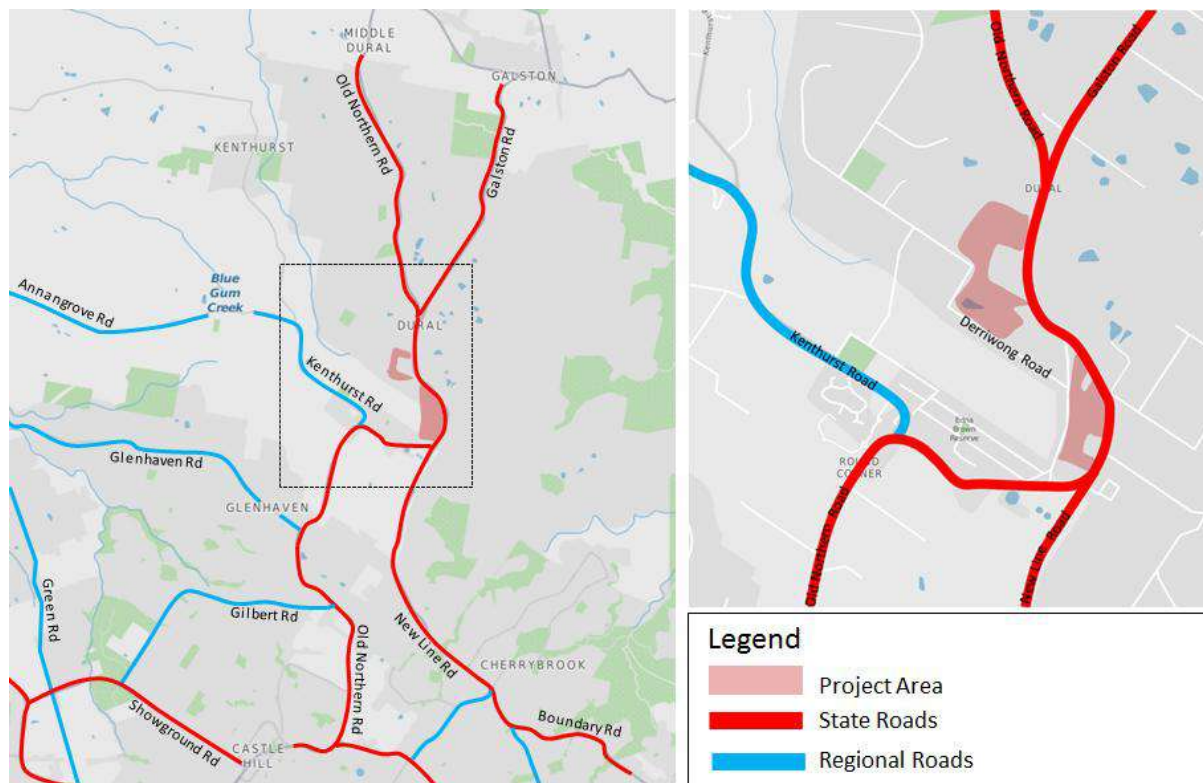


Source: Sydney Trains, accessed November 2015.

## 2.6 Road Network

The main roads in the vicinity of the proposed development sites are Old Northern Road and New Line Road. Connecting regional links include Glenhaven Road, Kenthurst Road and Galston Road which provides links to Old Northern Road and provide links to the surrounding areas including Kellyville and Galston.

Figure 9 Road network



Source: AECOM, 2016

### 2.6.1 Old Northern Road

The study area is located along the western side of Old Northern Road, which is a state road in a north-south direction. The road provides links to Glenorie and Wisemans Ferry to the north and Castle Hill and Baulkham Hills to the south.

Old Northern Road is a sealed road with predominantly one lane in each direction in the vicinity of the proposed development sites. The road widens locally to two lanes in each direction at larger intersections. **Figure 10** shows a typical cross-section of Old Northern Road in the vicinity of the study area.

Figure 10 Old Northern Road: typical cross section



Source: AECOM, 2015



Old Northern Road has a sign-posted speed limit of 60km/h close to the study area. A school zone is in operation along much of Old Northern Road close to the proposed development sites, extending from approximately the northern boundary point of the proposed northern site, to the intersection of Old Northern Road and Vineys Road in the south. The school zone reduces the vehicle speed to 40km/hr on school days between 8am and 9.30am and 2.30pm and 4pm.

### 2.6.2 New Line Road

New Line Road is an arterial road located to the south of the study area. It runs in a north-south direction from Old Northern Road to the Cumberland Highway. The road has one lane in each direction between Old Northern Road and Hastings Road. A roundabout is located at the intersection of New Line Road | Old Northern Road, which also provides access to Dural Business Park. The speed limit along New Line Road is 60km/h. There are no parking lanes along the road. **Figure 11** shows a typical cross-section of New Line Road.

**Figure 11** New Line Road south of Old Northern Road



Source: AECOM, 2014

### 2.6.3 Local access roads

There are limited local access roads close to the study. Existing local access roads include Derriwong Road which currently links to Old Northern Road which provides access to semi-rural land in the area. The intersection of Old Northern Road | Derriwong Road is currently a priority intersection.

**Figure 12** Derriwong Road



Source: AECOM, 2015

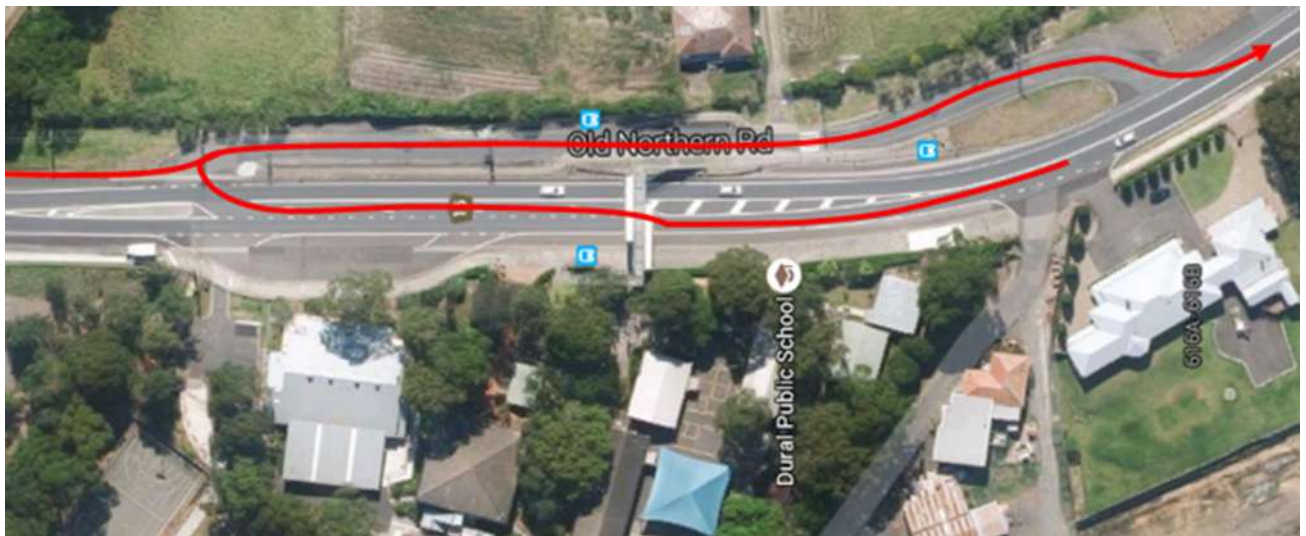
Valencia Street and Jaffa Road, to the west of the southern site, connect low density residential dwellings to Kenthurst Road via Maple Street. These roads provide access to the local properties and are generally sealed, single carriageway, and with a posted speed limit of 50km/hr.

#### 2.6.4 Other infrastructure

A dedicated passenger pick and drop off area is provided along Old Northern Road opposite Dural Primary School. This provides vehicles travelling along Old Northern Road opportunities to safely pick up and drop off passengers.

This dedicated area requires vehicles exiting the area to turn left only allowing vehicles originating from the south to travel southbound on Old Northern Road, however requires vehicles from the north to find other opportunities along Old Northern Road to travel northbound.

**Figure 13 Pick-up / drop off area**



Source: AECOM, 2016

## 2.7 Traffic Volumes

### 2.7.1 Daily Traffic Counts

Traffic volume data has been obtained from Roads and Maritime Services to determine the historical traffic growth in the surrounding area. **Table 4** shows historical Average Daily Traffic (ADT) volumes at stations in the vicinity of the study area.

The location of the stations is shown in **Figure 14**. The traffic data shows that there are approximately 19,500 vehicles per day on Old Northern Road and approximately 30,000 vehicles per day on New Line Road in the vicinity of the study area.

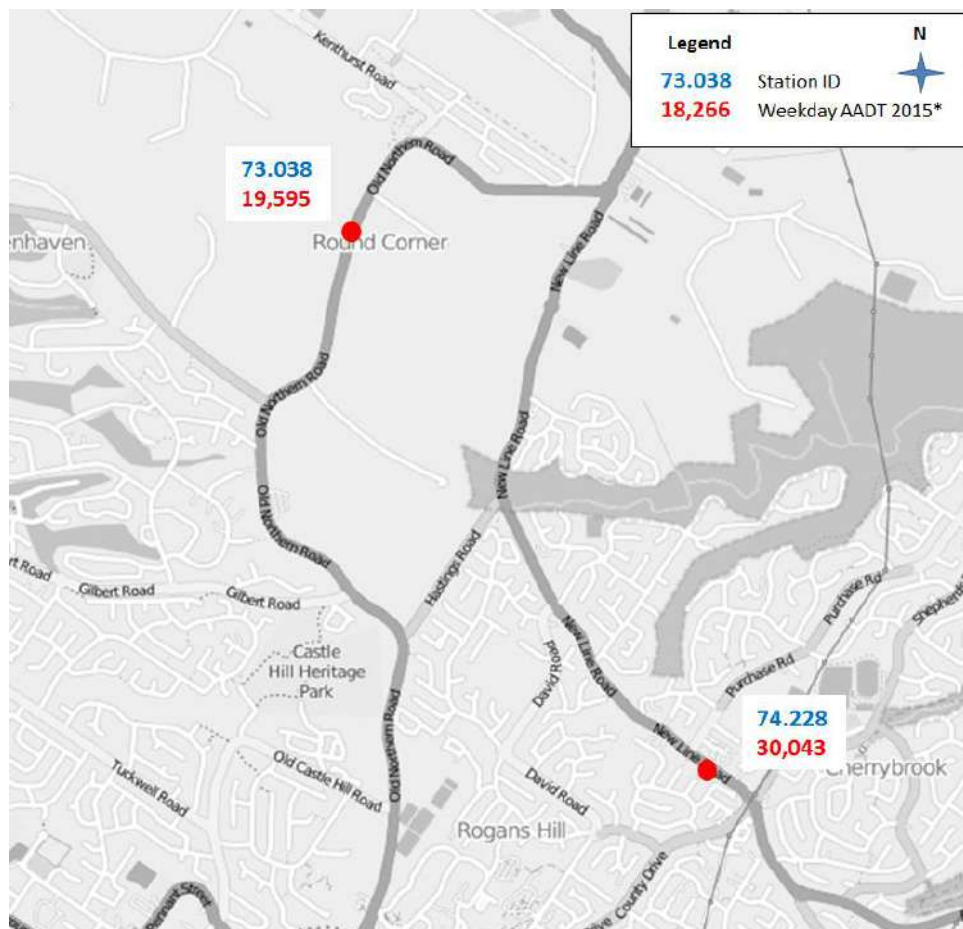
**Table 4 Historical weekday traffic volumes and growth**

| Station # | Location   | Weekday AADT |        |        |        |                   | Average growth / year |
|-----------|--|--------------|--------|--------|--------|-------------------|-----------------------|
|           |  | 2011         | 2012   | 2013   | 2014   | 2015 <sup>1</sup> |                       |
| 73038     | Old Northern Road, near Malabar Road, Round Corner | 18,531       | 18,841 | 19,214 | 18,737 | 19,595            | 1.41%                 |
| 74228     | New Line Road, east of Purchase Road, Cherrybrook  | 30,100       | 30,063 | 30,017 | 30,109 | 30,043            | -0.05%                |

Source: Roads and Maritime Services, 2015

<sup>1</sup> 2015 Weekday AADT is year to date (to November 2015)

**Figure 14 2014 Weekday AADT in the vicinity of the site**



Source: Roads and Maritime Services Traffic Volume Data 2015, OpenStreetMap (Base Imagery), 2014.

\*2015 Weekday AADT is year to date (to November 2015)

## 2.7.2 Intersection counts

Classified turning movement counts were undertaken by Trans Traffic Survey during the morning (7am to 9am) and evening (3.00pm to 6.00pm) peak periods on 28 October 2015 at the following intersections:

- Old Northern Road | Derriwong Road (priority)
- Old Northern Road | New Line Road (roundabout)
- Old Northern Road | Nursery Access Road (priority)

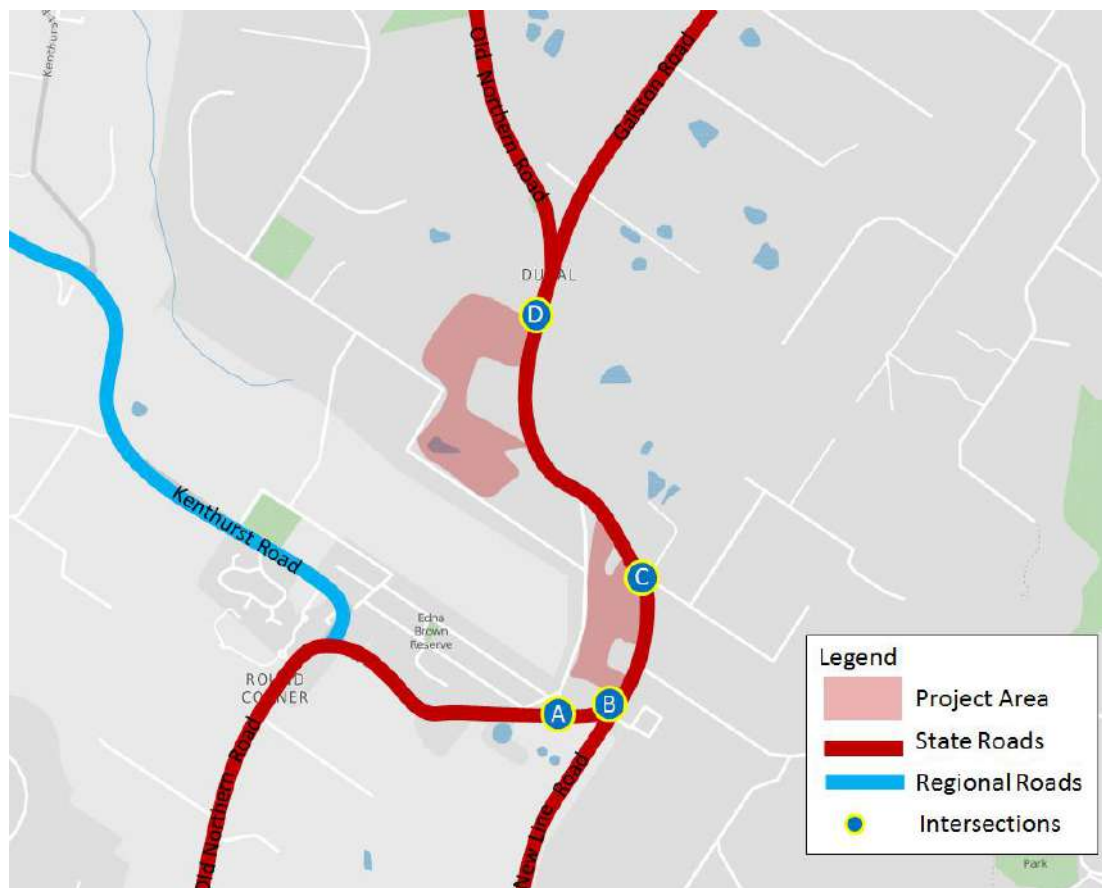
Analysis of the data shows that the AM peak period for the network was between 7.45am and 8.45am and the PM peak was between 3:15pm and 4.15pm, which is driven by the school peak rather than the typical PM commuter peak.

Key intersections assessed include:

- a. Old Northern Road | Derriwong Road (priority)
- b. Old Northern Road | New Line Road (roundabout)
- c. Old Northern Road | Vineys Road
- d. Old Northern Road | Nursery Access Road (priority)

Given the local nature of Vineys Road, traffic volumes at the intersection were estimated based on the assumption that properties that rely on Vineys Road for access generate 0.86 and 0.89 trips during the AM and PM peak respectively.

**Figure 15 Key intersections**



Source: AECOM, 2016



The traffic count data shows that traffic flow in the peak hour traffic direction on Old Northern Road and New Line Road has exceeded 1,000 veh/hr. This implies that both roads are approaching capacity for a one lane road during the peak hours.

## 2.8 Intersection Assessment

Intersection assessment based on the surveyed traffic data has been carried out using SIDRA 6.1, a computer based modelling package which calculates isolated intersection performance.

The main performance indicators for SIDRA 6.1 include:

- Degree of saturation (DoS) – a measure of the ratio between traffic volumes and the capacity of the intersection is used to measure the performance of isolated intersections.
- Average delay – how long in seconds the average vehicle waits at the intersection.
- Level of service (LoS) – a measure of the overall performance of the intersection (as explained in **Table 5**).

**Table 5** Level of Service criteria for Intersections

| Level of Service | Average Delay (secs/veh) | Traffic Signals and Roundabouts                               | Give Way and Stop Signs                   |
|------------------|--------------------------|---|---|
| A                | Less than 14             | Good Operation  | Good Operation                            |
| B                | 15 to 28                 | Good with acceptable delays and spare capacity                | Acceptable delays and spare capacity      |
| C                | 29 to 42                 | Satisfactory  | Satisfactory, but accident study required |
| D                | 43 to 56                 | Operating near capacity                                       | Near capacity and accident study required |
| E                | 57 to 70                 | At capacity; at signals incidents will cause excessive delays | At capacity; requires other control mode  |
| F                | >70                      | Roundabouts require other control mode                        | At capacity; requires other control mode  |

Source: Roads and Maritime Services, 2002

**Table 6** summarises the existing intersection operation in the AM peak period and **Table 7** summarises the existing intersection operation of the PM peak period. More detailed results are presented in **Appendix B**.

**Table 6** 2015 AM Peak Hour Intersection Performance

| Intersection                           | Intersection Type | Demand Flow (veh/h) | Level of Service | Degree of Saturation (v/c) | Ave Delay <sup>1</sup> (sec) | 95% Back of Queue (m) |
|--|-------------------|---------------------|------------------|----------------------------|------------------------------|-----------------------|
| Old Northern Road   Derriwong Road     | Give-way          | 2,005               | B                | 0.389                      | 27.9                         | 103                   |
| Old Northern Road   New Line Road      | Roundabout        | 3,804               | A                | 0.814                      | 13.0                         | 79                    |
| Old Northern Road   Vineys Road        | Give-way          | 2,559               | F                | 1.500                      | 509.5                        | 51                    |
| Old Northern Road   Nursey Access Road | Give-way          | 1,851               | A                | 0.583                      | 8.6                          | 1                     |

Source: AECOM, 2016

<sup>1</sup>Average delay report is the average delay of the worst intersection approach for giveway and roundabout intersections.

**Table 7 2015 PM Peak Hour Intersection Performance**

| Intersection                            | Intersection Type | Demand Flow (veh/h) | Level of Service | Degree of Saturation (v/c) | Ave Delay <sup>1</sup> (sec) | 95% Back of Queue (m) |
|---|-------------------|---------------------|------------------|----------------------------|------------------------------|-----------------------|
| Old Northern Road / Derriwong Road      | Give-way          | 2,186               | B                | 0.579                      | 16.3                         | 107                   |
| Old Northern Road / New Line Road       | Roundabout        | 3,993               | B                | 0.836                      | 16.3                         | 88                    |
| Old Northern Road / Vineys Road         | Give-way          | 2,402               | F                | 0.642                      | 243.7                        | 2                     |
| Old Northern Road / Nursery Access Road | Give-way          | 1,968               | A                | 0.566                      | 11.6                         | 3                     |

Source: AECOM, 2016

<sup>1</sup>Average delay report is the average delay of the worst intersection approach for giveaway and roundabout intersections.

The SIDRA results indicate that during the AM and PM peak hour, three of the four intersections assessed in the vicinity of the study area operate satisfactorily.

The intersection of Old Northern Road | Vineys Road operates unsatisfactorily due to delays experienced by vehicles on Vineys Road. It should also be noted at the intersection of Old Northern Road | Derriwong Road, the right turn movement from Derriwong Road experiences significant delays during both the AM and PM peak as vehicles are required to wait for gaps along Old Northern Road to enter the intersection.

### 3.0 Future Traffic Conditions

#### 3.1 Background Traffic Growth

The historical Roads and Maritimes Services traffic data over the past five years was analysed to estimate the background traffic growth in the vicinity of the study site.

As shown in **Table 4**, since 2011 traffic has increased by approximately 1.4 per cent per year on Old Northern Road, near Malabar Road, and decreased by approximately 0.5 per cent per year on New Line Road, west of Purchase Road. To estimate the growth of traffic along key roads of the study area, an average annual growth of 1.4 per cent was applied.

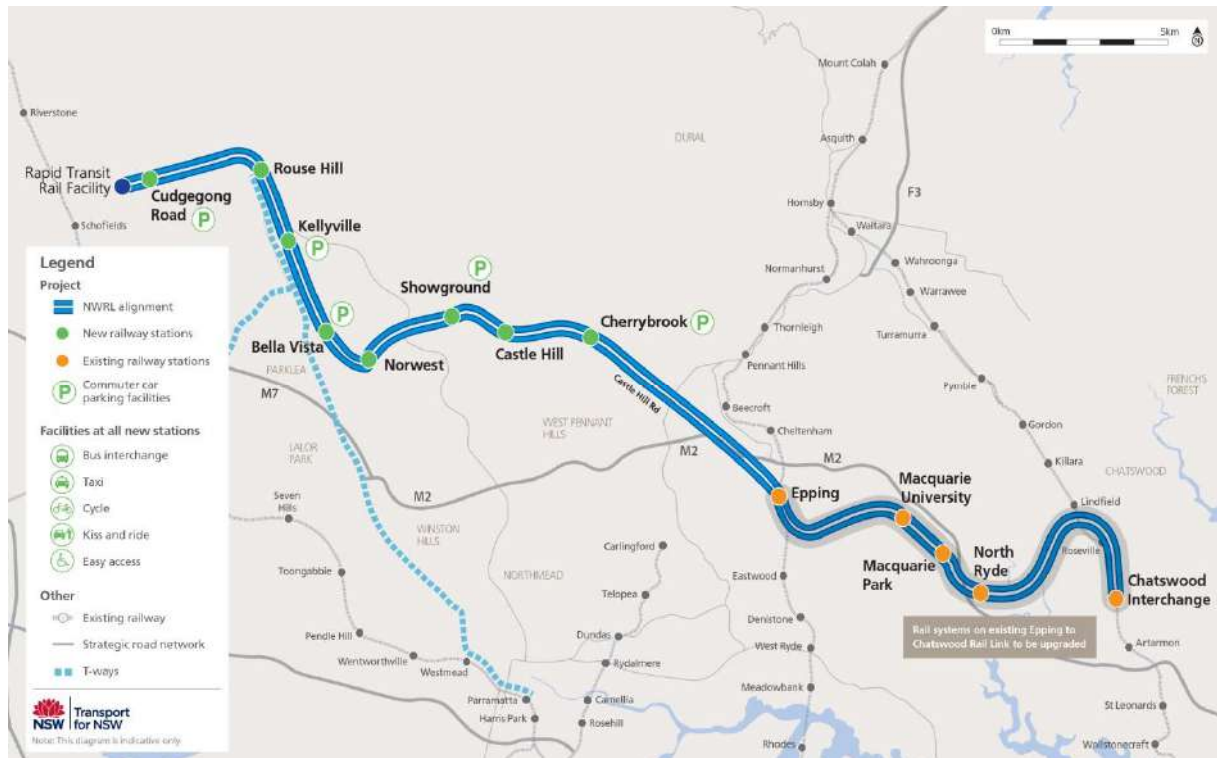
The traffic that would be generated by an approved shopping centre development at 488 Old Northern Road have also been accounted for in the background traffic volumes.

#### 3.2 Planned Infrastructure

North West Rail Link (NWRL), currently under construction and due to commence operation in the first half of 2019, will offer a metro rail transport option for the future residents of the proposed development by providing frequent train services between Rouse Hill and Chatswood. Passengers will be able to interchange at Epping or Chatswood to connect to the rest of Sydney Train network. As part of Sydney Metro, the metro services on NWRL will continue past Chatswood, into the Sydney CBD via a second harbour crossing. The NWRL will include the construction of six new stations as shown in **Figure 16**.

The new stations (Castle Hill and Cherrybrook) are approximately seven to eight kilometres from the study site. It is anticipated that there will be bus connections accessible from the study connecting to the NWRL. The Environmental Impact Statement (EIS) Stage 2 for the NWRL indicates that Castle Hill Station will be a major interchange point for commuters transferring between NWRL and bus services from the central part of the NWRL corridor.

**Figure 16 The Northwest Rail Link network**



Source: Transport for NSW, 2014

There are currently no planned road infrastructure upgrades around the study area.

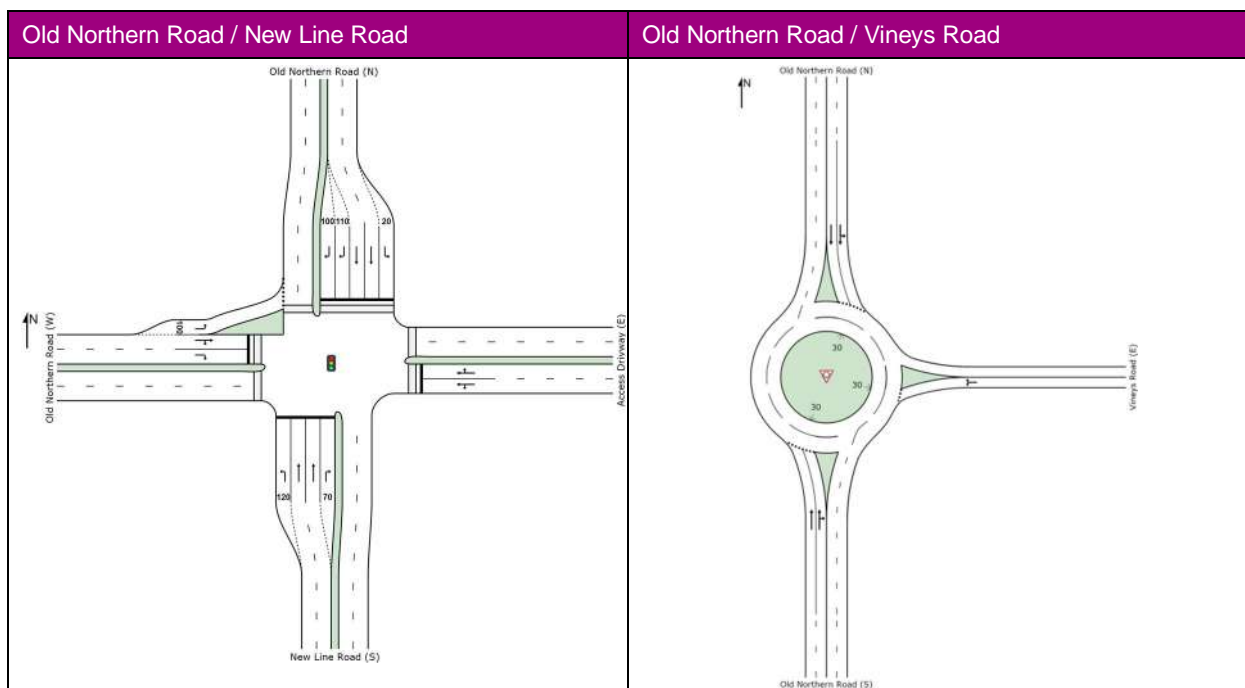
### 3.3 Mitigation Measures

To cater for the background traffic growth in the vicinity of the study area, local infrastructure upgrades may be required for the road network to continue to operate effectively.

It has been highlighted that existing traffic volumes along Old Northern Road and New Line Road are approaching capacity. It is expected that background traffic growth will trigger the requirement of upgrading these road for additional capacity.

Assessments of intersection performance under the 2026 forecast traffic volumes indicates the intersection of Old Northern Road | New Line Road and Old Northern Road | Vineys Road would need to be upgraded to cope with background traffic growth. Upgrade options are shown in **Figure 17**.

**Figure 17 Intersection layout options (2026 Base)**



Source: AECOM, 2016

### 3.4 Intersection Assessment

**Table 8** and **Table 9** below summarise both AM and PM intersections performance for future year 2026 without development traffic scenario.

**Table 8 2026 AM Peak intersection performance – without proposed development**

| Intersection                            | Intersection Type        | Demand Flow (veh/h) | Level of Service | Degree of Saturation (v/c) | Ave Delay (sec)   | 95% Back of Queue (m) |
|---|--------------------------|---------------------|------------------|----------------------------|-------------------|-----------------------|
| Old Northern Road   Derriwong Road      | Give-way (existing)      | 2,347               | F                | 0.511                      | 89.8 <sup>1</sup> | 191                   |
| Old Northern Road   New Line Road       | Roundabout (existing)    | 4,454               | F                | 1.102                      | 70.9              | 814                   |
|   | Upgraded to signals      | 4,454               | C                | 0.833                      | 30.5              | 160                   |
| Old Northern Road   Vineys Road         | Give-way (existing)      | 2,995               | F                | 1.500                      | 488.3             | 49                    |
|   | Upgraded to a roundabout | 2,996               | A                | 0.462                      | 9.2 <sup>1</sup>  | 31                    |
| Old Northern Road   Nursery Access Road | Give-way                 | 2,177               | A                | 0.688                      | 11.4 <sup>1</sup> | 2                     |

Source: AECOM, 2016

<sup>1</sup>Average delay report is the average delay of the worst intersection approach for giveaway and roundabout intersections

**Table 9 2026 PM Peak intersection performance – without proposed development**

| Intersection                            | Intersection Type        | Demand Flow (veh/h) | Level of Service | Degree of Saturation (v/c) | Ave Delay (sec)   | 95% Back of Queue (m) |
|---|--------------------------|---------------------|------------------|----------------------------|-------------------|-----------------------|
| Old Northern Road   Derriwong Road      | Give-way (existing)      | 2,585               | E                | 0.767                      | 59.4 <sup>1</sup> | 182                   |
| Old Northern Road   New Line Road       | Roundabout (existing)    | 4,709               | F                | 1.116                      | 104.6             | 1,013                 |
|   | Upgraded to signals      | 4,709               | C                | 0.893                      | 35.2              | 135                   |
| Old Northern Road   Vineys Road         | Give-way (existing)      | 2,840               | F                | 1.000                      | 2,704.2           | 16                    |
|   | Upgraded to a roundabout | 2,840               | A                | 0.462                      | 9.6 <sup>1</sup>  | 29                    |
| Old Northern Road   Nursery Access Road | Give-way                 | 2,344               | B                | 0.673                      | 17.8 <sup>1</sup> | 7                     |

Source: AECOM, 2016

<sup>1</sup>Average delay report is the average delay of the worst intersection approach for giveaway and roundabout intersections.

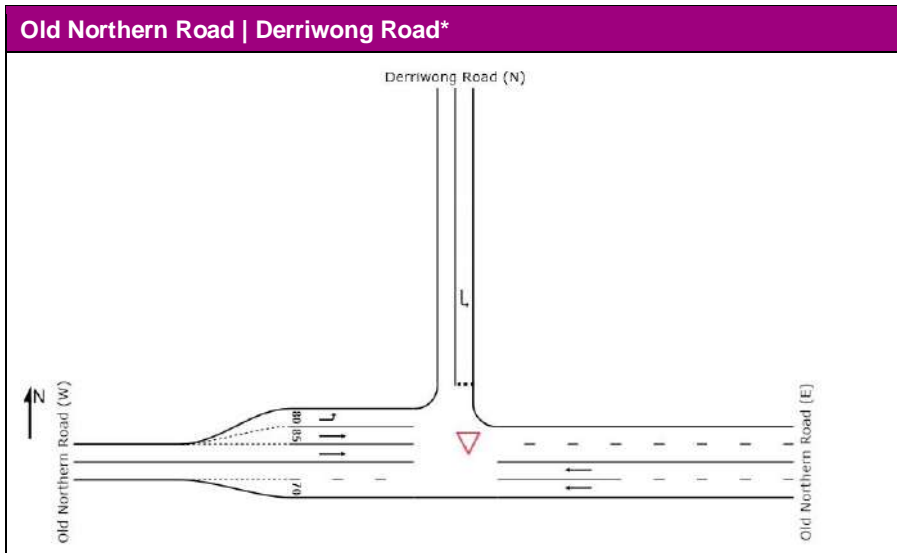
It is noted that during the AM peak, the 95th percentile queue along the west leg of the Old Northern Road | New Line Road intersection extends past the Old Northern Road | Derriwong Road intersection. Modelling also suggests that the priority Old Northern Road | Derriwong Road intersection would fail in 2026 as right turn movements onto Old Northern Road experience significant delays.

As part of the development proposed in this study, new intersections will allow vehicles which either turn right into or out of the Old Northern Road | Derriwong Road intersection, to use alternate points at new northern intersections with Old Northern Road, refer to **Section 4.2**. This would allow movements at this intersection to be restricted to left in left out, improving intersection safety.

Old Northern Road | Derriwong Road is proposed to be converted to a LILO, however this is reliant on a new access point on Old Northern Road provided by the proposed development to allow the banned right turn movements at the intersection an alternate way to access to road network.

The layout for the conversion of Old Northern Road | Derriwong Road to a left-in /left-out (LILO) intersection is shown in **Figure 18**.

**Figure 18 Intersection Layout Options (2026 Base)**



Source: AECOM, 2016

\* requires alternate access point to allow the banned right turn movements to access the road network, which is provided by the proposed development.



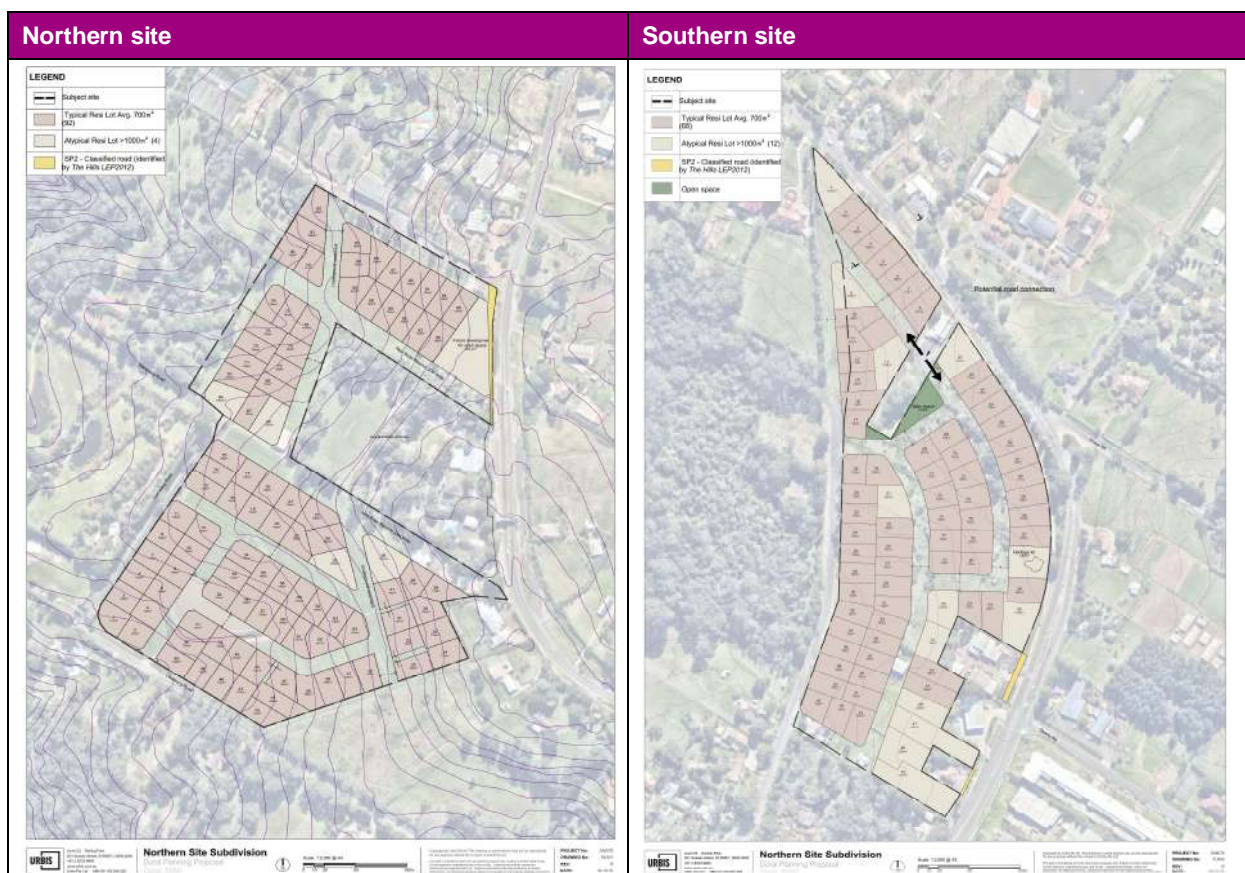
## 4.0 Proposed Development

### 4.1 Land Use

The Dural Planning Proposal is for a residential development. The proposed development has been divided into the following two sites:

- The northern site is proposed to consist of approximately 96 low density residential lots and approximately 3,400 m<sup>2</sup> of open space.
- The southern site is proposed to consist of 80 low density residential lots and 1,250 m<sup>2</sup> of open space.

Figure 19 Dural Planning Proposal



Source: Urbis, 2016

The development types and quantity of each of the types of residential and commercial development are shown in **Table 10**.

Table 10 Proposed Development Type and Quantity

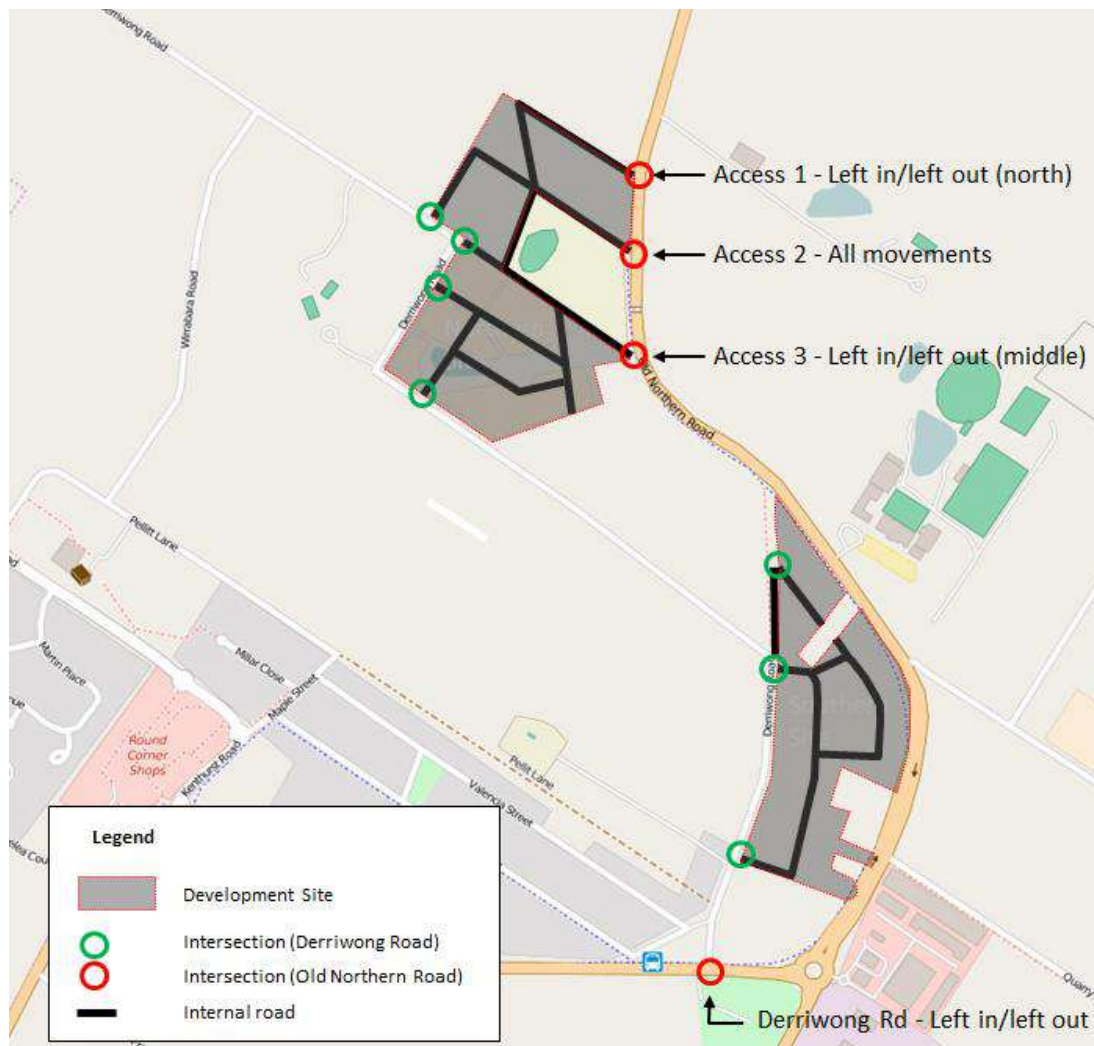
| Site          | Development Type        | Quantity             |
|---------------|-------------------------|----------------------|
| Northern Site | Low density residential | 96 lots              |
|               | Open space              | 3,350 m <sup>2</sup> |
| Southern Site | Low density residential | 80 lots              |
|               | Open space              | 1,250 m <sup>2</sup> |

Source: Urbis, 2016

## 4.2 Site Access

The indicative location and type of site accesses are shown in **Figure 20**. Primary access to the proposed development is expected to be undertaken at Access 2. Access to the proposed development has been summarised below for the northern and southern sites.

**Figure 20 Study site access intersections**



Source: Basemap; Openstreetmap, accessed 2016

### 4.2.1 Northern site

The northern site can be accessed from both Old Northern Road and Derriwong Road. It will have three accesses from Old Northern Road via the two LILO intersections and one intersection allowing all movements listed below:

- Access 1 – conversion of the existing intersection of Old Northern Road | Nursery Access Road to a left in / left out (LILO)
- Access 2 – new intersection allowing all movements
- Access 3 – new LILO.

#### 4.2.2 Southern site

Direct access for the southern site will be from Derriwong Road which vehicles are able to access at intersections along Old Northern Road.

With the intersection of Old Northern Road | Derriwong Road proposed to operate as a LILLO, banned right turn movements are required to use the new access points from Old Northern Road:

- vehicles heading to the west (along Old Northern Road) will be required to use Access 2 (all movements)
- vehicles coming from the south (along New Line Road) will likely use Access 2 or Access 3.

#### 4.3 Internal Road Network

The internal road network for both sites is shown in **Figure 20**. All internal roads should be designed or upgraded to provide safe access and egress for trips generated by the development.

It is envisioned that the proposed site access for the northern site allows an alternative location for pick-up/drop off movements generated by Dural Public School. This will resolve the issue experienced at the existing pick up/drop off location opposite Dural Public School, allowing vehicles from the north to use the internal road network to travel northbound on Old Northern Road, after pick-up/drop off.

#### 4.4 Pedestrians and Cyclists

Internal pedestrian paths will be connected to existing footpaths on Old Northern Road allowing pedestrians to reach existing bus stops in the area. It is envisioned that the internal road network will allow for cyclists to share the roadways with general traffic.

#### 4.5 Public Transport

The majority of the study area will be within the 400m catchment of current bus routes operating on Old Northern Road and New Line Road. Therefore, most of the residents will be within a 400m walking distance of an existing bus route linking to surrounding transport hubs. It is also anticipated that new bus connections to the NWRL stations will be established that are accessible from the study area.

## 5.0 Traffic Impact Assessment

### 5.1 Traffic Generation

The Roads and Maritime's *Guide to Traffic Generating Developments: Updated traffic surveys* (TDT 2013/04a) were used to determine the number of trips generated by the proposed development. Given the rural nature of the area, the average trip rate for low density dwellings within Sydney was applied.

Details of the applied trip generation rates and the generation trips for the proposed development are shown in **Table 11**.

**Table 11 Total trips generated by proposed development**

| Site          | Development Type        | Quantity | AM Peak           |                 | PM Peak           |                 |
|---------------|-------------------------|----------|-------------------|-----------------|-------------------|-----------------|
|               |                         |          | Trip Rate         | Trips Generated | Trip Rate         | Trips Generated |
| Northern Site | Low density residential | 96 lots  | 0.86 per dwelling | 83              | 0.89 per dwelling | 86              |
| Southern Site | Low density residential | 80 lots  | 0.86 per dwelling | 69              | 0.89 per dwelling | 71              |
| <b>Total</b>  |                         |          | <b>152</b>        |                 | <b>157</b>        |                 |

Source: AECOM, 2016

In terms of the split between inbound and outbound trips, it was assumed that trips generated by the low density residential will have 90 per cent outbound trips and 10 per cent inbound trips in the AM Peak, with this reversed in the PM Peak.

The future traffic flows generated from both the northern and southern sites are shown in **Table 12**. In the AM peak hour, a total of 152 trips would be generated from the two sites, while in the PM peak hour, a total of 157 trips would be generated from the two sites.

**Table 12 Forecast Traffic Flow**

| Site          | AM Peak trips |            |            | PM Peak trips |           |            |
|---------------|---------------|------------|------------|---------------|-----------|------------|
|               | In            | Out        | Total      | In            | Out       | Total      |
| Northern Site | 8             | 75         | 83         | 77            | 9         | 86         |
| Southern Site | 7             | 62         | 69         | 64            | 7         | 71         |
| <b>Total</b>  | <b>15</b>     | <b>137</b> | <b>152</b> | <b>141</b>    | <b>16</b> | <b>157</b> |

Source: AECOM, 2016

## 5.2 Traffic Distribution and Assignment

Trip distribution and assignment for the development was determined based on existing Journey to Work patterns for private vehicle trips to and from Travel Zone 4310, within which the study area is located. The access roads that drivers would use to reach their destinations were considered, and this was used to distribute the trips between drivers who would use:

- Old Northern Road north (north of the sites)
- New Line Road
- Kenthurst Road / Old Northern Road west (west of the sites)

The trip distribution to each of these routes for the AM Peak period is shown in **Table 13**. These distributions are assumed to be reversed in the PM Peak period.

**Table 13** Distribution of generated traffic to key routes in the AM Peak Period

| Route                                     | To/from      | % of allocated trips |                   |
|---|--------------|----------------------|-------------------|
|   |              | Origin trips         | Destination trips |
| Old Northern Road (north)                 | North        | 25%                  | 31%               |
| New Line Road                             | South / East | 25%                  | 35%               |
| Kenthurst Road / Old Northern Road (west) | West         | 50%                  | 34%               |
| <b>Total</b>                              |              | <b>100%</b>          | <b>100%</b>       |

Source: AECOM, 2016

**Table 14** provides a summary of the likely traffic distribution for the development between the Old Northern Road and Derriwong Road access road intersections.

**Table 14** Traffic splits between access roads

| Access Road       | AM Peak     |             | PM Peak     |             |
|-------------------|-------------|-------------|-------------|-------------|
|                   | In          | Out         | In          | Out         |
| Old Northern Road | 67%         | 64%         | 75%         | 75%         |
| Derriwong Road    | 33%         | 36%         | 25%         | 25%         |
| <b>Total</b>      | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> |

Source: AECOM, 2016

### 5.3 Intersection Assessment

**Table 15** and **Table 16** show the intersection performance of future year together with development traffic for both AM and PM peak hour.

**Table 15 2026 AM Peak Intersection Performance – with proposed development**

| Intersection                                       | Intersection Type           | Demand Flow (veh/h) | Level of Service | Degree of Saturation (v/c) | Ave Delay (sec) <sup>1</sup> | 95% Back of Queue (m) |
|--|-----------------------------|---------------------|------------------|----------------------------|------------------------------|-----------------------|
| Old Northern Road   Derriwong Road                 | Give-way (left in/left out) | 2,402               | A                | 0.381                      | 9.1                          | 4                     |
| Old Northern Road   New Line Road                  | Signals                     | 4,555               | C                | 0.839                      | 32.4                         | 162                   |
| Access 1 (Old Northern Road   Nursery Access Road) | Give-way (left in/left out) | 2,214               | A                | 0.687                      | 8.6                          | 1                     |
| Access 2   | Roundabout                  | 2,266               | A                | 0.445                      | 10.7                         | 28                    |
|  | Signals                     | 2,266               | B                | 0.860                      | 14.7                         | 91                    |
| Access 3   | Give-way (left in/left out) | 2,671               | A                | 0.776                      | 11.5                         | 2                     |

<sup>1</sup>Average delay report is the average delay of the worst intersection approach for giveway and roundabout intersections.

Source: AECOM, 2016

**Table 16 2026 PM Peak Intersection Performance – with proposed development**

| Intersection                                       | Intersection Type           | Demand Flow (veh/h) | Level of Service | Degree of Saturation (v/c) | Ave Delay (sec) | 95% Back of Queue (m) |
|--|-----------------------------|---------------------|------------------|----------------------------|-----------------|-----------------------|
| Old Northern Road   Derriwong Road                 | Give-way (left in/left out) | 2,587               | A                | 0.485                      | 8.4             | 2                     |
| Old Northern Road   New Line Road                  | Signals                     | 4,772               | C                | 0.914                      | 36.6            | 138                   |
| Access 1 (Old Northern Road   Nursery Access Road) | Give-way (left in/left out) | 2,385               | B                | 0.677                      | 16.3            | 2                     |
| Access 2   | Roundabout                  | 2,388               | A                | 0.434                      | 11.3            | 23                    |
|  | Signals                     | 2,388               | A                | 0.618                      | 8.0             | 65                    |
| Access 3   | Give-way (left in/left out) | 2,654               | B                | 0.753                      | 16.8            | 1                     |

<sup>1</sup>Average delay report is the average delay of the worst intersection approach for giveway and roundabout intersections.

Source: AECOM, 2016

As noted in the intersection assessment that assessed the 2026 background traffic only, at the intersection of Old Northern Road | New Line Road, the left turn movement on the Old Northern Road west leg exceeds the 100m left turn bay provision and queueing extends past the preceding priority intersection at Old Northern Road / Derriwong Road.

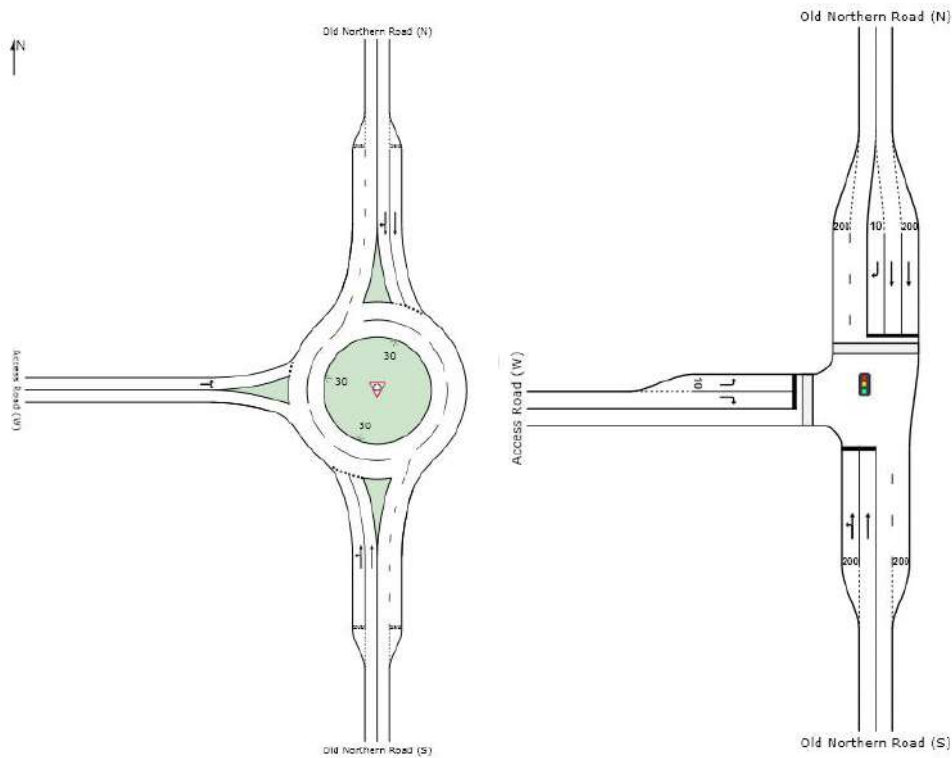
It is forecast that minimal traffic would use the intersections along Derriwong Road, which would operate satisfactorily as priority intersections.



The primary intersection providing access to the development has been assessed as a roundabout and as a signalised intersection, given the low likelihood of a priority intersection allowing all movements and operating satisfactorily. This intersection is located near the northern site and would require a new intersection along Old Northern Road.

**Figure 21** presents the geometric layout assessed for the intersection. There is potential for both the roundabout and signalised intersection to integrate with the pick-up/drop-off zone subject to detailed design.

**Figure 21 Northern site – Access Road 2**



Source: AECOM, 2016

## 5.4 Infrastructure Upgrade Summary

The following infrastructure upgrades are required to accommodate background traffic:

- Upgrade of Old Northern Road and New Line Road to provide additional capacity.
- Old Northern Road | New Line Road to be upgraded to a signalised intersection.
- Old Northern Road | Vineys Road to be upgraded to a roundabout.
- Conversion of Old Northern Road | Derriwong Road to operate as a LILO

Further infrastructure upgrades are required to accommodate the traffic generated by the proposed development:

- Access 1 – conversion of the existing intersection of Old Northern Road | Nursery Access Road to a LILO.
- Access 2 – New roundabout or signalised intersection on Old Northern Road, north of Dural Primary School.
- Access 3 – New LILO intersection on Old Northern Road, south of Dural Primary School.

It is forecast that minimal traffic would use the intersections along Derriwong Road, which would operate satisfactorily as priority intersections.

## 6.0 Summary and Conclusion

### 6.1 Proposed development

The Dural Planning Proposal is for a residential development, which is divided into the following two sites:

- The northern site is proposed to consist of approximately 96 low density residential lots and approximately 3,400 m<sup>2</sup> of open space.
- The southern site is proposed to consist of 80 low density residential lots and 1,250 m<sup>2</sup> of open space.

### 6.2 Vehicle Access

Old Northern Road and Derriwong Road will provide vehicular access to both northern and southern sites. Three access points are proposed along Old Northern Road, which include two LLOs and an intersection allowing all movements.

An additional seven access points are proposed along Derriwong Road, which are proposed as priority intersections.

### 6.3 Transport and Accessibility

All internal roads are to be designed or upgraded to provide safe access and egress for trips generated by the development.

The majority of the study area will be within the 400m catchment of current bus routes operating on Old Northern Road and New Line Road. Therefore, most of the residents will be within a 400m walking distance of an existing bus route linking to surrounding transport hubs. It is also anticipated that new bus connections to the NWRL stations will be established that are accessible from the study area.

Internal pedestrian paths will be connected to existing footpaths on Old Northern Road allowing pedestrians to reach existing bus stops in the area. It is envisioned that the internal road network will allow for cyclists to share the roadways with general traffic.

### 6.4 Traffic Impacts

The existing intersections assessed indicate three of the four intersections in the vicinity of the study area operate satisfactorily. The intersection of Old Northern Road | Vineys Road operates unsatisfactorily due to delays experienced by vehicles on Vineys Road. The right turn movement from Derriwong Road at the intersection of Old Northern Road | Derriwong Road also experiences significant delays during both the AM and PM peak as vehicles are required to wait for gaps along Old Northern Road to enter the intersection.

Current traffic volumes experienced along Old Northern Road and New Line Road are approaching capacity, with the two roads expected to be upgraded to provide additional capacity to cater for future background traffic.

Forecasted 2026 background traffic volumes indicate the following intersections will need to be upgraded to cope with background traffic growth:

- Old Northern Road | New Line Road upgraded to a signalised intersection
- Old Northern Road | Vineys Road upgraded to a roundabout
- Old Northern Road | Derriwong Road converted to a LLO, however this is reliant on a new access point on Old Northern Road provided by the proposed development to allow the banned right turn movements at the intersection an alternate route to access the road network.

Further infrastructure upgrades are required to accommodate the traffic generated by the proposed development:

- Access 1 – conversion of the existing intersection of Old Northern Road | Nursery Access Road to a LILLO.
- Access 2 – New roundabout or signalised intersection on Old Northern Road, north of Dural Primary School.
- Access 3 – New LILLO intersection on Old Northern Road, south of Dural Primary School.

It is forecast that minimal traffic would use the intersections along Derriwong Road, which would operate satisfactorily as priority intersections.

## **6.5 Timing and Delivery**

It is understood that infrastructure upgrades would be required to provide sufficient capacity within the existing road network to support the delivery and realisation of several planning proposals, which are at various stages of consideration by relevant planning authorities. Other planning proposals in the surrounding area include South Dural, Dural Service Centre and the adjoining Round Corner Timber site.

It is noted that the South Dural planning proposal was granted Gateway Approval on the premise of delivering these infrastructure upgrades and, despite the potential for the Gateway Approval to lapse, the DP&E has provided an extension of time to allow this proposal to be developed and implemented. The South Dural planning proposal, together with the Dural Service Centre, Round Corner Timber Yard and the subject planning proposal, represent an opportunity for a coordinated approach and efficient spending on infrastructure.

The significant progression of the South Dural Planning Proposal, together with the recent extension of time granted to the site, represents a clear commitment to the delivery of the necessary infrastructure works and should be interpreted as certainty that upgrades will be delivered in the near future.



Skye Playfair Redman  
Urbis  
Level 23, Darling Park Tower 2, 201 Sussex Street  
Sydney NSW 2000

**Project No. 15GOS\_1895**

23 March 2016

Dear Skye,

**RE: Ecological Assessment – Dural Rezoning**

Eco Logical Australia Pty Ltd was commissioned to prepare an Ecological (flora and fauna) and Bushfire Constraints Analysis for the proposed rezoning of multiple parcels of land along Old Northern Road, Dural (**Figure 1**). Although the main focus of the ecological assessment was to identify possible constraints within the parcels of land along Old Northern Road (referred to as the “subject site” - see **Figure 1**), Urbis also requested a desktop review of the broader area surrounding the land (referred to as the “study area” - see **Figure 1**).

This letter outlines the ecological constraints across the subject site, as determined from the desktop literature review and field survey. Potential ecological constraints were assessed in relation to State and Commonwealth legislation, namely the NSW *Threatened Species Conservation Act 1995* (TSC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

An initial constraints assessment was conducted for seven lots in late 2015. Another five lots were added in early 2016, and have been combined in a single ecological constraints assessment provided below.

Eco Logical Australia undertook a desktop analysis to refine the field survey. The ecological constraints analysis concluded that despite the subject site being substantially modified, there is a potential that threatened ecological communities persist within the study area. A site investigation was required to validate the presence of threatened ecological communities within the subject site.

Two threatened ecological communities in poor condition were recorded within the subject site as part of the site inspection by Eco Logical Australia. These were Blue Gum High Forest listed as a critically endangered under the TSC Act, and Sydney Turpentine Ironbark Forest listed as endangered under the TSC Act.

The desktop vegetation mapping and a brief visual inspection of the broader study area suggests that the study area may contain patches of Sydney Turpentine Ironbark Forest and Blue Gum High Forest, as well as potential habitat for threatened flora and fauna species. Additional surveys would be required to verify the extent and condition of threatened ecological communities and the presence of threatened species within the study area.

If you have any questions please do not hesitate to contact me (02) 8536 8650 or [matthewd@ecoaus.com.au](mailto:matthewd@ecoaus.com.au).

Kind Regards,



Matthew Dowle  
Senior Ecologist



## Site Description

The site is comprised of two cluster lots along Old Northern Road, Dural (**Figure 1**) (referred to as the “subject site”) within The Hills Shire Council (THSC).

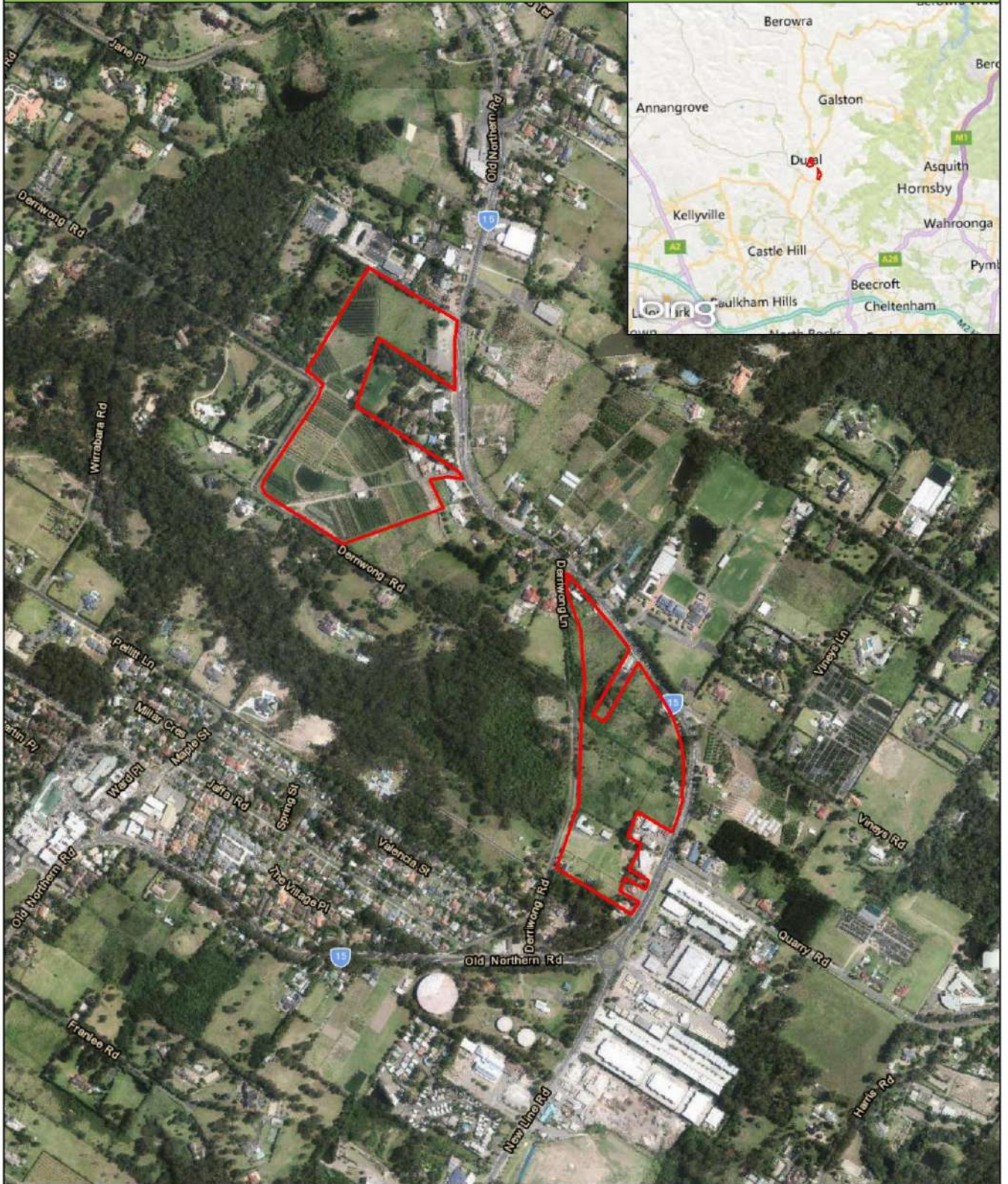
The site includes the following lots:

- Lot 100 and 102 (DP13628)
- Lot 1 (DP656036)
- Lot X (DP501233)
- Lot 2 (DP567995)
- Lot 9 (DP237576)
- Lot 2 (DP541329)
- Lots 101 and 103 (DP713628)
- Lot 1 (DP660184)
- Lot 11 DP866560
- Lot D DP38097
- Lot 1 DP73652
- Lot 12 DP866560.

The entire subject site is zoned as RU6 Transition. The majority of the study area is also zoned RU6 Transition with the exception of a parcel of land to the corner of Derriwong Road, zoned SP2 (Cemetery) and two small linear sections along Old Northern Road in the south of the study area are also zoned SP2 (Classified Road).

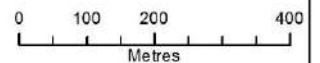
A review of The Hills Local Environmental Plan 2012 (HLEP) Terrestrial Biodiversity layer has confirmed that the subject site does not fall within land mapped as ‘biodiversity’. However, the land directly west of Derriwong Road has been mapped as part of the Terrestrial Biodiversity layer. This relates to clause 7.4 Biodiversity (Terrestrial) and requires that certain objectives relating to biodiversity protection be considered when assessing development applications on land that have been shown on the Terrestrial Biodiversity Map.

**Location**



**Legend**

Subject Site



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Prepared by: BH Date: 15/03/2016

**Figure 1: study area and subject site**

## Methodology

The following resources were reviewed during the desktop assessment of the study area:

- NSW BioNet, Atlas of NSW Wildlife database search (5 km ) (accessed 27 July 2015)
- EPBC Act Protected Matters Search Tool (5 km) (accessed 27 July 2015)
- *Soil Landscapes of the Sydney 1:100 000 sheet* (Chapman and Murphy 1989)
- Vegetation mapping:
  - Native vegetation of Western Sydney (NSW NPWS 2002)
  - The Hills Shire Council vegetation mapping (THSC 2008) (Sheet 6)
- Local government planning instruments
  - The Hills Local Environmental Plan 2012 (HLEP)
  - The Hills Shire Council Terrestrial Biodiversity Map (Sheet CL1\_023)
- Aerial photography.

A review of available literature and database searches was conducted to determine potential ecological constraints and data gaps. This information was used to assist in the assessment of the subject site.

A brief site investigation was originally conducted on 22 October 2015 by Danielle Adams-Bennett to identify the presence and condition of TECs, threatened species and fauna habitat values (i.e. hollow-bearing trees) within the subject site. A follow-up site investigation to incorporate the additional sites was conducted on 17 February 2016. A brief visual assessment from the roadside was conducted to identify vegetation in the broader study area. This method is suitable when trying to conduct broad validation. However, additional field surveys are required to confirm the boundaries of these vegetation communities and the presence of threatened species within the study area that are outside the subject site.

An assessment of the likelihood of occurrence of TECs and threatened flora and fauna species and their habitats was undertaken to determine if these are likely to occur within the study area (**Appendix A**).

## Results

### *Literature review of study area*

#### Hydrology and Soils

Several tributaries of O'haras creek drain away from the subject site and converge with O'haras Creek to the west of the study area. O'haras Creek is a major creek line which is buffered by native vegetation and flows in a north-west direction.

The majority of the site is located within Glenorie soil landscape with a small section on Lucas Heights within the south-eastern portion of Lot X DP 501233 and Lot 2 DP567995. Glenorie soil landscape (erosional) occurs on undulating or rolling hills. It is associated with the Wianamatta Group Shales and has low to moderate fertility and high erosional hazard (Chapman and Murphy 1989). Lucas Heights soil landscape (residual) is generally found on upper slopes or ridgetops and has a low fertility (Chapman and Murphy 1989).

#### Vegetation communities

The vegetation within the study area has been previously mapped by broad-scale mapping projects (NPWS 2002, THSC 2008). The majority of the subject site was not mapped as native vegetation under these previous projects. Interpretation of aerial photography indicated the presence of market gardens, cleared lands and a modified landscape. However, small stands of native vegetation were mapped within and adjacent to the subject site.



The two vegetation mapping datasets NPWS (2002) and THSC (2008) were inconsistent in the classification of native vegetation types within the subject site and study area (discussed below). Therefore field validation was required to confirm the presence and identity of any native vegetation communities within the subject site.

Additional surveys would be required to validate the vegetation within the study area because the study area was not surveyed in detail beyond the subject site.

### Threatened species

Database searches identified seven threatened ecological communities, 31 threatened flora species and 54 threatened fauna species, which are listed under the TSC or EPBC Acts. Fauna included 30 birds (including 12 migratory species), 14 mammals (including nine bats), five amphibians, two fish, two invertebrate and one reptile that have been recorded or are likely to occur within a 5 km radius around the subject site.

An assessment of the likelihood of occurrence for threatened species to occur within the study area is provided in **Appendix A**. The assessment identified that highly mobile fauna species such as microbats and bird species may utilise the study area. Additionally, there are a number of records for one threatened invertebrate *Pommerhelix duralensis* (Dural Land Snail) which may inhabit the study area. There are a number of records for one threatened flora species, *Epacris purpurascens* var. *purpurascens*, within the study area and adjacent lands.

Field surveys were conducted to determine if threatened species occur or whether suitable habitat is present within the subject site.

### **Field results of subject site inspection**

#### Vegetation communities

The majority of the subject site has been substantially modified. However, small patches of native vegetation were located within Lot 1 (DP 656036) and Lot 11 (DP 866560) in the south. These patches of vegetation were previously mapped by THSC (2008) as Sandstone Gully Forest or Shale/Sandstone Transition Woodland, and by NPWS (2002) as Blue Gum High Forest or Sydney Turpentine Ironbark Forest.

However, three patches were validated as Blue Gum High Forest listed under the TSC Act, due to the presence of *Eucalyptus saligna* (Blue Gum) and *Eucalyptus pilularis* (Blackbutt) (**Figure 2**). *Eucalyptus saligna* and *Eucalyptus pilularis* are key diagnostic species of Blue Gum High Forest listed under the TSC Act. The two northern patches contained mature and regenerating individuals of *Eucalyptus saligna* (**Plate 1**), while the southern patch contained just two mature *Eucalyptus pilularis* (**Plate 2**). Areas of high quality Blue Gum High Forest may also be listed under the EPBC Act. However, these patches do not satisfy the listing criteria under the EPBC Act, due to their small size (less than 1 ha), lack of native species diversity across all strata, and/or they contain a canopy cover less than 10%.

A small linear patch of Sydney Turpentine Ironbark Forest was located along Derriwong Road and may be impacted by the proposed rezoning. Sydney Turpentine Ironbark Forest is listed as an endangered ecological community under the TSC Act. This patch of vegetation along the road does not satisfy the stringent criteria for listing under the EPBC Act due to its poor quality, small patch size (less than 1 ha) and canopy cover less than 10%.

The site inspection outside the subject site also identified key characteristic species of Sydney Turpentine Ironbark Forest or Blue Gum High Forest, suggesting that these communities are located within the broader study area (**Figure 2**). Several *Syncarpia glomulifera* (Turpentine), *Eucalyptus saligna*, *Eucalyptus pilularis* and *Angophora costata* were identified in vegetation patches adjacent to the subject site. These were identified in previous mapping as Blue Gum High Forest or Sydney Turpentine Ironbark Forest by NPWS (2002) and Shale/Sandstone Transition Forest by THSC (2008).



**Plate 1: Patch of Blue Gum High Forest in poor condition**



**Plate 2: Patch of Blue Gum High Forest consisting of two individual *Eucalyptus pilularis***

### **Threatened Species**

One migratory species, *Ardea ibis* (Cattle Egret), listed under the EPBC Act was recorded foraging with livestock. This species is common in disturbed environments. Similar types of habitat were located in semi-rural properties adjacent to the subject site and across the broader study area.

The subject site contained limited fauna habitat values. Fauna habitat values included farm dams and scattered canopy trees. No hollow-bearing trees and only limited foraging habitat for fauna species were recorded within the subject site. Due to the lack of native species within the canopy or shrub layers, there is also limited leaf litter and woody debris in the subject site.

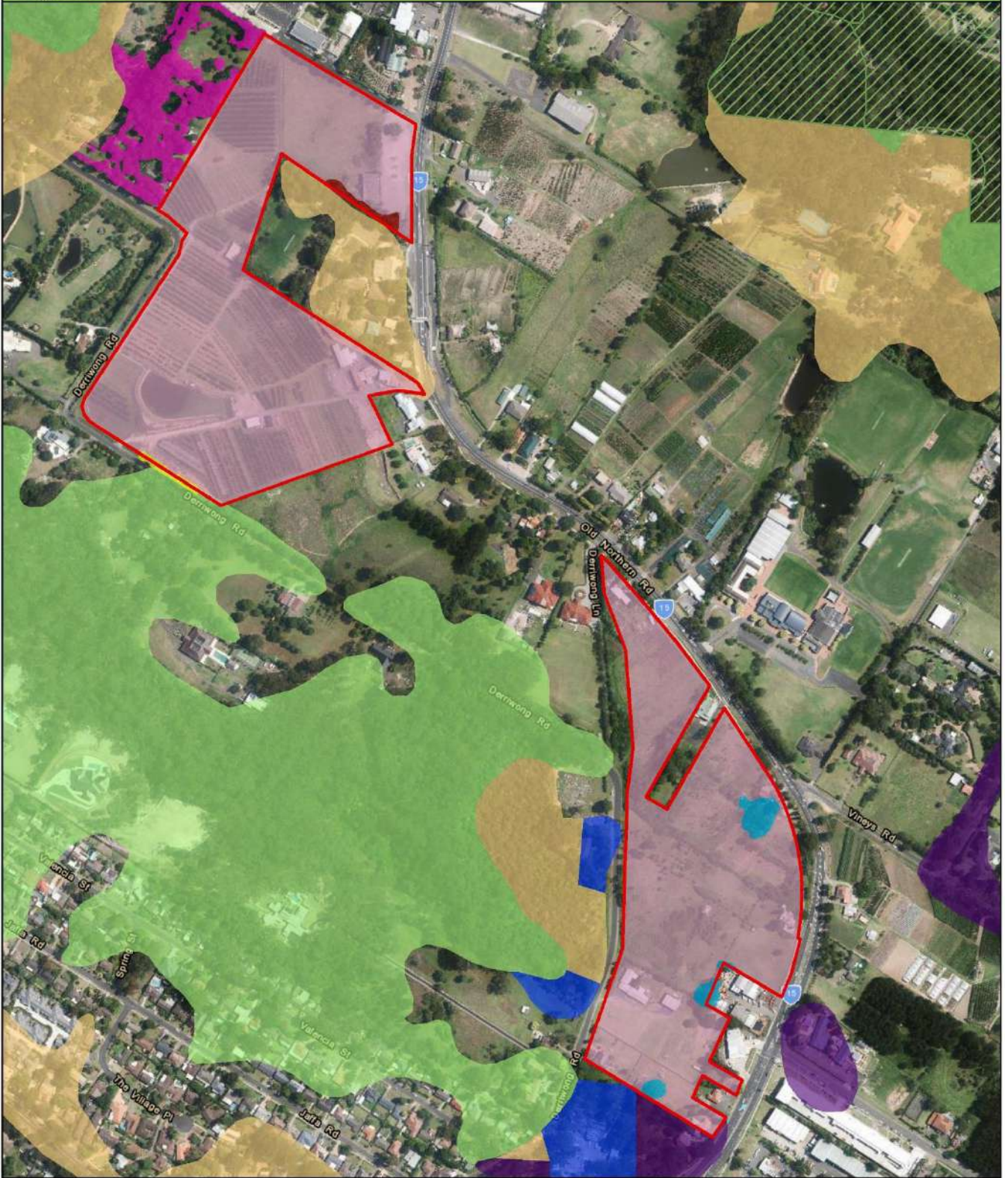
The subject site does not provide habitat for threatened *Pommerhelix duralensis* (Dural Woodland Snail), despite the number of records in the locality. This species prefers forested habitats that have good native cover and woody debris, including fallen bark and leaf litter. These habitat features were largely absent from the subject site, due to current land practices and dominance of exotic species in the understorey. However, there is potential that the vegetation within the broader study area may contain habitat for the Dural Land Snail.

Due to the lack of important habitat features (i.e. hollow-bearing trees and intact native vegetation) the subject site is unlikely to support significant habitat for threatened fauna species. There is potential that highly mobile species such as threatened microbats and birds (e.g. Little Eagle) may utilise the area for occasional foraging or roosting.

No threatened flora species were recorded within the subject site during the field surveys. Furthermore, threatened flora are considered unlikely to occur within the subject site, due its predominately disturbed nature and thereby lack of potential habitat. Targeted surveys would be required to determine if the native vegetation within the broader study area contained threatened flora species.



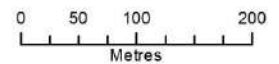
**Vegetation Communities**



**Legend**

- Subject Site
- Validated Vegetation (ELA 2015/2016)**
- Blue Gum High Forest (low condition)
- Exotics
- Native Planted
- Sydney Turpentine Ironbark Forest

- THSC 2008**
- Sydney Turpentine Ironbark Forest
- NPWS 2002**
- Blue Gum High Forest
- Sydney Turpentine Ironbark Forest
- Turpentine-Ironbark Margin Forest
- Western Sandstone Gully Forest
- Unclassified Vegetation



GDA 1994 MGA Zone 56



Prepared by: BH/VH Date: 19/02/2016

**Figure 2: Vegetation communities**

## Constraints

An ecological constraint value was assigned to the subject site based on the information from both the desktop review and site inspections. The value relates to potential risk of the rezoning to be constrained by biodiversity. These ecological constraints have been mapped (**Figure 3**) and discussed in the table below.

**Table 1: constraints assessment of the subject site**

| Constraint | Value present on site   | Constraint ranking criteria   | Recommendation  |
|------------|---|---|---|
| High       | Blue Gum High Forest and Sydney Turpentine Ironbark Forest (both low condition) | <ul style="list-style-type: none"> <li>vegetation communities listed as threatened under the TSC Act</li> <li>whilst not intact, vegetation supports characteristic species of these communities</li> <li>potential foraging habitat for threatened bird species (e.g. Little Eagle) and microbats</li> </ul> | <ul style="list-style-type: none"> <li>retain vegetation if possible and consider assisted revegetation with diagnostic species for the ecological community</li> <li>minimise impacts during development design and construction phase including establishing a buffer area adjacent to the vegetation.</li> <li>it is noted that an interior road network will be required within the subject site to provide sufficient permeability. Should trees within these communities be required to be removed, an impact assessment should be undertaken at the subdivision stage when the road network and lot layout is finalised.</li> <li>educate local community on significance of these ecological communities and threatened species through interpretative signage</li> </ul> |
| Moderate   | Native vegetation with a canopy   | <ul style="list-style-type: none"> <li>potential foraging habitat for threatened fauna species</li> <li>corridor for native fauna dispersal</li> </ul>  | <ul style="list-style-type: none"> <li>retain native vegetation where possible</li> <li>incorporate into landscape planting design if possible</li> </ul>   |
| Moderate   | Patch of native shrubs  | <ul style="list-style-type: none"> <li>contains some native resilience, although it does not represent a native vegetation community</li> <li>potential corridor or shelter for native fauna</li> </ul>   | <ul style="list-style-type: none"> <li>suitable for development</li> </ul>  |
| Moderate   | Planted non-indigenous native vegetation  | <ul style="list-style-type: none"> <li>does not represent a native vegetation community</li> <li>potential corridor or shelter for native fauna</li> </ul>  | <ul style="list-style-type: none"> <li>suitable for development</li> </ul>  |
| Low        | Farm dam  | <ul style="list-style-type: none"> <li>potential foraging habitat for microbats</li> <li>suitable habitat for native fauna species</li> </ul>   | <ul style="list-style-type: none"> <li>conduct dewatering plan and relocation of native fauna species prior to disturbance</li> <li>suitable for development</li> </ul>   |
| Low        | Exotic vegetation   | <ul style="list-style-type: none"> <li>suitable foraging habitat for Little Eagle, microbats and migratory birds such as the Cattle Egret</li> <li>waterbodies support limited vegetation cover for fauna</li> </ul>  | <ul style="list-style-type: none"> <li>development should be confined to these areas wherever possible</li> <li>implement management techniques to prevent the dispersal of weed species into adjacent woodland areas particularly during construction</li> </ul>   |

| Constraint | Value present on site | Constraint ranking criteria  | Recommendation   |
|------------|-----------------------|--|--|
| Low        | Landscape gardens     | <ul style="list-style-type: none"> <li>• planted tree species</li> <li>• potential foraging habitat for fauna species such as birds, reptiles</li> </ul> | <ul style="list-style-type: none"> <li>• suitable for development</li> </ul> |



**Constraints**



**Legend**

- Subject Site

**Constraints**

- High
- Moderate
- Low

0 50 100 200  
Metres

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**Figure 3: Constraints assessment**

## Recommendations and conclusion

Three small patches of Blue Gum High Forest in low condition were recorded within the subject site. A small patch of Sydney Turpentine Ironbark Forest was recorded along Derriwong Road and may be impacted upon under the proposed rezoning. All the Blue Gum High Forest and Sydney Turpentine Ironbark Forest patches were considered to be in low condition as they contained low native species diversity, are highly fragmented and had high weed densities or contained an understorey dominated by exotic species.

The subject site had limited habitat for threatened fauna species. No threatened flora species were recorded within the subject site. According to the literature review and a brief visual inspection, the study area contains potential Blue Gum High Forest and Sydney Turpentine Ironbark Forest vegetation and potential habitat for threatened flora and fauna species. However, additional surveys would be required to validate the vegetation boundaries and confirm the presence of threatened species within the broader study area.

The following recommendations have been provided for the proposed rezoning of the subject site:

- Avoid impact to areas of high ecological constraint, if possible.
- If high ecologically constrained areas are to be impacted by future road networks or lot layouts, further investigations are to be undertaken at the subdivision stage.
- Consider implementing a Vegetation Management Plan (VMP) for the long-term conservation of Blue Gum High Forest and management of weeds to prevent their spread.
- Any plantings as part of future developments incorporate native species indigenous to the study area.
- Prepare a soil and erosion control plan as part of the Development Application process.



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## APPENDIX A - Likelihood of occurrence

Searches of the Atlas of NSW Wildlife and EPBC Protected Matters search tool were performed for the study area, based on a 5 km buffer around the study area. Marine species (including whales, seabirds, turtles and seals) have been removed from the list as these species were not considered relevant to the current proposal. The likelihood of occurrence was considered for all listed species, and is provided for each species under the 'likely' column.

Each species likely occurrence was initially informed through a desktop assessment and was used to guide the site inspection. The final assessment of the likelihood of occurrence was completed following the site inspection and was based on database or other records, presence or absence of suitable habitat, features of the study area, results of the field survey and professional judgement.

The terms for likelihood of occurrence are defined below:

- “yes” = the species was or has been observed in the study area
- “likely” = a medium to high probability that a species uses the study area
- “potential” = suitable habitat for a species occurs in the study area, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- “unlikely” = a very low to low probability that a species uses the study area, and
- “no” = habitat in the study area and in its vicinity is unsuitable for the species

Those species considered as potentially, likely or known to occur (likelihood of potential, likely or yes) are considered subject species for this project.

The following abbreviations have been used in the likelihood assessment:

- *TSC\_Status* = Listing under the NSW Threatened Species Conservation Act 1995
- *EPBC\_Status* = Listing under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999
- *CE* = Critically Endangered
- *E* = Endangered
- *E2* = Endangered Population
- *V* = Vulnerable
- *M* = Migratory

| SCIENTIFIC NAME               | COMMON NAME  | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|-------------------------------|--|---------|----------|---|--------------------------|
| <b>Ecological Communities</b> |  |         |          |   |                          |
|                               | Blue Gum High Forest in the Sydney Basin Bioregion                               | CE      | CE       | Occurs mainly in areas with deep clay soil derived from shale, generally at altitudes greater than 100 m above sea level, and that have an annual rainfall of more than 1050 mm. Also known to occur in isolated valleys on soils associated with localised volcanic intrusions. Remnants mainly occur in the Lane Cove, Willoughby, Ku-ring-gai, Hornsby, Baulkham Hills, Ryde and Parramatta local government areas.  | Known                    |
|                               | Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion | E       | E        | Occurs on sandy soils of Hawkesbury-Nepean river system typically with low nutrient value and flat topography. The vegetation community contains low woodland, canopy up to 15m tall and dense mid layer of sclerophyll shrubs and scattered sedges. Species include <i>Angophora bakeri</i> , <i>Eucalyptus racemosa</i> , <i>Melaleuca decora</i> and <i>Banksia aemula</i> .   | No                       |
|                               | Coastal Upland Swamps in the Sydney Basin Bioregion                              | E       | E        | This ecological community is restricted to the Sydney Basin Bioregion. It occurs on the Hawkesbury sandstone plateaux on acidic soils which are high in organic matter and subject to periodic waterlogging (OEH 2014). The structure of the vegetation may vary from tall open scrubs, tall closed scrubs, closed heaths, open graminoid heaths, sedgeland and fernlands (OEH 2014). This ecological community is associated with shallow groundwater aquifers in the headwaters and impeded drainage lines of streams, and on sandstone benches with abundant seepage moisture (OEH 2014). The floristic assemblage is diverse particularly in the ground layer (OEH 2014). | No                       |
|                               | Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion            | E       | CE       | Occurs in western Sydney, with the most extensive stands occurring in the Castlereagh and Holsworthy areas. Smaller remnants occur in the Kemps Creek area and in the eastern section of the Cumberland Plain.  | No                       |

| SCIENTIFIC NAME               | COMMON NAME   | TSC ACT          | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE           |
|-------------------------------|---|------------------|----------|---|------------------------------------|
|                               | Shale/Sandstone Transition Forest                         | CE               | E        | Occurs at the edges of the Cumberland Plain, where clay soils from the shale rock intergrade with earthy and sandy soils from sandstone, or where shale caps overlay sandstone. The boundaries are indistinct, and the species composition varies depending on the soil influences. It typically occurs in moderately wet sites, with an annual rainfall of 800-1100mm per year, and on clay soils derived from Wianamatta shale. The tree canopy is dominated by Turpentine and a variety of eucalypt species. Its distribution is mainly on the Cumberland Plain of the Sydney region. Was not recorded during the field surveys. | Potential outside the subject site |
|                               | Turpentine-Ironbark Forest in the Sydney Basin Bioregion  | E                | CE       | Occurs in areas of moderate annual rainfall 800 – 1100 mm on fertile soils of the Wianamatta Shale including altitude margins of the Cumberland Plain, and on the shale ridge caps of sandstone plateaus. It is distributed between areas of Blue Gum High Forest (which occurs on more fertile soils and higher rainfall areas) and Cumberland Plain Woodland (on flat areas, less fertile soils and less rainfall). Remnants mostly occur in the Baulkham Hills, Hornsby, Ku-ring-gai, Parramatta, Ryde, Sutherland and Hurstville local government areas (OEH 2014).   | Known                              |
|                               | Western Sydney Dry Rainforest and Moist Woodland on Shale | E                | CE       | A closed canopy often associated with humid conditions and supports epiphytes, vines and mesic shrubs although this varies according to topography and landform. It is found on shale soil in the Cumberland Plain Sub-region of the Sydney Basin Bioregion in elevations below 300m with a mean annual rainfall between 700-900mm.   | No                                 |
| <b>FISH</b>                   |   |                  |          |   |                                    |
| <i>Macquaria australasica</i> | Macquarie Perch   | E (under FM Act) | E        | Habitat for the Macquarie perch is bottom or mid-water in slow-flowing rivers with deep holes, typically in the upper reaches of forested catchments with intact riparian vegetation. Macquarie perch also do well in some upper catchment lakes. In some parts of its range, the species is reduced to taking refuge in small pools which persist in midland–upland areas through the drier summer periods.  | No                                 |



| SCIENTIFIC NAME                 | COMMON NAME                | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE |
|---------------------------------|----------------------------|---------|----------|--|--------------------------|
| <i>Prototroctes maraena</i>     | Australian Grayling        | -       | V        | Historically, this species occurred in coastal streams from the Grose River southwards through NSW, VIC and TAS. On mainland Australia, this species has been recorded from rivers flowing east and south of the main dividing ranges. This species spends only part of its lifecycle in freshwater, mainly inhabiting clear, gravel-bottomed streams with alternating pools and riffles, and granite outcrops but has also been found in muddy-bottomed, heavily silted habitat. Grayling migrate between freshwater streams and the ocean and as such it is generally accepted to be a diadromous (migratory between fresh and salt waters) species.   | No                       |
| <b>FROGS</b>                    |                            |         |          |  |                          |
| <i>Heleioporus australiacus</i> | Giant Burrowing Frog       | V       | V        | Forages in woodlands, wet heath, dry and wet sclerophyll forest (Ehmann 1997). Associated with semi-permanent to ephemeral sand or rock based streams (Ehmann 1997), where the soil is soft and sandy so that burrows can be constructed (Environment Australia 2000).   | Unlikely                 |
| <i>Litoria aurea</i>            | Green and Golden Bell Frog | E       | V        | This species has been observed utilising a variety of natural and man-made waterbodies (Pyke and White 1996) such as coastal swamps, marshes, dune swales, lagoons, lakes, other estuary wetlands, riverine floodplain wetlands and billabongs, stormwater detention basins, farm dams, bunded areas, drains, ditches and any other structure capable of storing water (OEH 2014). Fast flowing streams are not utilised for breeding purposes by this species. Preferable habitat for this species includes attributes such as shallow, still or slow flowing, permanent and/or widely fluctuating water bodies that are unpolluted and without heavy shading (OEH 2014). Large permanent swamps and ponds exhibiting well-established fringing vegetation (especially bulrushes– <i>Typha</i> sp. and spikerushes– <i>Eleocharis</i> sp.) adjacent to open grassland areas for foraging are preferable (Ehmann 1997). Ponds that are typically inhabited tend to be free from predatory fish such as <i>Gambusia holbrooki</i> (Mosquito Fish) (OEH 2014). | No                       |

| SCIENTIFIC NAME            | COMMON NAME                           | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|----------------------------|---------------------------------------|---------|----------|---|--------------------------|
| <i>Litoria littlejohni</i> | Littlejohn's Tree Frog,<br>Heath Frog | V       | V        | <p>Littlejohn's Tree Frog has a distribution that includes the plateaus and eastern slopes of the Great Dividing Range from Watagan State Forest (90 km north of Sydney) south to Buchan in Victoria (OEH 2014). It occurs along permanent rocky streams with thick fringing vegetation associated with eucalypt woodlands and heaths among sandstone outcrops. It appears to be restricted to sandstone woodland and heath communities at mid to high altitude (OEH 2014). It forages both in the tree canopy and on the ground, and it has been observed sheltering under rocks on high exposed ridges during summer (OEH 2014). It hunts either in shrubs or on the ground. Breeding is triggered by heavy rain and can occur from late winter to autumn, but is most likely to occur in spring when conditions are favourable.</p> <p>Males call from low vegetation close to slow flowing pools. Eggs and tadpoles are mostly found in slow flowing pools that receive extended exposure to sunlight, but will also use temporary isolated pools (OEH 2014).</p> | No                       |
| <i>Mixophyes balbus</i>    | Stuttering Frog                       | E       | V        | <p>A variety of forest habitats from rainforest through wet and moist sclerophyll forest to riparian habitat in dry sclerophyll forest (OEH 2014) that are generally characterised by deep leaf litter or thick cover from understorey vegetation (Ehmann 1997). Breeding habitats are streams and occasionally springs. Not known from streams disturbed by humans (Ehmann 1997) or still water environments (NSW Scientific Committee 2002).</p>  | No                       |

| SCIENTIFIC NAME  | COMMON NAME  | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE |
|--|--|---------|----------|--|--------------------------|
| <i>Pseudophryne australis</i>                                  | Red-crowned Toadlet  | V       | -        | Red-crowned Toadlets are found in steep escarpment areas and plateaus, as well as low undulating ranges with benched outcroppings on Triassic sandstones of the Sydney Basin (OEH 2014). Within these geological formations, this species mainly occupies the upper parts of ridges, usually being restricted to within about 100 metres of the ridgetop. However they may also occur on plateaus or more level rock platforms along the ridgetop (OEH 2014). Associated with open forest to coastal heath (Ehmann 1997). Utilises small ephemeral drainage lines which feed water from the top of the ridge to the perennial creeks below for breeding, and are not usually found in the vicinity of permanent water (Ehmann 1997). Breeding sites are often characterised by clay-derived soils and generally found below the first sandstone escarpment in the talus slope (NPWS 1997). | Unlikely                 |
| <b>DIURNAL BIRDS</b>   |  |         |          |  |                          |
| <i>Anthochaera phrygia</i><br>(aka <i>Xanthomyza phrygia</i> ) | Regent Honeyeater  | E       | E and M  | Associated with temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts, and riparian forests of River Oak ( <i>Casuarina cunninghamiana</i> ) (Garnett 1993). Areas containing Swamp Mahogany ( <i>Eucalyptus robusta</i> ) in coastal areas have been observed to be utilised (NPWS 1997). The Regent Honeyeater primarily feeds on nectar from box and ironbark eucalypts and occasionally from banksias and mistletoes (NPWS 1995). As such it is reliant on locally abundant nectar sources with different flowering times to provide reliable supply of nectar (Environment Australia 2000).   | Unlikely                 |
| <i>Botaurus poiciloptilus</i>                                  | Australasian Bittern   | V       | -        | Terrestrial wetlands with tall dense vegetation, occasionally estuarine habitats (Marchant and Higgins 1993). Reedbeds, swamps, streams, estuaries (Simpson and Day 2004).   | No                       |
| <i>Callocephalon fimbriatum</i>                                | Gang-gang Cockatoo<br>(population in Hornsby and Ku-ring-gai LGAs) | V-E2    | -        | During summer in dense, tall, wet forests of mountains and gullies, alpine woodlands (Morcombe 2004). In winter they occur at lower altitudes in drier more open forests and woodlands, particularly box-ironbark assemblages (Shields and Chrome 1992). They sometimes inhabit woodland, farms and suburbs in autumn/winter (Simpson and Day 2004).   | Potential                |

| SCIENTIFIC NAME                  | COMMON NAME           | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|----------------------------------|-----------------------|---------|----------|---|--------------------------|
| <i>Calyptorhynchus lathamii</i>  | Glossy Black-Cockatoo | V       | -        | Associated with a variety of forest types containing Allocasuarina species, usually reflecting the poor nutrient status of underlying soils (Environment Australia 2000; NPWS 1997; OEH 2014). Intact drier forest types with less rugged landscapes are preferred (OEH 2014). Nests in large trees with large hollows (Environment Australia 2000).  | No                       |
| <i>Daphoenositta chrysoptera</i> | Varied Sittella       | V       | -        | Distribution includes most of mainland Australia except deserts and open grasslands. Prefers eucalypt forests and woodlands with rough-barked species, or mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods from bark, dead branches, or small branches and twigs.  | Potential                |
| <i>Dasyornis brachypterus</i>    | Eastern Bristlebird   | E       | E        | Habitat is characterised by dense, low vegetation including heath and open woodland with a heathy understorey; in northern NSW occurs in open forest with tussocky grass understorey; all of these vegetation types are fire prone.<br>Age of habitat since fires (fire-age) is of paramount importance to this species; Illawarra and southern populations reach maximum densities in habitat that has not been burnt for at least 15 years; however, in the northern NSW population a lack of fire in grassy forest may be detrimental as grassy tussock nesting habitat becomes unsuitable after long periods without fire; northern NSW birds are usually found in habitats burnt five to 10 years previously.  | No                       |
| <i>Glossopsitta pusilla</i>      | Little Lorikeet       | V       | -        | In New South Wales Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Little Lorikeets mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. They feed primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including melaleucas and mistletoes. On the western slopes and tablelands White Box <i>Eucalyptus albens</i> and Yellow Box <i>E. melliodora</i> are particularly important food sources for pollen and nectar respectively. | Potential                |

| SCIENTIFIC NAME                     | COMMON NAME                                   | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE |
|-------------------------------------|---|---------|----------|--|--------------------------|
| <i>Hieraaetus morphnoides</i>       | Little Eagle                                  | V       | —        | The Little Eagle is widespread in mainland Australia, central and eastern New Guinea. The Little Eagle is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest (OEH 2014). The population of Little Eagle in NSW is considered to be a single population (OEH 2014). This species was recently listed as vulnerable due to a moderate reduction in population size based on geographic distribution and habitat quality (OEH 2014).   | Potential                |
| <i>Lathamus discolor</i>            | Swift Parrot                                  | E       | E        | Breeds in Tasmania between September and January. Migrates to mainland in autumn, where it forages on profuse flowering Eucalypts (Blakers <i>et al.</i> 1984; Schodde and Tidemann 1986). Hence, in this region, autumn and winter flowering eucalypts are important for this species. Favoured feed trees include winter flowering species such as Swamp Mahogany ( <i>Eucalyptus robusta</i> ), Spotted Gum ( <i>Corymbia maculata</i> ), Red Bloodwood ( <i>C. gummifera</i> ), Mugga Ironbark ( <i>E. sideroxylon</i> ), and White Box ( <i>E. albens</i> ) (OEH 2014).   | Unlikely                 |
| <i>Melithreptus gularis gularis</i> | Black-chinned Honeyeater (eastern subspecies) | V       | -        | Predominantly associated with box-ironbark association woodlands and River Red Gum (NSW Scientific Committee 2001). Also associated with drier coastal woodlands of the Cumberland Plain and the Hunter, Richmond and Clarence Valleys (NSW Scientific Committee 2001).  | Unlikely                 |
| <i>Petroica boodang</i>             | Scarlet Robin                                 | V       | -        | Occurs from the coast to the inland slopes in NSW. After breeding (July-Jan), some disperse to the lower valleys and plains of the tablelands and slopes, and may appear as far west as the eastern edges of the inland plains in autumn and winter. Primarily resides in dry eucalypt forests and woodlands, with usually open and grassy understorey, with scattered shrubs. Abundant logs and fallen timber are important habitat components. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees, and may join mixed flocks of other small insectivorous birds. | Unlikely                 |
| <i>Petroica phoenicea</i>           | Flame Robin                                   | V       | —        | Flame Robins are found in a broad coastal band around the south-east corner of the Australian mainland, from southern Queensland to just west of the South Australian border. The species is also found in Tasmania. Flame Robins prefer forests and woodlands up to about 1800 m above sea level.   | Unlikely                 |



| SCIENTIFIC NAME   | COMMON NAME                              | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE |
|---|--|---------|----------|--|--------------------------|
| <i>Rostratula australis</i><br>(a.k.a. <i>R. benghalensis</i> ) | Painted Snipe<br>(Australian subspecies) | E       | V        | Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber (OEH 2014). Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds (ibid.). Breeding is often in response to local conditions; generally occurs from September to December (OEH 2014). Roosts during the day in dense vegetation (NSW Scientific Committee 2004). Forages nocturnally on mud-flats and in shallow water (OEH 2014). Feeds on worms, molluscs, insects and some plant-matter (ibid.).  | Unlikely                 |
| <i>Stagonopleura guttata</i>                                    | Diamond Firetail                         | V       | —        | Typically found in grassy eucalypt woodlands, but also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities (OEH 2014). It is often found in riparian areas and sometimes in lightly wooded farmland (OEH 2014). Appears to be sedentary, though some populations move locally, especially those in the south (OEH 2014).   | Unlikely                 |
| <b>NOCTURNAL BIRDS</b>  |  |         |          |  |                          |
| <i>Ninox connivens</i>  | Barking Owl                              | V       | -        | Associated with a variety of habitats such as savanna woodland, open eucalypt forests, wetland and riverine forest. The habitat is typically dominated by Eucalypts (often Redgum species), however often dominated by Melaleuca species in the tropics (OEH 2014). It usually roosts in dense foliage in large trees such as River She-oak ( <i>Allocasuarina cunninghamiana</i> ), other Casuarina and Allocasuarina, eucalypts, Angophora, Acacia and rainforest species from streamside gallery forests. It usually nests near watercourses or wetlands in large tree hollows with entrances averaging 2-29 metres above ground, depending on the forest or woodland structure and the canopy height (Debus 1997). | Unlikely                 |
| <i>Ninox strenua</i>  | Powerful Owl                             | V       | -        | Powerful Owls are associated with a wide range of wet and dry forest types with a high density of prey, such as arboreal mammals, large birds and flying foxes (Environment Australia 2000). Large trees with hollows at least 0.5m deep are required for shelter and breeding (Environment Australia 2000).   | Potential                |

| SCIENTIFIC NAME  | COMMON NAME   | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|--|---|---------|----------|---|--------------------------|
| <i>Tyto novaehollandiae</i>                                      | Masked Owl  | V       | -        | Associated with forest with sparse, open, understorey, typically dry sclerophyll forest and woodland (OEH 2014) and especially the ecotone between wet and dry forest, and non-forest habitat (Environment Australia 2000). Known to utilise forest margins and isolated stands of trees within agricultural land and heavily disturbed forest where its prey of small and medium sized mammals can be readily obtained.  | Unlikely                 |
| <i>Tyto tenebricosa</i>  | Sooty Owl   | V       | -        | Sooty Owls are associated with tall wet old growth forest on fertile soil with a dense understorey and emergent tall Eucalyptus species (Environment Australia 2000). Pairs roost in the daytime amongst dense vegetation, in tree hollows and sometimes in caves. The Sooty Owl is typically associated with an abundant and diverse supply of prey items and a selection of large tree hollows (Garnett 1993).  | Unlikely                 |
| <b>MAMMALS (EXCLUDING BATS)</b>                                  |   |         |          |   |                          |
| <i>Dasyurus maculatus</i><br><i>Dasyurus maculatus maculatus</i> | Spotted-tailed Quoll<br>Spotted-tailed Quoll (SE Mainland Population) | V<br>-  | -<br>E   | The Spotted-tailed Quoll inhabits a range of forest communities including wet and dry sclerophyll forests, coastal heathlands and rainforests (OEH 2014), more frequently recorded near the ecotones of closed and open forest. This species requires habitat features such as maternal den sites, an abundance of food (birds and small mammals) and large areas of relatively intact vegetation to forage in (OEH 2014). Maternal den sites are logs with cryptic entrances; rock outcrops; windrows; burrows (Environment Australia 2000).                                   | Unlikely                 |
| <i>Isodon obselus obselus</i>                                    | Southern Brown Bandicoot  | V       | E        | This species is associated with heath, coastal scrub, sedgeland, heathy forests, shrubland and woodland on well drained, infertile soils, within which they are typically found in areas of dense ground cover. Suitable habitat includes patches of native or exotic vegetation which contain understorey vegetation structure with 50–80% average foliage density in the 0.2–1 m height range. This species is thought to display a preference for newly regenerating heathland and other areas prone to fire, but requires a mosaic of burnt and unburnt areas for survival. | Unlikely                 |
| <i>Petrogale penicillata</i>                                     | Brush-tailed Rock-wallaby   | E       | V        | Rocky areas in a variety of habitats, typically north facing sites with numerous ledges, caves and crevices (Strahan 1998).   | No                       |

| SCIENTIFIC NAME                   | COMMON NAME               | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE |
|-----------------------------------|---------------------------|---------|----------|--|--------------------------|
| <i>Phascolarctos cinereus</i>     | Koala                     | V-E2    | -        | Associated with both wet and dry Eucalypt forest and woodland that contains a canopy cover of approximately 10 to 70% (Reed <i>et al.</i> 1990), with acceptable Eucalypt food trees. Some preferred Eucalyptus species are: <i>Eucalyptus tereticornis</i> , <i>E. punctata</i> , <i>E. cypellocarpa</i> , <i>E. viminalis</i>  | Unlikely                 |
| <i>Pseudomys novaehollandiae</i>  | New Holland Mouse         | -       | V        | A small burrowing native rodent with a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Inhabits open heathlands, open woodlands with a heathland understorey and vegetated sand dunes. A social animal, living predominantly in burrows shared with other individuals. The home range of the New Holland Mouse ranges from 0.44 ha to 1.4 ha and the species peaks in abundance during early to mid-stages of vegetation succession typically induced by fire   | No                       |
| <b>MAMMALS (BATS)</b>             |                           |         |          |  |                          |
| <i>Chalinolobus dwyeri</i>        | Large-eared Pied Bat      | V       | V        | The Large-eared Pied Bat has been recorded in a variety of habitats, including dry sclerophyll forests, woodland, sub-alpine woodland, edges of rainforests and wet sclerophyll forests (Churchill 1998; OEH 2014). This species roosts in caves, rock overhangs and disused mine shafts and as such is usually associated with rock outcrops and cliff faces (Churchill 1998; OEH 2014).  | Unlikely                 |
| <i>Falsistrellus tasmaniensis</i> | Eastern False Pipistrelle | V       | —        | Prefers moist habitats with trees taller than 20m (OEH 2014). Roosts in tree hollows but has also been found roosting in buildings or under loose bark (OEH 2014).   | Potential                |
| <i>Miniopterus australis</i>      | Little Bent-wing Bat      | V       | -        | Prefers well-timbered areas including rainforest, wet and dry sclerophyll forests, Melaleuca swamps and coastal forests (Churchill 1998). This species shelter in a range of structures including culverts, drains, mines and caves (Environment Australia 2000). Relatively large areas of dense vegetation of either wet sclerophyll forest, rainforest or dense coastal banksia scrub are usually found adjacent to caves in which this species is found (OEH 2014). Breeding occurs in caves, usually in association with <i>M. schreibersii</i> (Environment Australia 2000, OEH 2014). | Potential                |

| SCIENTIFIC NAME                            | COMMON NAME             | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|--|-------------------------|---------|----------|---|--------------------------|
| <i>Miniopterus schreibersii oceanensis</i> | Eastern Bent-wing Bat   | V       | -        | Associated with a range of habitats such as rainforest, wet and dry sclerophyll forest, monsoon forest, open woodland, paperbark forests and open grassland (Churchill 1998). It forages above and below the tree canopy on small insects (Dwyer 1995). Will utilise caves, old mines, and stormwater channels, under bridges and occasionally buildings for shelter (Environment Australia 2000, Dwyer 1995).  | Potential                |
| <i>Mormopterus norfolkensis</i>            | East Coast Freetail Bat | V       | -        | Most records of this species are from dry eucalypt forest and woodland east of the Great Dividing Range (Churchill 1998). Individuals have, however, been recorded flying low over a rocky river in rainforest and wet sclerophyll forest and foraging in clearings at forest edges (Environment Australia 2000; Allison and Hoyer 1998). Primarily roosts in hollows or behind loose bark in mature eucalypts, but have been observed roosting in the roof of a hut (Environment Australia 2000; Allison and Hoyer 1998).  | Potential                |
| <i>Myotis macropus</i>                     | Southern Myotis         | V       | -        | The Large-footed Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Will occupy most habitat types such as mangroves, paperbark swamps, riverine monsoon forest, rainforest, wet and dry sclerophyll forest, open woodland and River Red Gum woodland, as long as they are close to water (Churchill 1998). While roosting (in groups of 10-15) is most commonly associated with caves, this species has been observed to roost in tree hollows, amongst vegetation, in clumps of Pandanus, under bridges, in mines, tunnels and stormwater drains (Churchill 1998). However the species apparently has specific roost requirements, and only a small percentage of available caves, mines, tunnels and culverts are used (Richards 1998). Forages over streams and pools catching insects and small fish by raking their feet across the water surface. In NSW females have one young each year usually in November or December (OEH 2014) | Potential                |
| <i>Pteropus poliocephalus</i>              | Grey-headed Flying-Fox  | V       | V        | Inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas (Churchill 1998). Camps are often located in gullies, typically close to water, in vegetation with a dense canopy (Churchill 1998).  | Potential                |

| SCIENTIFIC NAME                 | COMMON NAME                    | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|---------------------------------|--------------------------------|---------|----------|---|--------------------------|
| <i>Saccolaimus flaviventris</i> | Yellow-bellied Sheath-tail-bat | V       | -        | Found in almost all habitats, from wet and dry sclerophyll forest, open woodland (Churchill 1998), open country, mallee, rainforests, heathland and waterbodies. Roosts in tree hollows; may also use caves; has also been recorded in a tree hollow in a paddock (Environment Australia 2000) and in abandoned sugar glider nests (Churchill 1998). The Yellow-bellied Sheath-tail-bat is dependent on suitable hollow-bearing trees to provide roost sites, which may be a limiting factor on populations in cleared or fragmented habitats (Environment Australia 2000). | Potential                |
| <i>Scoteanax rueppellii</i>     | Greater Broad-nosed Bat        | V       | -        | Associated with moist gullies in mature coastal forest, or rainforest, east of the Great Dividing Range (Churchill 1998), tending to be more frequently located in more productive forests (Hoye and Richards 1998). Within denser vegetation types, use is made of natural and man-made openings such as roads, creeks and small rivers, where it hawks backwards and forwards for prey (Hoye and Richards 1998).  | Unlikely                 |
| <b>INVERTEBRATE</b>             |                                |         |          |   |                          |
| <i>Meridolum corneovirens</i>   | Cumberland Plain Land Snail    | V       | -        | Associated with open eucalypt forests, particularly Cumberland Plain Woodland. Found under fallen logs, debris and in bark and leaf litter around the trunk of gum trees or burrowing in loose soil around clumps of grass, or rubbish (NPWS 1997).   | Unlikely                 |
| <i>Pommerhelix duralensis</i>   | Dural Woodland Snail           | -       | E        | This species is endemic to NSW. It has a narrow distribution and its habitat is specifically shale-influenced which occur along the transition of shale-sandstone landscape (TSCC 2014). Its known distribution ranges from St Albans. Moving southwest from St Albans, East Kurrajong and along the footslopes of the Blue Mountains as far south as Mulgoa (TSCC 2014).   | Potential                |



| SCIENTIFIC NAME  | COMMON NAME               | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|--|---------------------------|---------|----------|---|--------------------------|
| <b>REPTILE</b>   |                           |         |          |   |                          |
| <i>Hoplocephalus bungaroides</i>                           | Broad-headed Snake        | E       | V        | Typical sites consist of exposed sandstone outcrops and benching where the vegetation is predominantly woodland, open woodland and/or heath on Triassic sandstone of the Sydney Basin (OEH 2014). They utilise rock crevices and exfoliating sheets of weathered sandstone during the cooler months and tree hollows during summer (Webb and Shine 1998). Some of the canopy tree species found to regularly co-occur at known sites include <i>Corymbia eximia</i> , <i>C. gummifera</i> , <i>Eucalyptus sieberi</i> , <i>E. punctata</i> and <i>E. piperita</i> (OEH 2014). | No                       |
| <b>MIGRATORY TERRESTRIAL SPECIES LISTED UNDER EPBC ACT</b> |                           |         |          |   |                          |
| <i>Apus pacificus</i>                                      | Fork-tailed Swift         | -       | M        | Sometimes travels with Needletails. Varied habitat with a possible tendency to more arid areas but also over coasts and urban areas (Simpson and Day 1999).   | Unlikely                 |
| <i>Hirundapus caudacutus</i>                               | White-throated Needletail | -       | M        | Forages aerially over a variety of habitats usually over coastal and mountain areas, most likely with a preference for wooded areas (Marchant and Higgins 1993; Simpson and Day 1999). Has been observed roosting in dense foliage of canopy trees, and may seek refuge in tree hollows in inclement weather (Marchant and Higgins 1993).   | Potential                |
| <i>Merops ornatus</i>                                      | Rainbow Bee-eater         | -       | M        | Resident in coastal and subcoastal northern Australia; regular breeding migrant in southern Australia, arriving September to October, departing February to March, some occasionally present April to May. Occurs in open country, chiefly at suitable breeding places in areas of sandy or loamy soil: sand-ridges, riverbanks, road-cuttings, sand-pits, occasionally coastal cliffs (ibid). Nest is a chamber at the end of a burrow, up to 1.6 m long, tunneled in flat or sloping ground, sandy bank or cutting.   | Unlikely                 |
| <i>Monarcha melanopsis</i>                                 | Black-faced Monarch       | -       | M        | Rainforest and eucalypt forests, feeding in tangled understorey.  | Unlikely                 |
| <i>Monarcha trivirgatus</i>                                | Spectacled Monarch        | —       | M        | Wet forests, mangroves (Simpson and Day 1999).  | Unlikely                 |
| <i>Myiagra cyanoleuca</i>                                  | Satin Flycatcher          | -       | M        | Wetter, denser forest, often at high elevations (Simpson and Day 2004).   | Unlikely                 |

| SCIENTIFIC NAME                                 | COMMON NAME       | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|---|-------------------|---------|----------|---|--------------------------|
| <i>Rhipidura rufifrons</i>                      | Rufous Fantail    | -       | M        | The Rufous Fantail is a summer breeding migrant to southeastern Australia (Morcombe 2004). The Rufous Fantail is found in rainforest, dense wet eucalypt and monsoon forests, paperbark and mangrove swamps and riverside vegetation (Morcombe 2004). Open country may be used by the Rufous Fantail during migration (Morcombe 2004).  | Unlikely                 |
| <i>Xanthomyza phrygia</i>                       | Regent Honeyeater | E       | E, M     | SEE DIURNAL BIRDS ABOVE   | See diurnal birds above  |
| MIGRATORY WETLAND SPECIES LISTED UNDER EPBC ACT |                   |         |          |   |                          |
| <i>Ardea alba</i>                               | Great Egret       | -       | M        | The Great Egret is common and widespread in Australia (McKilligan 2005). The Eastern Great Egret has been reported in a wide range of wetland habitats (for example inland and coastal, freshwater and saline, permanent and ephemeral, open and vegetated, large and small, natural and artificial). These include swamps and marshes; margins of rivers and lakes; damp or flooded grasslands, pastures or agricultural lands; reservoirs; sewage treatment ponds; drainage channels; salt pans and salt lakes; salt marshes; estuarine mudflats, tidal streams; mangrove swamps; coastal lagoons; and offshore reefs (Marchant and Higgins 1993; Martínez-Vilalta and Motis 1992). The species usually frequents shallow waters. It forages in a wide range of wet and dry habitats including permanent and ephemeral freshwaters, wet pasture and estuarine mangroves and mudflats (McKilligan 2005). | Potential                |
| <i>Ardea ibis</i>                               | Cattle Egret      | -       | M        | Cattle Egrets forage on pasture, marsh, grassy road verges, rain puddles and croplands, but not usually in the open water of streams or lakes and they avoid marine environments (McKilligan 2005). Some individuals stay close to the natal heronry from one nesting season to the next, but the majority leave the district in autumn and return the next spring. Cattle Egrets are likely to spend the winter dispersed along the coastal plain and only a small number have been recovered west of the Great Dividing Range (McKilligan 2005).  | Yes                      |

| SCIENTIFIC NAME   | COMMON NAME    | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|---|----------------|---------|----------|---|--------------------------|
| <i>Gallinago hardwickii</i>                                     | Latham's Snipe | -       | M        | A variety of permanent and ephemeral wetlands, preferring open fresh water wetlands with nearby cover (Marchant and Higgins 1993). Occupies a variety of vegetation around wetlands (Marchant and Higgins 1993) including wetland grasses and open wooded swamps (Simpson and Day 1999). Latham's Snipe sometimes occur in habitats that have saline or brackish water, such as saltmarsh, mangrove creeks, around bays and beaches, and at tidal rivers. These habitats are most commonly used when the birds are on migration. They are regularly recorded in or around modified or artificial habitats including pasture, ploughed paddocks, irrigation channels and drainage ditches, ricefields, orchards, saltworks, and sewage and dairy farms. They can also occur in various sites close to humans or human activity (e.g. near roads, railways, airfields, commercial or industrial complexes). | No                       |
| <i>Pandion cristatus</i><br>( <i>Pandion haliaetus</i> )        | Eastern Osprey | V       | Ma, M    | Associated with waterbodies including coastal waters, inlets, lakes, estuaries, beaches, offshore islands and sometimes along inland rivers (Schodde and Tidemann 1986). Osprey may nest on the ground, on sea cliffs or in trees. Osprey generally prefer emergent trees, often dead or partly dead with a broken off crown.   | Unlikely                 |
| <i>Rostratula benghalensis</i><br>(a.k.a. <i>R. australis</i> ) | Painted Snipe  | -       | M        | See: <i>Rostratula australis</i>  | No                       |
| <b>FLORA SPECIES</b>  |                |         |          |   |                          |
| <i>Acacia bynoeana</i>  | Bynoe's Wattle | E       | V        | <i>Acacia bynoeana</i> is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains, and has recently been found in the Colymea and Parma Creek areas west of Nowra. It is found in heath and dry sclerophyll forest, typically on a sand or sandy clay substrate, often with ironstone gravels (OEH 2014).  | No                       |
| <i>Acacia gordonii</i>  | -              | E       | E        | <i>Acacia gordonii</i> is restricted to the north-west of Sydney, occurring in the lower Blue Mountains in the west, and in the Maroota/Glenorie area in the east, within the Hawkesbury, Blue Mountains and Baulkham Hills local government areas. Grows in dry sclerophyll forest and heathlands amongst or within rock platforms on sandstone outcrops (OEH 2014).   | No                       |

| SCIENTIFIC NAME                 | COMMON NAME                  | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE |
|---------------------------------|------------------------------|---------|----------|--|--------------------------|
| <i>Acacia pubescens</i>         | Downy Wattle                 | V       | V        | <i>Acacia pubescens</i> occurs on the NSW Central Coast in Western Sydney, mainly in the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. It is associated with Cumberland Plains Woodlands, Shale / Gravel Forest and Shale / Sandstone Transition Forest growing on clay soils, often with ironstone gravel (NPWS 1997; Benson and McDougall 1994).   | Potential                |
| <i>Allocasuarina glareicola</i> | -                            | E       | E        | <i>Allocasuarina glareicola</i> is primarily restricted to the Richmond district on the north-west Cumberland Plain, with an outlier population found at Voyager Point. It grows in Castlereagh woodland on lateritic soil (OEH 2014).   | Unlikely                 |
| <i>Asterolasia elegans</i>      | <i>Asterolasia elegans</i>   | E       | E        | <i>Asterolasia elegans</i> is restricted to a few localities on the NSW Central Coast north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby LGAs. It is found in sheltered forests on mid- to lower slopes and valleys, in or adjacent to gullies (OEH 2014).   | Unlikely                 |
| <i>Cryptostylis hunteriana</i>  | Leafless Tongue Orchid       | V       | V        | <i>Cryptostylis hunteriana</i> is known from a range of vegetation communities including swamp-heath and woodland (OEH 2014). The larger populations typically occur in woodland dominated by Scribbly Gum ( <i>Eucalyptus sclerophylla</i> ), Silvertop Ash ( <i>E. sieberi</i> ), Red Bloodwood ( <i>Corymbia gummifera</i> ) and Black Sheoak ( <i>Allocasuarina littoralis</i> ); where it appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid ( <i>C. subulata</i> ) and the Tartan Tongue Orchid ( <i>C. erecta</i> ) (OEH 2014). | Unlikely                 |
| <i>Darwinia biflora</i>         | <i>Darwinia biflora</i>      | V       | V        | <i>Darwinia biflora</i> is an erect or spreading shrub to 80 cm high associated with habitats where weathered shale capped ridges intergrade with Hawkesbury Sandstone, where soils have a high clay content (NPWS 1997).  | Potential                |
| <i>Darwinia peduncularis</i>    | <i>Darwinia peduncularis</i> | V       |          | <i>Darwinia peduncularis</i> occurs as local disjunct populations in coastal NSW in the Blue Mountains, Brooklyn, Berowra, Galston Gorge, Hornsby, Bargo River, Glen Davis, Mount Boonbourwa and Kings Tableland, and usually grows on or near rocky outcrops on sandy, well drained, low nutrient soil over sandstone (OEH 2014).   | Unlikely                 |

| SCIENTIFIC NAME                                      | COMMON NAME  | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|--|--|---------|----------|---|--------------------------|
| <i>Epacris purpurascens</i> var. <i>purpurascens</i> | <i>Epacris purpurascens</i> var. <i>purpurascens</i> | V       | -        | <i>Epacris purpurascens</i> var. <i>purpurascens</i> has been recorded between Gosford in the north to Avon Dam in the south, in a range of habitats, but most have a strong shale soil influence (OEH 2014).   | Potential                |
| <i>Eucalyptus camfieldii</i>                         | Camfield's Stringybark                               | V       | V        | <i>Eucalyptus camfieldii</i> is associated with shallow sandy soils bordering coastal heath with other stunted or mallee eucalypts, often in areas with restricted drainage and in areas with laterite influenced soils, thought to be associated with proximity to shale (OEH 2014).   | Unlikely                 |
| <i>Eucalyptus nicholii</i>                           | Narrow-leaved Peppermint                             | V       | V        | <i>Eucalyptus nicholii</i> naturally occurs in the New England Tablelands of NSW, where it occurs from Nundle to north of Tenterfield. Grows in dry grassy woodland, on shallow and infertile soils, mainly on granite (OEH 2014). This species is widely planted as an urban street tree and in gardens but is quite rare in the wild (OEH 2014). Plantings undertaken for horticultural and aesthetic purposes are not considered threatened species under the TSC Act. | No                       |
| <i>Eucalyptus scoparia</i>                           | Wallangarra White Gum                                | E       | V        | Known in NSW only from the Tenterfield district where it is very uncommon. Grows on rocky hillsides in shrubby woodland close to granite outcrops.  | No                       |
| <i>Eucalyptus</i> sp. <i>Cattai</i>                  | <i>Eucalyptus</i> sp. <i>Cattai</i>                  | E       | -        | <i>Eucalyptus</i> sp. <i>Cattai</i> occurs in the area between Colo Heights and Castle Hill, north western Sydney. It occurs as a rare emergent in scrub, heath and low woodland on sandy soils, usually as isolated individuals or occasionally in small groups. The sites at which it occurs are generally flat and on ridge tops and associated soils are laterised clays overlying sandstone (OEH 2014).  | No                       |



| SCIENTIFIC NAME              | COMMON NAME                 | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE |
|------------------------------|-----------------------------|---------|----------|--|--------------------------|
| <i>Galium australe</i>       | Tangled Bedstraw            | E       |          | <i>Galium australe</i> is known from the Towamba Valley near Bega, Lake Yarrunga near Kangaroo Valley, Cullendulla Creek Nature Reserve near Batemans Bay, Conjola National Park, Swan Lake near Swanhaven, and the Big Hole in Deua National Park. Tangled Bedstraw was recorded historically from the Clyde River near Batemans Bay and the Mongarlowe area near Braidwood (OEH 2014). The species also occurs beside Lake Windemere in Jervis Bay, is widespread in Victoria and is also found in South Australia and Tasmania (OEH 2014). In NSW <i>Galium australe</i> has been found in moist gullies of tall forest, <i>Eucalyptus tereticornis</i> forest, coastal Banksia shrubland, and <i>Allocasuarina nana</i> heathland, while in other states the species is found in a range of near-coastal habitats, including sand dunes, sand spits, shrubland and woodland. | Unlikely                 |
| <i>Genoplesium baueri</i>    | Bauer's Midge Orchid        | V       |          | Known from coastal areas from northern Sydney south to the Nowra district. Previous records from the Hunter Valley and Nelson Bay are now thought to be erroneous. Grows in shrubby woodland in open forest on shallow sandy soils.  | Unlikely                 |
| <i>Grammitis stenophylla</i> | Narrow-leaf Finger Fern     | E       |          | In NSW, <i>Grammitis stenophylla</i> has been found on the south, central and north coasts, and as far west as Mount Kaputar National Park near Narrabri, in moist places, usually near streams, on rocks or in trees, in rainforest and moist eucalypt forest (OEH 2014).   | Unlikely                 |
| <i>Hibbertia superans</i>    | -                           | E       | -        | <i>Hibbertia superans</i> mainly occurs in the north west Sydney region between Baulkham Hills and Wisemans Ferry, with a disjunct occurrence near Mt Boss (inland from Kempsey) on the Mid North Coast of NSW. In the Sydney region it occurs in dry sclerophyll forest on sandstone ridgetops while the northern occurrence is on granite (OEH 2014).  | Potential                |
| <i>Lasiopetalum joyceae</i>  | <i>Lasiopetalum joyceae</i> | V       | V        | <i>Lasiopetalum joyceae</i> grows in ridgetop woodland, heath, woodland or open scrub, often with a clay influence (NPWS 1997).  | Unlikely                 |

| SCIENTIFIC NAME                                     | COMMON NAME   | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|---|---|---------|----------|---|--------------------------|
| <i>Leptospermum deanei</i>                          | Deane's Tea-tree                                    | V       | V        | <i>Leptospermum deanei</i> has been recorded in Hornsby, Warringah, Kuring-gai and Ryde LGAs, in woodland on lower hill slopes or near creeks, at sites with sandy alluvial soil or sand over sandstone (OEH 2014). It has also been recorded in riparian scrub dominated by <i>Tristaniopsis laurina</i> and <i>Baeckea myrtifolia</i> ; woodland dominated by <i>Eucalyptus haemastoma</i> ; and open forest dominated by <i>Angophora costata</i> , <i>Leptospermum trinervium</i> and <i>Banksia ericifolia</i> (OEH 2014). | Unlikely                 |
| <i>Leucopogon fletcheri</i> subsp. <i>fletcheri</i> | <i>Leucopogon fletcheri</i> subsp. <i>fletcheri</i> | E       | -        | <i>Leucopogon fletcheri</i> subsp. <i>fletcheri</i> is restricted to north-western Sydney between St Albans in the north and Annangrove in the south, within the local government areas of Hawkesbury, Baulkham Hills and Blue Mountains. It occurs in dry eucalypt woodland or in shrubland on clayey lateritic soils, generally on flat to gently sloping terrain along ridges and spurs (OEH 2014).  | No                       |
| <i>Melaleuca biconvexa</i>                          | Biconvex Paperbark                                  | V       | V        | <i>Melaleuca biconvexa</i> occurs in coastal districts and adjacent tablelands from Jervis Bay north to the Port Macquarie district. It grows in damp places often near streams.  | No                       |
| <i>Melaleuca deanei</i>                             | Deane's Paperbark                                   | V       | V        | Found in heath on sandstone (OEH 2014), and also associated with woodland on broad ridge tops and slopes on sandy loam and lateritic soils (Benson and McDougall 1998).   | Potential                |
| <i>Pelargonium</i> sp. <i>Striatellum</i>           | Omeo Stork's-bill                                   | E       | E        | In NSW, <i>Pelargonium</i> sp. (G.W. Carr 10345) is known from the Southern Tablelands. Otherwise, only known from the shores of Lake Omeo near Benambra in Victoria where it grows in cracking clay soil that is probably occasionally flooded.  | No                       |
| <i>Persoonia hirsuta</i>                            | Hairy Geebung                                       | E       | E        | <i>Persoonia hirsuta</i> occurs from Singleton in the north, south to Bargo and the Blue Mountains to the west (OEH 2014). It grows in dry sclerophyll eucalypt woodland and forest on sandstone  | No                       |
| <i>Persoonia mollis</i> subsp. <i>maxima</i>        | <i>Persoonia mollis</i> subsp. <i>maxima</i>        | E       | E        | Deep gullies or on the steep upper hillsides of narrow gullies incised from Hawkesbury Sandstone, characterised by steep sideslopes, rocky benches and broken scarps, with creeks fed by small streams and intermittent drainage depressions. Occurrences of this plant have been recorded on the dry upper-hillsides of gullies and in more exposed aspects (Scribbly Gum <i>E. haemastoma</i> , Grey Gum ( <i>E. punctata</i> )).   | Potential                |

| SCIENTIFIC NAME                                  | COMMON NAME                                      | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|--|--|---------|----------|---|--------------------------|
| <i>Pimelea curviflora</i> var. <i>curviflora</i> | <i>Pimelea curviflora</i> var. <i>curviflora</i> | V       | V        | <i>Pimelea curviflora</i> var. <i>curviflora</i> is confined to the coastal area of Sydney between northern Sydney in the south and Maroota in the north-west. It grows on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands (OEH 2014). Associated with the Duffys Forest Community, shale lenses on ridges in Hawkesbury sandstone geology.  | Unlikely                 |
| <i>Pimelea spicata</i>                           | Spiked Rice-flower                               | E       | E        | In western Sydney, <i>Pimelea spicata</i> occurs on an undulating topography of well-structured clay soils, derived from Wianamatta shale (OEH 2014). It is associated with Cumberland Plains Woodland (CPW), in open woodland and grassland often in moist depressions or near creek lines (Ibid.). Has been located in disturbed areas that would have previously supported CPW (Ibid.).  | Unlikely                 |
| <i>Pterostylis saxicola</i>                      | Sydney Plains Greenhood                          | E       | E        | Terrestrial orchid predominantly found in Hawkesbury Sandstone Gully Forest growing in small pockets of soil that have formed in depressions in sandstone rock shelves (NPWS 1997). Known from Georges River National Park, Ingleburn, Holsworthy, Peter Meadows Creek, St Marys Tower (NSW Scientific Committee 2011).   | Unlikely                 |
| <i>Syzygium paniculatum</i>                      | Magenta Lilly Pilly                              | V       | V        | This species occupies a narrow coastal area between Bulahdelah and Conjola State Forests in NSW. On the Central Coast, it occurs on Quaternary gravels, sands, silts and clays, in riparian gallery rainforests and remnant littoral rainforest communities. In the Ourimbah Creek valley, <i>S. paniculatum</i> occurs within gallery rainforest with <i>Alphitonia excelsa</i> , <i>Acmena smithii</i> , <i>Cryptocarya glaucescens</i> , <i>Toona ciliata</i> , <i>Syzygium oleosum</i> with emergent <i>Eucalyptus saligna</i> . At Wyrribalong NP, <i>S. paniculatum</i> occurs in littoral rainforest as a co-dominant with <i>Ficus fraseri</i> , <i>Syzygium oleosum</i> , <i>Acmena smithii</i> , <i>Cassine australe</i> , and <i>Endiandra sieberi</i> . It is also report that this species appears absent from Terrigal formation shales, on which the gully rainforests occur. <i>S. paniculatum</i> is summer flowering (November-February), with the fruits maturing in May (OEH 2014). | Unlikely                 |

| SCIENTIFIC NAME              | COMMON NAME                  | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE |
|------------------------------|------------------------------|---------|----------|--|--------------------------|
| <i>Tetratheca glandulosa</i> | <i>Tetratheca glandulosa</i> | V       | V        | Associated with ridgetop woodland habits on yellow earths, also in sandy or rocky heath and scrub (NPWS 1997). Often associated with sandstone / shale interface where soils have a stronger clay influence (NPWS 1997). Flowers July to November.   | Potential                |
| <i>Thesium austral</i>       | Austral Toadflax             | V       | V        | Widespread throughout the eastern third of NSW but most common on the North Western Slopes, Northern Tablelands and North Coast. Occurs in grassland or grassy woodland. Often found in damp sites in association with Kangaroo Grass ( <i>Themeda australis</i> ) (OEH 2014). The preferred soil type is a fertile loam derived from basalt although it occasionally occurs on metasediments and granite. | Unlikely                 |

Disclaimer: Data extracted from the Atlas of NSW Wildlife and EPBC Protected Matters Report are only indicative and cannot be considered a comprehensive inventory. 'Migratory marine species' and 'listed marine species' listed on the EPBC Act (and listed on the protected matters report) have not been included in this table, since they are considered unlikely to occur within the study area due to the absence of marine habitat.

V = Vulnerable, E = Endangered, CE = Critically Endangered, M = migratory, Ma = Marine





## **Bushfire Protection Assessment**

Proposed Rezoning – Dural

Prepared for  
**Urbis Pty Ltd**

15 March 2016





**DOCUMENT TRACKING**

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# 1 Introduction

## 1.1 Description of proposal

Urbis commissioned Eco Logical Australia Pty Ltd (ELA) to prepare a bushfire protection assessment (BPA) for a proposed rezoning of a number of large allotments in Dural.

The lots are currently zoned as rural land being RU6-Transition with one lot being effected by a split zoning of RU6 and SP2-Infrastructre. Under the proposed rezoning, *The Hills Shire Local Environmental Plan 2012* (LEP) will be amended to allow for R2 Low Density Residential zone with areas of private/public open space (RE1 or RE2. There is also potential for special uses including medical, commercial and ancillary development. A separate ecological (flora and fauna) assessment has been undertaken by ELA.

This report relates to 14 lots within the proposed rezoining however it also considers the wider area of Dural, north of the Dural town centre.

## 1.2 Study area

The study area is located approximately 1 to 1.5 km from Dural town centre, within the The Hills Shire Council. There are currently existing dwellings or structures located within some lots within the subject area as shown in **Figure 1**.

The existing lots captured by the proposal are:

- Lot 100 and 102 DP13628
- Lot 1 DP656036
- Lot X DP501233
- Lot 2 DP567995
- Lot 9 DP237576
- Lot 2 DP541329
- Lots 101 and 103 DP713628
- Lot 1 DP660184
- Lot 11 DP866560
- Lot D DP38097
- Lot 1 DP73652
- Lot 12 DP866560.

The study area is separated into two clusters, separated by existing large lot residential land with dwellings and associated ancillary buildings. The main access to the lots is off Old Northern Road to the east and Derriwong Road to the west of the southern cluster of lots. The majority of the vegetation within the lots has been cleared except where scattered trees remain.

### 1.2.1 Aim and structure of report

ELA has been engaged to investigate the current bushfire risk of the study area and the appropriate combination of bushfire protection measures to mitigate this risk in support of the rezoning. Specifically, this analysis responds to the requirements of *Planning for Bush Fire Protection 2006* (PBP), *Australian Standard AS 3959 Construction of buildings in bushfire-prone areas* (AS3959) and the requirements of The Hills LEP. This report details the outcomes of these investigations in the context of the proposed land use.

The overarching objective of this report is to identify all potential bushfire constraints to the future urban development of the study area. The results of this assessment will directly support the preparation of necessary planning documentation. As such the objectives of this report are to:

- Ensure the statutory requirements for bushfire protection are identified and can be adequately met; and
- Implement suitable management frameworks for bushfire protection, whilst having consideration of the vegetation and ecological issues for the study area, enabling long term conservation and management of these environmental values while facilitating safe urban development outcomes.
- Consider the likely rehabilitation of ecological issues and the recommendations of the flora and fauna study to preserve and enhance ecological communities on the subject land.

This report assesses the potential bushfire hazard across the study area, in the context of existing vegetation (refer to **Figure 2** for vegetation coverage). It then identifies planning requirements as per PBP. Management of future asset protection zones (APZ) and environmental areas are also considered.

Future subdivision of land and the construction of buildings will require an assessment against PBP. As such the provisions of this report are to be considered in the planning and design of any development following the rezoning process.

### **1.3 Legislative requirements**

#### **1.3.1 Environmental Planning and Assessment Act 1979**

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal planning legislation for NSW, providing a framework for the overall environmental planning and assessment of development proposals. A variety of other legislation and environmental planning instruments, such as the *Threatened Species Conservation Act 1995* (TSC Act), *Water Management Act 2000* and *Rural Fires Act 1997* (RF Act), are integrated with the EP&A Act.

#### **1.3.2 Threatened Species Conservation Act 1995**

The TSC Act aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. The TSC Act is integrated with the EP&A Act and requires consideration of whether a development (assessed under Part 4 of the EP&A Act) is likely to significantly affect threatened species, populations and ecological communities or their habitat.

#### **1.3.3 Rural Fires Act 1997**

Bushfire suppression and management is regulated by the RF Act. Both the EP&A Act and the RF Act were modified by the *Rural Fires and Environmental Assessment Legislation Amendment Act 2002* to enhance bushfire protection through the development assessment process. Key requirements of the RF Act include:

- The need for a bushfire safety authority to be issued by the RFS under section 100B of the RF Act for any development applications for subdivision (therefore considered integrated development);
- All landowners to exercise a duty of care to prevent bushfire from spreading on or from their land under section 63 of the RF Act. This relates to the appropriate provision and maintenance of APZs, landscaping and any retained vegetation when developing land.

### 1.3.4 Direction 4.4 Planning for Bush Fire Protection

Direction 4.4 Planning for Bushfire Protection identifies matters for consideration for planning proposals that will affect, or are in proximity to land mapped as bush fire prone. In particular a planning proposal where development is proposed must:

- have regard to *Planning for Bush Fire Protection 2006* (PBP),
- provide an Asset Protection Zone (APZ) incorporating at a minimum:
  - an Inner Protection Area (IPA) bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and
  - an Outer Protection Area (OPA) managed for hazard reduction and located on the bushland side of the perimeter road,
- for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service (RFS). If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the RF Act), the APZ provisions must be complied with,
- contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,
- contain provisions for adequate water supply for fire fighting purposes,
- minimise the perimeter of the area of land interfacing the hazard which may be developed,
- introduce controls on the placement of combustible materials in the Inner Protection Area.

Consideration must also be given to NSW RFS *Practice Note 2/12 Planning Instruments and Policies*. It is expected that the RFS, in its assessment of the proposal will consider the requirements of this Practice Note.

### 1.3.5 Planning for Bush Fire Protection 2006

Rezoning proposals require consultation with the NSW RFS as the lead agency for managing bushfire. As such the requirements of *Planning for Bush Fire Protection* (NSW RFS, 2006) are to be addressed. This includes having regard to the following planning principles of PBP:

- Provision of a perimeter road with adequate two way access which delineates the extent of the intended development;
- Provision, at the urban bushland interface, for the establishment of adequate asset protection zones for future housing;
- Specifying minimum residential lot depths to accommodate asset protection zones for lots on perimeter roads;
- Minimising the perimeter of the area of land, interfacing the hazard, which may be developed;
- Introduction of controls which avoid placing inappropriate developments in hazardous areas; and
- Introduction of controls on the placement of combustible materials in asset protection zones.



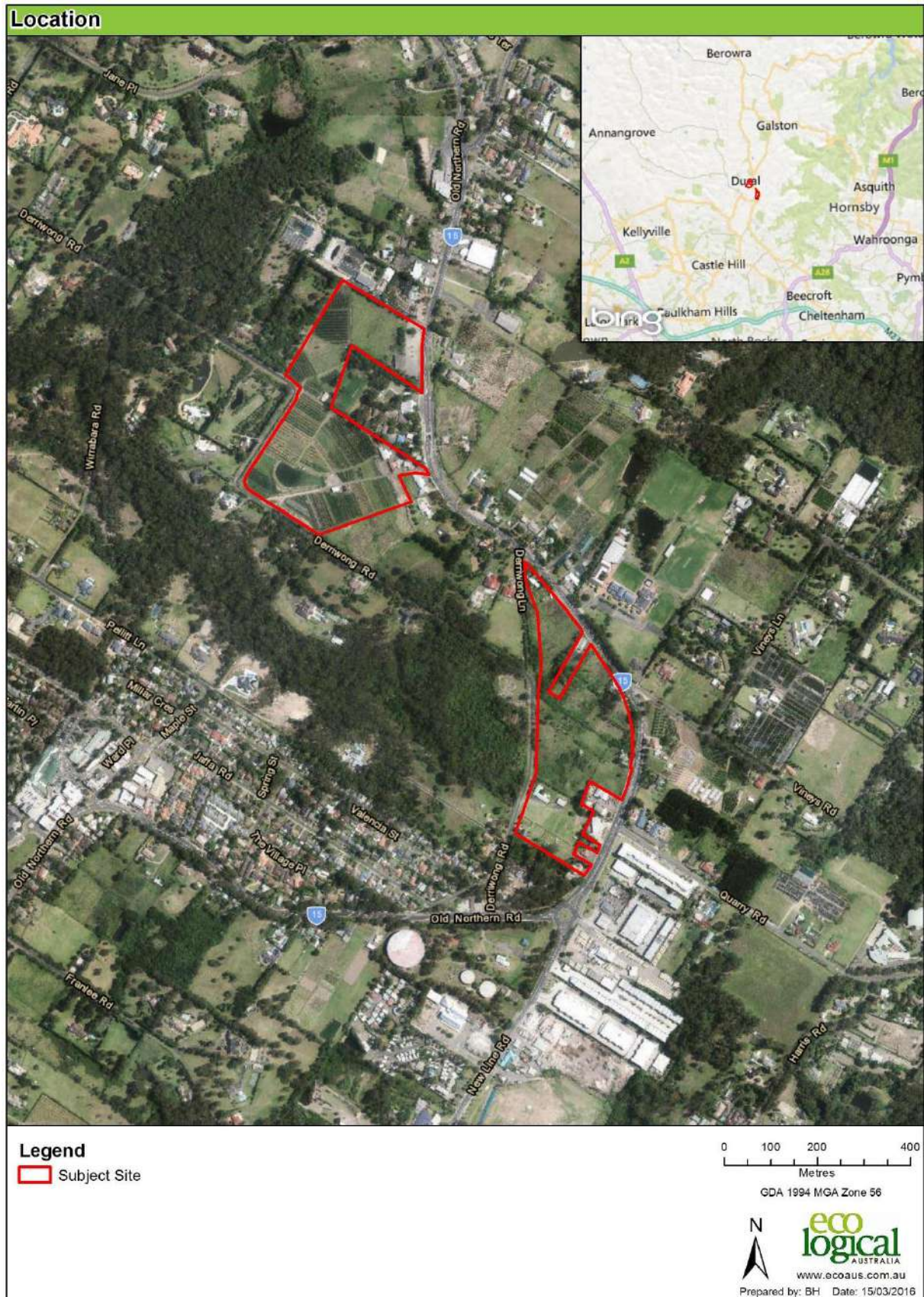


Figure 1: Study area



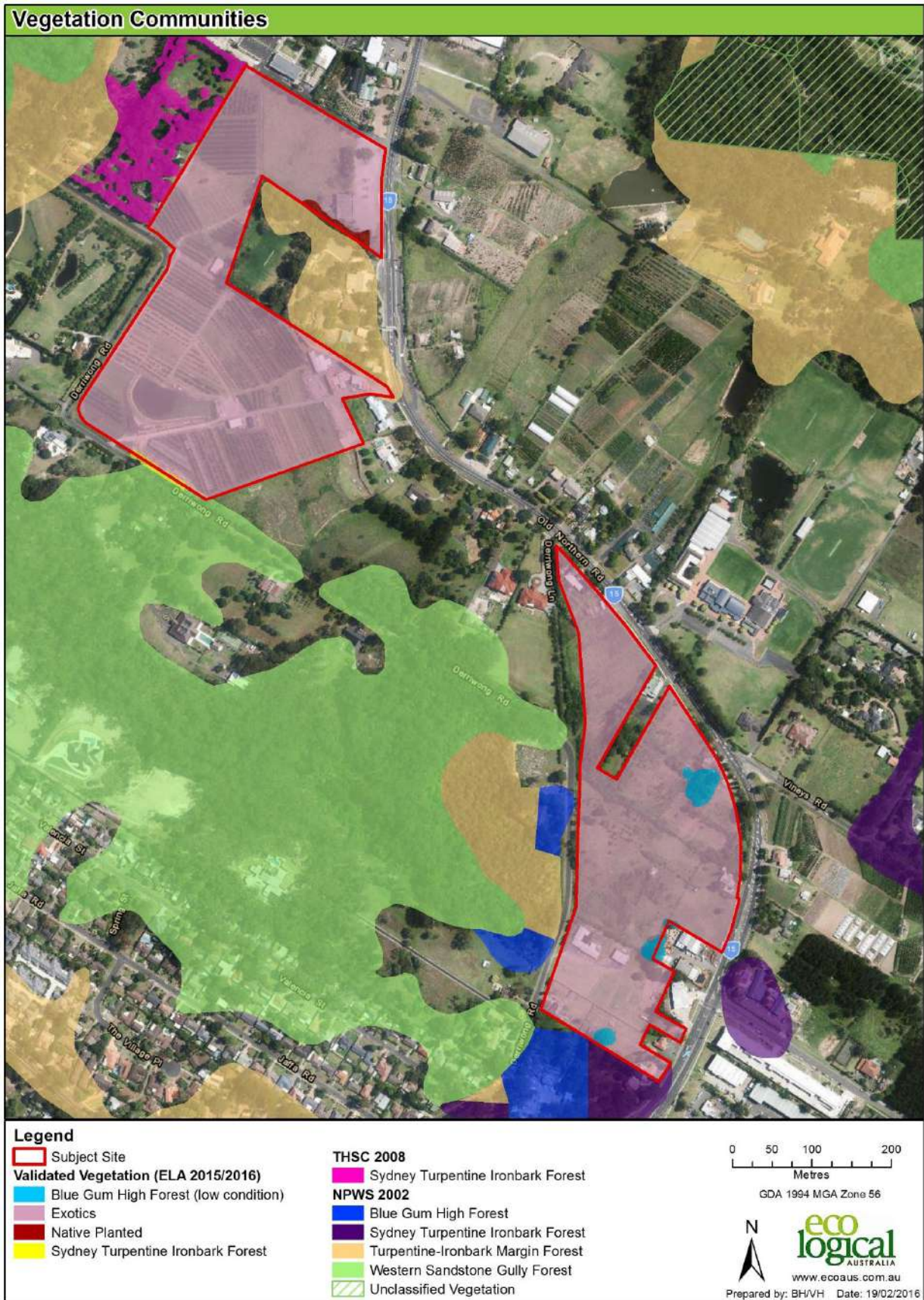


Figure 2: Vegetation Communities

## 2 Bushfire threat assessment

An assessment of the bushfire hazard is necessary to determine the application of bushfire protection measures such as asset protection zone location and dimension. This section provides a detailed account of the vegetation communities (bushfire fuels) and the topography (effective slope) that combine to create the bushfire hazard that may affect bushfire behaviour at the study area.

The concept of bushfire risk as influenced by fire history and current and past bushfire issues has little bearing on the determination of bushfire protection strategies for rezoning and future development within the study area. This is due to the fact that PBP assesses bushfire protection based purely on vegetation and slope (i.e. hazard and not risk), making the assumption that a fire may occur in any patch of bushland at a worst-case scenario (based on a set design fire).

Notwithstanding this, the *The Hills Bush Fire Risk Management Plan* (BFRMP) was reviewed to gain a greater understanding of the bushfire environment, hazard and risk issues that affect the study area.

The development of the study area is situated to the north east of the Dural town centre. The proposed development will provide further asset protection for existing development surrounding the study area by creating increased separation from bushfire hazards. The BFRMP does not affect the bushfire protection measures required for future development within the study area, but should be updated following development of the study area (**Figure 3**).

### 2.1 Bushfire protection measures

PBP requires the assessment of a suite of bushfire protection measures that in total afford an adequate level of protection. The measures required to be assessed for rezoning are listed in **Table 1** and are discussed in detail in this section. This section demonstrates that the study area can accommodate the required bushfire protection measures and achieve the Direction 4.4 objectives and RFS requirements.

**Table 1: PBP bushfire protection measures**

| Bushfire Protection Measure      | Considerations  |
|----------------------------------|---|
| Asset Protection Zones (APZ)     | Location and dimension of APZ setbacks from vegetation including prescriptions of vegetation management within the APZ.   |
| Access                           | Assessment to include access and egress in and out of a developable area such as alternate access, operational response and evacuation options. APZ perimeter access to be considered as is design standards of public roads and any fire trails. |
| Water supply and other utilities | List requirements for reticulated water supply and hydrant provisions, and any static water supplies for fire fighting.   |
| Building construction standards  | Provide a guide on the application of construction standards for future buildings.  |

### 2.2 Vegetation types

In accord with PBP, the predominant vegetation class has been assessed within the proposed lots and calculated for a distance of at least 140 m out from the proposed development. The predominant vegetation and effective slope assessments are shown **Table 3**.

Vegetation mapping shows Western Sandstone Gully Forest to the west of the southern cluster of lots with smaller pockets of Blue Gum High Forest, Turpentine-Ironbark Margin Forest, and Sydney

Turpentine-Ironbark Forest to the west and south. These vegetation formations also occur around the northern cluster of lots. In accordance with PBP the predominant vegetation is 'forest'.

Vegetation to the south of the southern cluster of lots is highly fragmented as a result of practices related to the timber supply yard and is a 'low hazard' in accordance with PBP.

The remaining vegetation within the study area consists of land used for intensive agriculture or land that is cleared and managed.

### 2.3 Effective slope

In accord with PBP, the slope that would most significantly influence fire behaviour was determined over a distance of 100 m from the boundary of the subject land where the vegetation was found (measuring the worst-case scenario). This assessment was made with 10 m contours and slope classes are listed in **Table 2**.

The land slopes down to the water course to the west. Slopes vary across the site and within the bushfire hazard and range from >0-15 degrees downslope and are shown in **Figure 3**.

**Table 2: PBP slope classes**

| Upslope or Downslope | PBP Slope Class  |
|----------------------|--|
| Upslope / Flat Land  | Flat land and all upslope land leading away from the development |
| Downslope            | >0-5 degrees downslope leading away from the development         |
|                      | >5-10 degrees downslope leading away from the development        |
|                      | >10-15 degrees downslope leading away from the development       |
|                      | >15-18 degrees downslope leading away from the development       |

### 3 Asset protection zones

Table A2.4 of PBP has been used to indicate the required APZ dimensions for future residential development within the subject land using the vegetation and slope data identified in **Section 2**. The APZ calculation is tabulated below and shown in **Figure 3**.

It is best practice to provide an APZ dimension that achieves a building construction standard under *AS 3959-2009 Construction of buildings in bushfire-prone areas* (Standards Australia 2009) of Bushfire Attack Level (BAL)-29 for residential development to ensure future home owners are not impacted by the additional costs associated with construction of a dwelling at BAL-40. **Table 3** lists the current minimum APZ and best practice APZ related to BAL-29 (refer to **Section 4** for more information on AS 3959-2009). Special Fire Protection Purpose (SFPP) developments will require an increase in APZ to provide a higher level of bushfire protection.

It is important to note that the APZ calculations quoted in this assessment are indicative only and have been determined at a landscape scale. This level of detail is suitable for a rezoning assessment where the aim is to demonstrate whether a parcel of land can accommodate the bushfire hazard, the expected APZ and future development. The final APZ dimensions for any future subdivision or development depends on the accuracy of a slope assessment undertaken at a site-specific level. The APZ dimensions quoted in this assessment should not be relied on to approve a future subdivision; they may be used as a guide only.

#### 3.1 APZ maintenance plan

The following fuel management specifications will need to be considered in the provision of APZ fo future development:

- No tree or tree canopy is to occur within 2 m of the dwelling roofline.
- The presence of a few shrubs or trees in the APZ is acceptable provided that they:
  - are well spread out and do not form a continuous canopy
  - are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period
  - are located far enough away from the building so that they will not ignite the building by direct flame contact or radiant heat emission.
- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species.

#### 3.2 Staging of development for APZ

Staging of future development should give consideration to the provision of an APZ to manage any potential bushfire hazard within adjoining future development areas to ensure that future dwellings are not impacted by unnecessary construction standards. This could occur through the provision of temporary APZ for earlier stages which will be automatically extinguished once the land where the APZ operates is developed and the hazard is permanently removed.

#### 3.3 Perimeter access within APZ

An APZ may require a perimeter road depending on the significance of the bushfire threat. The assessment of perimeter access is provided in the following **Section 5.3**.

**Table 3: Threat assessment, APZ and category of bushfire attack**

| Direction from envelope | Slope <sup>1</sup>         | Vegetation <sup>2</sup> | PBP required APZ <sup>3</sup> | BAL-29 APZ AS3959 | Comments  |
|-------------------------|----------------------------|-------------------------|-------------------------------|-------------------|---|
| Northern cluster        |                            |                         |                               |                   |   |
| West and south          | 0-5 <sup>0</sup> downslope | Forest                  | 25 m<br>70 m (SFPP)           | 32 m              | Provided within property boundaries                       |
| South                   | 0-5 <sup>0</sup> downslope | Grassland               | 10 m                          | 10 m              |   |
| All other directions    | Managed land               |                         |                               |                   |   |
| Southern cluster        |                            |                         |                               |                   |   |
| West                    | 0-5 <sup>0</sup> downslope | Forest                  | 25 m<br>70 m (SFPP)           | 32 m              | Provided by Derriwong Road and within property boundaries |
| West                    | 0-5 <sup>0</sup> downslope | Grassland               | 10 m                          | 10 m              | Provided within property boundaries                       |
| South                   | 0-5 <sup>0</sup> downslope | Low hazard              | 10 m<br>30 m (SFPP)           | 14 m              |   |
| All other directions    | Managed land               |                         |                               |                   |   |

<sup>1</sup> Slope most significantly influencing the fire behaviour of the site having regard to vegetation found. Slope classes are according to PBP.

<sup>2</sup> Predominant vegetation is identified, according to PBP and "Where a mix of vegetation types exist the type providing the greater hazard is said to be predominate".

<sup>3</sup> Assessment according to Table A2.4 of PBP



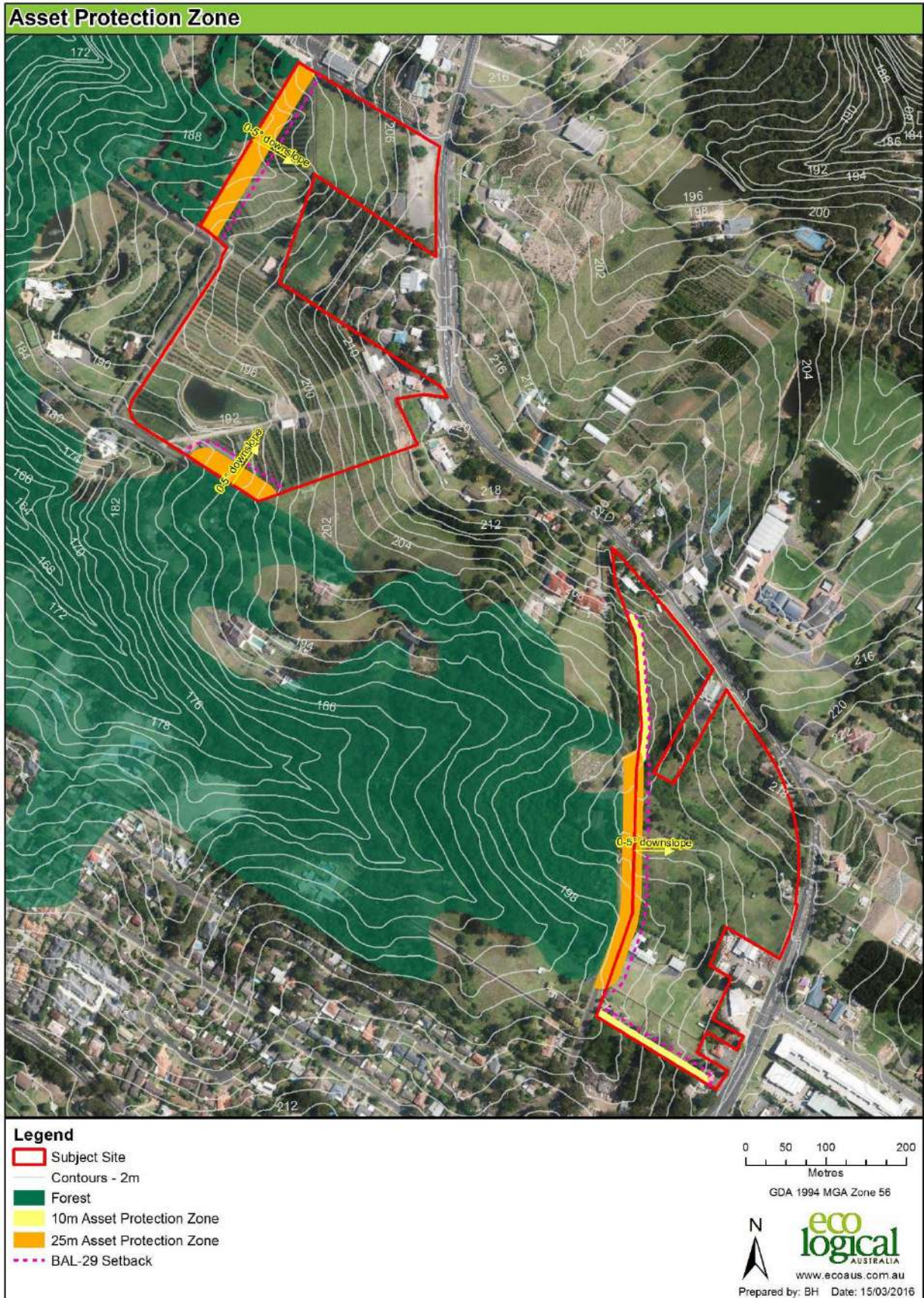


Figure 3: Asset protection zones

## 4 Construction standard

The application of building construction standards for bushfire protection under *AS 3959-2009 Construction of buildings in bushfire-prone areas* (Standards Australia 2009) is to be considered at the development application stage for individual dwellings and buildings. An assessment under AS 3959-2009 is not required at the rezoning or subdivision stages. The following is a brief introduction on AS 3959-2009.

AS 3959-2009 contains six Bushfire Attack Levels (BAL), each with a prescribed suite of design and construction specifications aimed at preventing ignition during the passing of a bushfire front. The BALs are outlined below:

- BAL-Low: The threat does not warrant application of construction standards. Developments with BAL-Low are generally not within bushfire prone land (greater than 100 m from bushland)
- BAL-12.5: Addresses background radiant heat at lower levels and ember attack
- BAL-19: Addresses mid-range radiant heat and ember attack
- BAL-29: Addresses high range radiant heat and ember attack
- BAL-40: Addresses extreme range of radiant heat and potential flame contact and ember attack
- BAL-FZ: Addresses construction within the flame zone. New subdivided lots are not permitted within the flame zone in NSW.

NSW has a minor variation to AS 3959-2009 which requires consideration in future development applications. The variation is contained within the document '*PBP Appendix 3 Addendum*' (RFS 2010).

## 5 Utilities and access

### 5.1 Water supply

Future lots will likely be serviced by reticulated water infrastructure suitable for fire fighting purposes. With the exception of rural residential subdivision, the furthest point from any future dwellings to a hydrant is to be less than 90 m (with a tanker parked in-line) in accordance with *Australian Standard 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (Standards Australia 2005). The reticulated water supply is to comply with the following acceptable solutions within Section 4.1.3 of PBP:

- Reticulated water supply to use a ring main system for areas with perimeter roads;
- Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005;
- Hydrants are not located within any road carriageway;
- All above ground water and gas service pipes external to the building are metal, including and up to any taps; and
- The PBP provisions of parking on public roads are met.

## 5.2 Gas and electrical supplies

In accordance with PBP, electricity should be underground wherever practicable. Where overhead electrical transmission lines are installed:

- Lines are to be installed with short pole spacing, unless crossing gullies
- No part of a tree should be closer to a powerline than the distance specified in the *ISSC 3 Guideline for Managing Vegetation Near Power Lines* (Industry Safety Steering Committee, 2005).

Any gas services are to be installed and maintained in accordance with *Australian Standard AS/NZS 1596 'The storage and handling of LP Gas'* (Standards Australia 2008).

## 5.3 Access

All bushfire prone areas should have an alternate access or egress option. This is usually achieved by providing more than one public road into and out of a precinct. The need for an alternative road and its location depends on the bushfire risk, the density of the development, and the chances of the road being cut by fire. All precincts within the study area should allow for an alternative public access road.

The proposed access arrangements within the study area are in accordance with the intent and principles of PBP regarding the provision of safe access and egress for both residents and fire fighters.

### 5.3.1 Safe access and egress

All bushfire prone areas should have an alternate access or egress option. An internal road system supporting future development is to comply with Section 4.2.7 of PBP.

### 5.3.2 Road design and construction

Depending on the bushfire risk, all bushland interface areas containing an APZ for a significant bushfire hazard should feature a perimeter public road within the APZ. It is acceptable for some areas not to have a perimeter road or have a perimeter trail instead. These include areas of lower bushfire risk (such as grassland or low hazard remnants or areas where it may not be feasible to provide a continuous road due to the shape of the interface or the terrain. These areas should have some other access strategy such as regular access points and good access to a hydrant network.

Provision of a simple layout with perimeter roads and frequent direct access to the internal road system will provide sufficient access/egress in the case of an emergency. Public roads should provide safe operational access to structures and water supply. Perimeter roads will be required at APZ bushland interface locations where a significant bushfire hazard exists. However, minor drainage corridors and the setbacks provided within larger 'lifestyle lots' present a lower risk scenario and, therefore, may not require implementation of perimeter roads. Property access roads will also need to provide safe access for emergency services and provide protection to properties and occupants during a bushfire

The design details (PBP acceptable solutions) of public roads are shown in **Table 4**.



Table 4: Performance criteria for proposed public roads

| Intent may be achieved where:   | Acceptable solutions  |
|---|---|
| <ul style="list-style-type: none"> <li>• firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)</li> </ul> | <ul style="list-style-type: none"> <li>• public roads are two-wheel drive, all weather roads</li> </ul>   |
| <ul style="list-style-type: none"> <li>• public road widths and design that allows safe access for firefighters while residents are evacuating an area</li> </ul>                     | <ul style="list-style-type: none"> <li>• urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle)</li> <li>• the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas</li> <li>• traffic management devices are constructed to facilitate access by emergency services vehicles</li> <li>• public roads have a cross fall not exceeding 3 degrees</li> <li>• public roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard</li> <li>• curves of roads (other than perimeter roads) are a minimum inner radius of six metres</li> <li>• maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient</li> <li>• there is a minimum vertical clearance to a height of four metres above the road at all times</li> <li>• the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicated load rating</li> </ul> |
| <ul style="list-style-type: none"> <li>• the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles</li> </ul>                               | <ul style="list-style-type: none"> <li>• public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression</li> </ul>  |
| <ul style="list-style-type: none"> <li>• roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered</li> </ul>         | <ul style="list-style-type: none"> <li>• public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression</li> <li>• public roads up to 6.5 metres wide provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression</li> </ul>   |
| <ul style="list-style-type: none"> <li>• there is clear access to reticulated water supply</li> </ul>   | <ul style="list-style-type: none"> <li>• one way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression</li> <li>• parking bays are a minimum of 2.6 metres wide from kerb to kerb edge to road pavement . No services or hydrants are located within the parking bays</li> </ul>   |
| <ul style="list-style-type: none"> <li>• parking does not obstruct the minimum paved width</li> </ul>   | <ul style="list-style-type: none"> <li>• public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road</li> </ul>   |

## 6 Recommendations and conclusion

Bushfire hazard has been assessed across the subject study area and found to be acceptable based on the ability to provide compliant APZ within the subject site. On the basis of this assessment, indicative asset protection zone requirements have been mapped across the proposed rezoning area.

A number of strategies have been provided in the form of planning controls such that the risk from bushfire can be minimised and future rezoning or development approval processes can be streamlined. Further, it has been found that development of the anticipated land uses within the subject study area, from a bushfire planning perspective, are considered suitable.

A number of strategies have been provided in this report such that the risk from bushfire can be mitigated. The main strategies suggested include:

- Ensure adequate setback from bushfire prone vegetation (APZs)
- Integrate non-combustible infrastructure within APZs such as roads, easements and parking areas. The majority of APZs should be contained within perimeter roads and front yard setbacks
- Ensure adequate access and egress from the study area through a well-designed road system
- Consider the adequacy of water supply and the delivery of other services (gas and electricity)
- Provide temporary APZs during any staged development
- Provide for effective and ongoing management of APZs; and
- Consider construction standards (AS3959) implications for future developments depending on development type (25 and 70 metre APZs).

The rezoning has been prepared based on the advice and constraints contained within this report. In relation to the furthering of the planning processes as they relate to the future uses of the study area, it is considered appropriate that more detailed assessment and consideration of the relevant bushfire protection strategies should be undertaken at the development application stage. This further assessment should include a more comprehensive review of the road and lot layout and subsequent planning controls, to ensure they are well designed in terms of bushfire protection outcomes.

The wider area of consideration has similar characteristics as the subject site and as such should have similar capacity to provide the required suite of bushfire protection measures for future rezoning investigations at the wider scale.

### 6.1 Statement of capability

This bushfire assessment demonstrates that the subject land is capable of accommodating future development and associated land use with the appropriate bushfire protection measures and bushfire planning requirements prescribed by s.117 (2) Direction 4.4 – *‘Planning for Bush Fire Protection’* and PBP.

If further information is required, please contact Mark Hawkins on 4302 1222.

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# Heritage Impact Statement

Multiple Properties along Old Northern Road and  
Derriwong Road, Dural

February 2016

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# Executive Summary

The following Heritage Assessment was prepared to assess the heritage impacts of proposed subdivision of properties on Old Northern Road and Derriwong Road, Dural. These properties are herein collectively referred to as 'subject site':

A planning proposal is currently being planned for the rezoning of the subject site to allow for residential and neighbourhood scale commercial/retail development. The subject site incorporates, or is in the vicinity of a number of locally listed heritage items on The Hills Local Environmental Plan 2012 and Hornsby Local Environmental Plan 2013. These include:

- House, 600A Old Northern Road (Item No. I85) The Hills LGA
- Dural Soldiers Memorial Hall, 604 Old Northern Road (Item No. I86) The Hills LGA
- Uniting Church Cemetery, Derriwong Road (Item No. I81) The Hills LGA
- House, 857 Old Northern Road, Dural (Item No.348) Hornsby LGA
- House, 873 Old Northern Road, Dural (Item No.349) Hornsby LGA
- Old Northern Road, between Dural and Wiseman's Ferry (Item A12, archaeological) The Hills LGA
- Street trees listed on Old Northern Road in the Hornsby LGA (item 448).

This report is principally concerned with the impacts to the Spanish Mission style Dural Memorial Hall at 604 Old Northern Road, constructed in 1925 and the Victorian weatherboard house, 600A Old Northern Road constructed between 1880 and 1900. The subject proposal has been assessed in relation to the relevant controls and provisions contained within The Hills LEP 2012 and The Hills DCP 2012.

Based on the results of this assessment, it has been determined that overall, the proposed low density residential subdivision is unlikely to impact on the heritage significance of both the heritage listed items within the proposed subdivision area as well as items in the vicinity. Both the house and hall are located very close to Old Northern Road and the visual prominence of the buildings within the streetscape will be maintained. Existing views to and from the principal (front) elevations of the items will not be obscured or adversely impacted.

- It is recommended that a heritage curtilage be formed for the house at 600A Old Northern Road to protect the impacts of potential future development. This is identified in Figure 17.
- Consider restoration of the house as part of the proposed works so that the principal house form is wholly retained. This would ultimately conserve and enhance the heritage significance of the item.
- If developed, it is recommended that lower-scale residences (one to two storey) in the vicinity of the heritage items would be in keeping with other development in the area and would not impact on views and the heritage significance of the item. Development in the vicinity of the items must respond appropriate to their form and scale.

# 1 Introduction

## 1.1 BACKGROUND

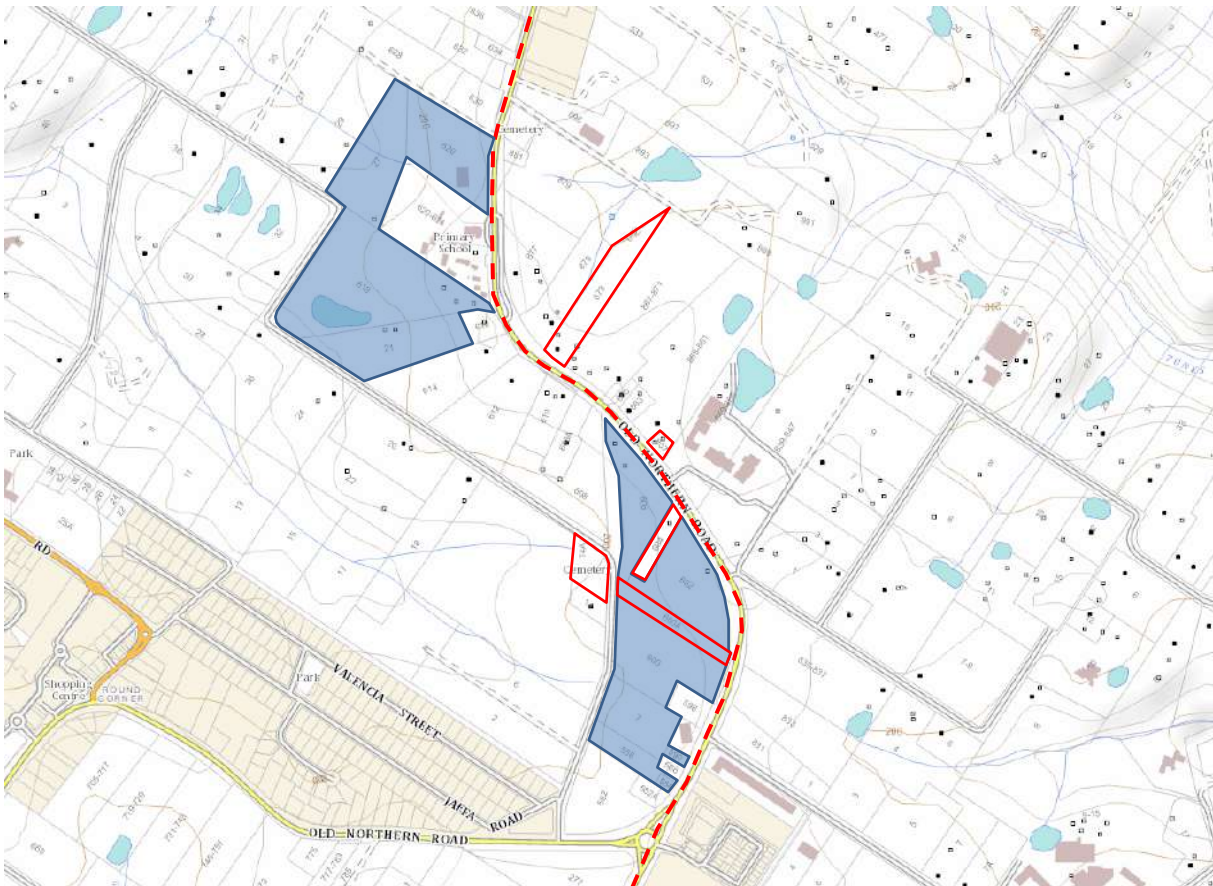
Urbis has been engaged HLA Group to prepare the following Heritage Assessment. This report was prepared to assess the heritage impacts of the proposed subdivision of properties in two areas between Old Northern Road and Derriwong Road, Dural, NSW.

The multiple properties contained within the subject site are currently predominately zoned as RU6 Transition, with Lot 2 DP 541329 being split zoned as both RU6 and SP2 Infrastructure. A planning proposal is currently being prepared for the rezoning of the subject site to allow for residential and neighbourhood scale commercial/retail development.

The subject site incorporates, or is in the vicinity of a number of locally listed heritage items in The Hills Local Environmental Plan 2012 and Hornsby Local Environmental Plan 2013. These include;

- House, 600A Old Northern Road (Item No. I85) The Hills LGA
- Dural Soldiers Memorial Hall, 604 Old Northern Road (Item No. I86) The Hills LGA
- Uniting Church Cemetery, Derriwong Road (Item No. I81) The Hills LGA
- House, 857 Old Northern Road, Dural (Item No.348) Hornsby LGA
- House, 873 Old Northern Road, Dural (Item No.349) Hornsby LGA
- Old Northern Road, between Dural and Wiseman's Ferry (Item A12, archaeological) The Hills LGA
- Street trees listed on Old Northern Road in the Hornsby LGA (item 448).

FIGURE 1 – SUBJECT SITE RELATED TO THIS REPORT OUTLINED BLUE AND HERITAGE ITEMS IN RED



SOURCE: SIX MAPS 2015

## 1.2 SITE LOCATION

The subject properties considered in this report are outlined in the below table.

TABLE 1 – LIST OF PROPERTIES INCLUDED IN THIS ASSESSMENT

| STREET ADDRESS  | LEGAL DESCRIPTION            |
|---|------------------------------|
| 584 Old Northern Road, Dural                                      | Lot 1 DP660184               |
| 586 Old Northern Road, Dural                                      | Lot 11 DP866560              |
| 590 Old Northern Road, Dural                                      | Lot D DP38097                |
| 600 Old Northern Road, Dural                                      | Lot 100 and Lot 102 DP713628 |
| 602 Old Northern Road, Dural                                      | Lot 1 DP656036               |
| 606 Old Northern Road, Dural                                      | Lot 1 DP73652                |
| 618 Old Northern Road, Dural (also known as No. 25 Deriwong Road) | Lot X DP 501233              |
| 626 Old Northern Road, Dural                                      | Lot 2 DP541329               |
| 7 Derriwong Road, Dural   | Lot 12 DP866560              |
| 11 Derriwong Road (also known as 600A ONR)                        | Lots 101 and 103 DP713628    |
| 21 Derriwong Road, Dural  | Lot 2 DP567995               |
| 27 Derriwong Road, Dural  | Lot 9 DP237576               |

The location of these properties in relation to listed heritage items or archaeological items in the vicinity is shown in (Figure 1).

## 1.3 METHODOLOGY

This Heritage Assessment has been prepared in accordance with the NSW Heritage Branch guideline 'Assessing Heritage Significance' (2001). The philosophy and process adopted is that guided by the *Australia ICOMOS Burra Charter 1999* (revised 2013).

Site constraints and opportunities have been considered with reference to relevant controls and provisions contained within The Hills Local Environmental Plan 2012 and the The Hills Development Control Plan 2012.

## 1.4 AUTHOR IDENTIFICATION

The following report has been prepared by Karyn McLeod (Heritage Consultant). Stephen Davies (Director) has reviewed and endorsed its content.

Unless otherwise stated, all drawings, illustrations and photographs are the work of Urbis.

## 1.5 THE PROPOSAL

The multiple properties contained within the subject site are currently predominately zoned as Zone RU6 Transition, with Lot 2 DP 541329 being split zoned as both RU6 and SP2 Infrastructure.

A planning proposal is currently being planned for the rezoning of the subject site to allow for residential and neighbourhood scale commercial/retail development.

The following properties, which are subject to the subdivision proposal include:

- 584 Old Northern Road, Dural
- 586 Old Northern Road, Dural
- 590 Old Northern Road, Dural
- 600 Old Northern Road, Dural
- 602 Old Northern Road, Dural
- 606 Old Northern Road, Dural
- 618 Old Northern Road, Dural (also known as No. 25 Deriwong Road)
- 626 Old Northern Road, Dural
- 7 Derriwong Road, Dural
- 11 Derriwong Road (also known as 600A ONR)
- 21 Derriwong Road, Dural
- 27 Derriwong Road, Dural

This report is principally concerned with the impacts to the heritage items located at 600A Old Northern Road (also known as 11 Derriwong Road) and 604 Old Northern Road, Dural. The Memorial Hall at 604 Old Northern Road is not part of the proposed subdivision; however it is surrounded by land that is within the proposal.

As no physical works are currently proposed, there is no identified risk of harm to Old Northern Road, which is identified in part as an archaeological item under the Hills LEP 2012.



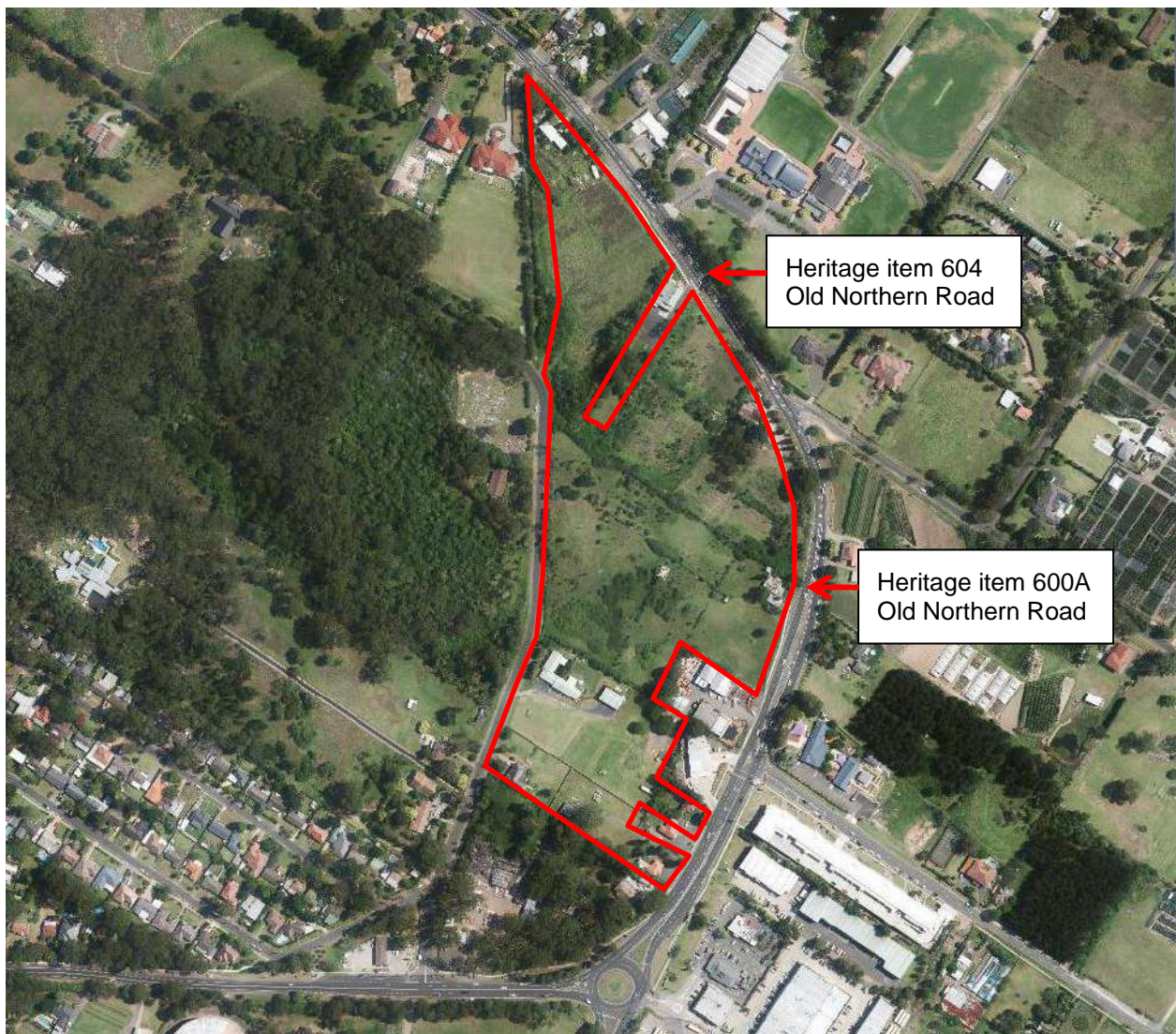
## 2 Site Description

### 2.1 THE SITE

Dural is a semi-rural suburb, 36 kilometres north-west of the Sydney central business district in the Local Government Areas (LGA) of Hornsby Shire and The Hills Shire. Dural is part of the Hills District, in North Western Sydney. The site is located between Old Northern Road and Derriwong Road and is mostly rural.

The subject site is located to the north of the Round Corner and contains a number of private residences and commercial properties fronting Old Northern Road. The land is largely cleared and vacant and contains remnant fruit trees from the orchards that dominated the area in the past. Orchards, plant nurseries and market gardens are common in the area, however low density housing development is located to the south west of the subject site and a large commercial and industrial precinct is located to the south east. Redfield College, an Independent Catholic boys' school is located opposite the site on the eastern side of Old Northern Road. The Dural Memorial Hall allotment has been excluded from the proposed subdivision, but is surrounded by land which is part of the proposal.

FIGURE 2 – THE SUBJECT SITE INDICATED IN RED OUTLINE



SOURCE: SIX MAPS 2015

## 2.2 HERITAGE ITEMS

### 2.2.1 600A OLD NORTHERN ROAD

The item is a beaded weatherboard cottage on brick footings with corrugated iron, hipped roof that flows to a verandah. It is symmetrical at the front, has a hipped projection to the rear and there are a number of later weatherboard and fibro additions to the rear. The rear verandah has been infilled, the doors are not original and a non-original iron railing has been added to the front and rear verandahs. The building has two brick chimneys with terracotta pots and Victorian style shutters. There is a garage and access to the Old Northern Road on the southern side of the house and remnant fencing that appears to separate what was originally an orchard at the rear. The house appears to have been constructed in the late Victorian period possibly between 1880 and 1900. It is located very close to the road separated by a high timber paling fence and footpath. The fencing and grounds are in poor condition and the house is uninhabited. The condition of the interior of the house is unknown as access was not possible.

Several mature non-native trees are located around the house and fence lines and the garden and orchard are overgrown. The land surrounding the listed property is cleared former orchard (stone fruit) and slopes down gently to the west to Derriwong Road. The property to the south (No. 600) is vacant and is currently being used for grazing horses and cattle. Commercial properties fronting Old Northern Road are also located to the south. A brick house constructed in the 1950s is located on 602 Old Northern Road to the north.

### 2.2.2 DURAL MEMORIAL HALL, 604 OLD NORTHERN RD

The Memorial Hall was constructed in the Spanish mission Style in 1925 and funded by the local residents. It is located very close to the road separated by a timber picket fence and has an addition to the north that houses a kitchen and disabled entrance. An iron arch at the front that states *1914 Lest We Forget 1918* and a plaque that states *In Loving Memory of Our Boys who fought in the Great War. 1914-1919*. The hall has a stage, seats approximately 200 and is used by the community for functions, theatre and musical performances. A driveway is located on the northern side of the building and an asphalt car park at the rear. The long allotment is located between Old Northern Road and Derriwong Road and is mostly vacant apart from some mature native trees to the rear of the building.

### 2.2.3 DURAL UNITING CHURCH CEMETERY

The small rural cemetery has been cleared from the bush that surrounds O'Haras Creek, a tributary of Cattai Creek to the north west. The land slopes from the south down to north and the graves lie in rows down this slope facing east. The cemetery was previously known as the Methodist Cemetery and was established in 1857 when part of Thomas Williams' grant was bought by a group of local Methodists. There are numerous graves dating to the 1870s including those of early local land owning families including Roughley, Cusbert and Mobbs. The cemetery is still in use. It is locally significant for its historic and aesthetic representative values.



FIGURE 3 – FRONT OF LISTED HOUSE AND GARAGE AT 600A OLD NORTHERN ROAD.



FIGURE 4 – REAR OF LISTED HOUSE 600A OLD NORTHERN ROAD.





FIGURE 5 – REAR 602 AND 600A OLD NORTHERN ROAD FROM DERRIWONG ROAD.



Pedestrian survey of the grounds of 600, 600A, 602 and 604 Old Northern Road found the properties to be covered in thick grasses and remnant orchards. There were also two derelict timber and iron sheds located at the rear of 600A which were of unknown function. The land has been previously cleared and used for a variety of agricultural uses and there is little likelihood of *in situ* Aboriginal objects being present on the site. The site also has low potential for the remains of significant historic archaeological features or deposits.

FIGURE 6 – VACANT LAND AT 600 OLD NORTHERN ROAD AND COMMERCIAL PROPERTIES TO THE SOUTH .



FIGURE 7 – PREVIOUS ORCHARD (STONE FRUIT) AT THE REAR OF 600A OLD NORTHERN ROAD.



FIGURE 8 – DURAL MEMORIAL HALL, 604 OLD NORTHERN ROAD, DURAL.





FIGURE 9 – THE REAR OF THE MEMORIAL HALL AND THE VACANT ALLOTMENT AT 606 OLD NORTHERN ROAD (LEFT)



FIGURE 10 – UNITING CHURCH CEMETERY ON THE WESTERN SIDE OF DERRIWONG ROAD

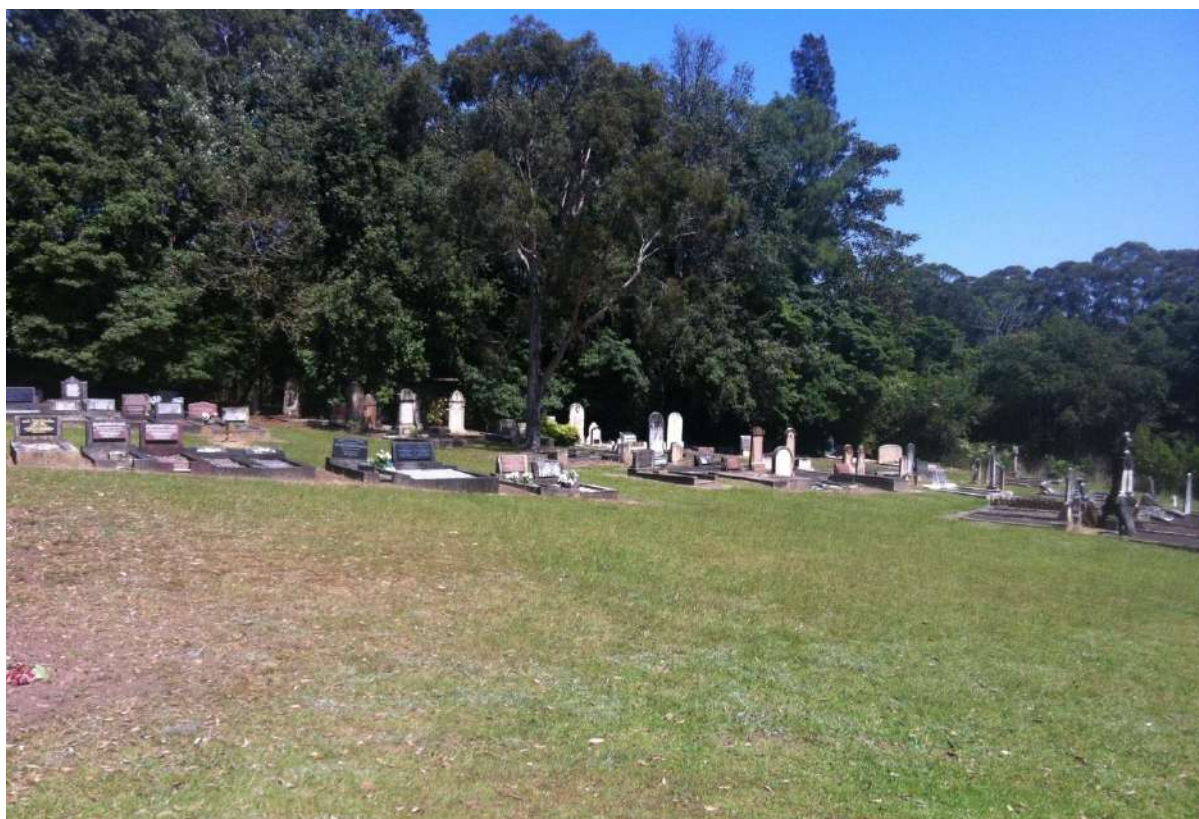




FIGURE 11 – SURROUNDING AREA.



PICTURE 1 – THE OLD NORTHERN ROAD VIEW NORTH



PICTURE 2 – LISTED HOUSE 600A OLD NORTHERN ROAD



PICTURE 3 – THE OLD NORTHERN ROAD VIEW SOUTH WITH COMMERCIAL PROPERTIES LEFT



PICTURE 4 – CAR PARK AT THE REAR OF THE MEMORIAL HALL AND DERRIWONG RD BEHIND



PICTURE 5 – DERRIWONG ROAD VIEW NORTH EAST WITH REAR OF 606, 604 AND 602 IN THE BACKGROUND



PICTURE 6 – DERRIWONG ROAD VIEW SOUTH EAST TOWARD THE REAR OF THE COMMERCIAL PROPERTIES



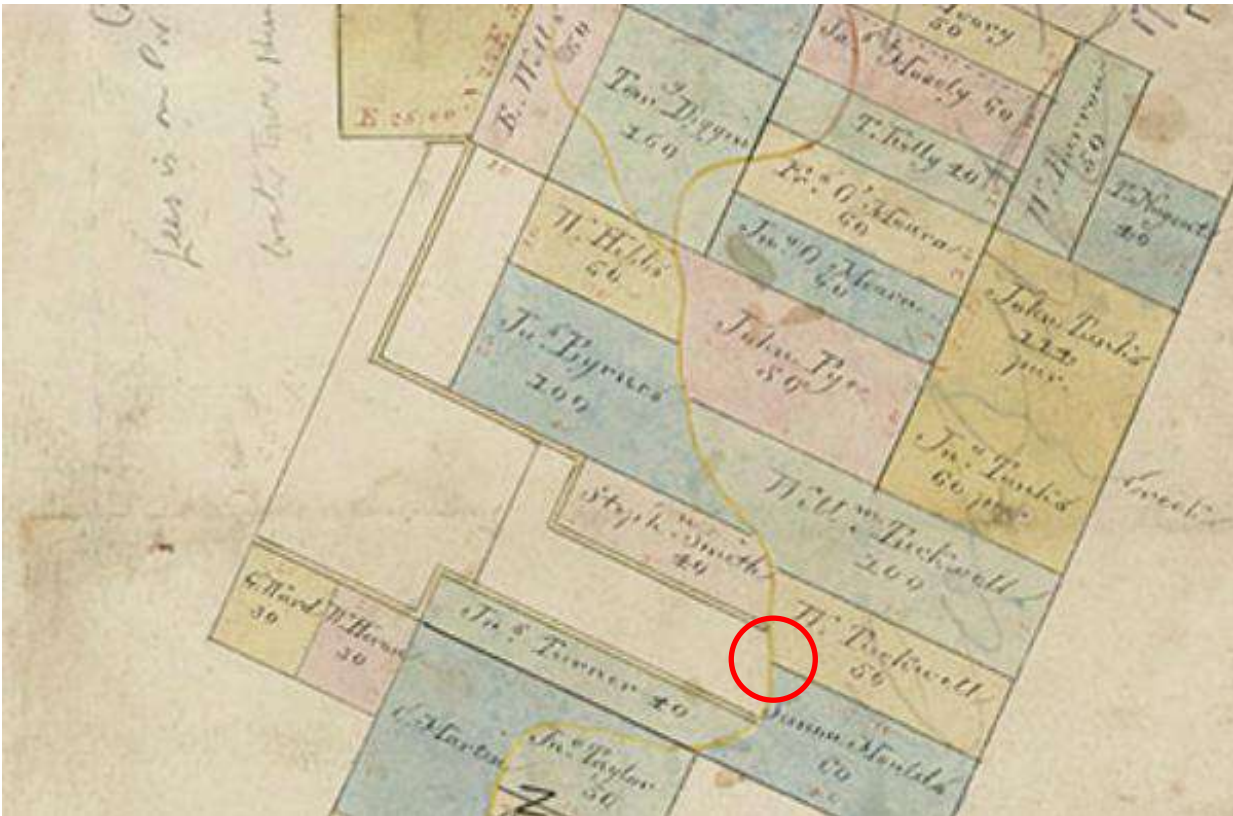
## 3 Historical Overview

### 3.1 AREA HISTORY

It has been claimed that Dural is an Aboriginal word used by the local Dharug language group meaning 'gully' or 'valley'. A map by surveyor James Meehan, dated 1817, shows the location for Dural as 'Doora', and a similar word appears in the Sydney Gazette in 1805. The Reverend WB Clarke gives Dural the meaning of 'valley' in his diary entry of November 1840. His informant was Nurragingy, a traditional owner of the land, who was then living at North Rocks.<sup>1</sup>

In 1817 James Meehan surveyed and marked out a road between Castle Hill and Dural, but it remained a bush track until 1825, when work commenced on the Great North Road. The Great North Road, surveyed in 1825 and completed in 1836, was constructed using convict labour and spanned 264 km, connecting Sydney to the settlements of the Hunter Valley. The Great North Road commences at Parramatta Road, Five Dock, crossing the Parramatta River it passed through Ryde and Dural before reaching the Hawkesbury River at Wisemans Ferry, 100 km (62 mi) to the north. It then traverses rugged terrain to provide access to Singleton via Broke and Cessnock, Maitland and on to Newcastle.<sup>2</sup>

FIGURE 12 – CASTLE HILL PARISH AND PART OF GIDLEY, FIELD OF MARS, SOUTH COLAH, NELSON, ST. MATTHEW [AND] PROSPECT 1840. CASTLE HILL ROAD AND STUDY AREA INDICATED.



SOURCE: STATE LIBRARY OF NEW SOUTH WALES Z/M2 811.13/1840/1

The earliest settlers to make a living from the Dural district were timber-getters who cut timber from the forest to service the growing needs of Sydney. The forests of the Dural area stretched from Castle Hill across to Windsor and included ironbark, blue gum, turpentine, cedar, blackbutt, mahogany and wattle trees. The first land grants were given to 30 settlers, including 600 acres to George Hall in 1819. John Hall still owned property in the area in the 1880s. Another early landowner in the area was George Best,

<sup>1</sup> Dictionary of Sydney - Dural

<sup>2</sup> OEH – Convict History

whose farm became a well-known landmark after the Great North Road was built through his property and he established the 'Half-Way Inn' at Middle Dural in 1831.<sup>3</sup>

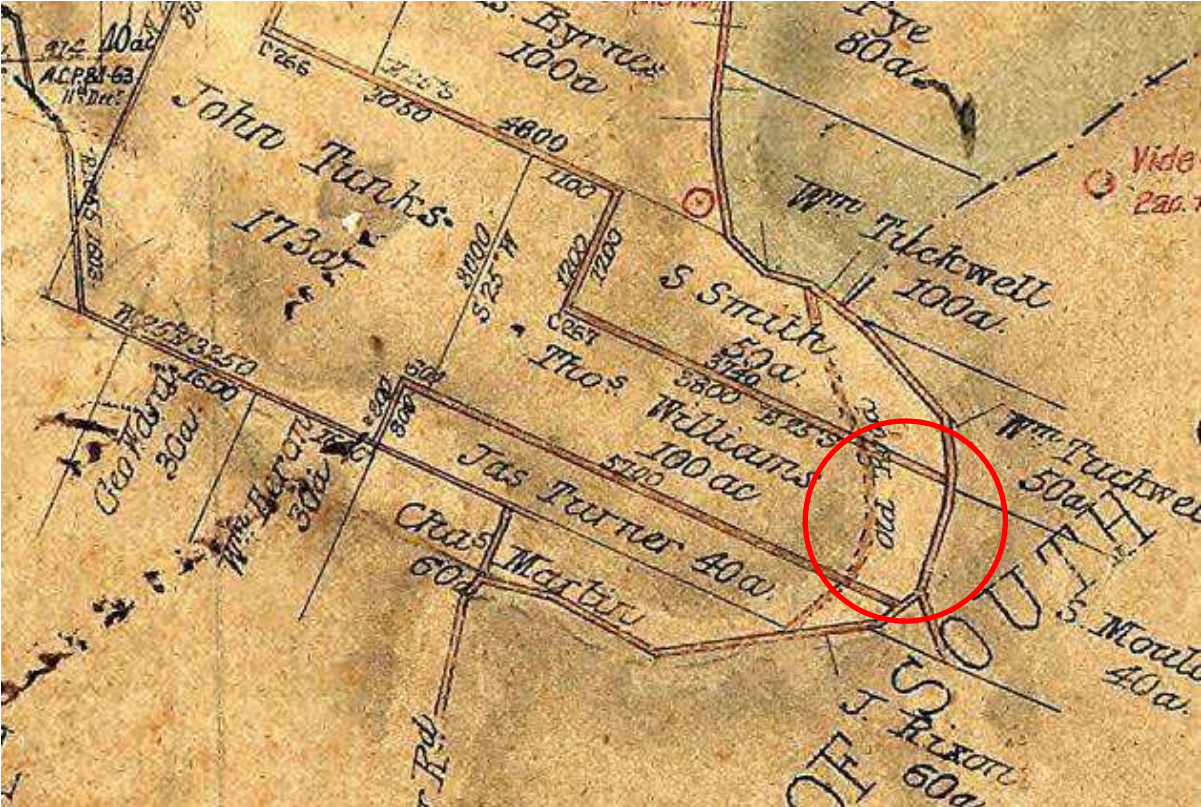
Other pioneers of this time were the Fagan, Waddell, Moulds, Hunt and Roughly families, many of their descendants still live in the region today. James Roughley donated land to be used for the building of a church. A sandstone chapel, known as St Jude's Church, was built on Old Northern Road circa 1846, with a vestry, apse and shingle roof, plus a bell turret on the western gable. A porch was added soon after. Prior to the construction of the church, services were held in a timber school building where St Jude's parish hall now stands. Some of the building materials from the old school were used in the building of the parish hall.<sup>4</sup>

Other settlers followed and the cleared land and the rich soils proved ideal for growing crops and later citrus. By 1870 there were dozens of citrus orchards, which drew a large number of workers to the area. As the population increased, additional schools, churches and a police station were established and the Dural Post Office opened in 1864.

Hornsby and Pennant Hills railway stations, located on the Main Northern line, opened on 17 September 1886. In 1893 there was a planned train line from Rosehill to Dural that would have taken in part of Thomas Williams land along the southern end boundary of Dural Road, however it was not completed. Castle Hill and Cherrybrook stations will be constructed as part of the North West Rail Link to be completed in 2019.

Dural is now a semi-rural area with orchards, market gardens and remnant forest. Land blocks average five acres (two hectares) and are popular as hobby farms.<sup>5</sup>

FIGURE 13 – PARISH OF NELSON COUNTY OF CUMBERLAND 1878 APPROXIMATE SITE INDICATED



SOURCE: DEPARTMENT OF LANDS - HLRV VIEWER 2015

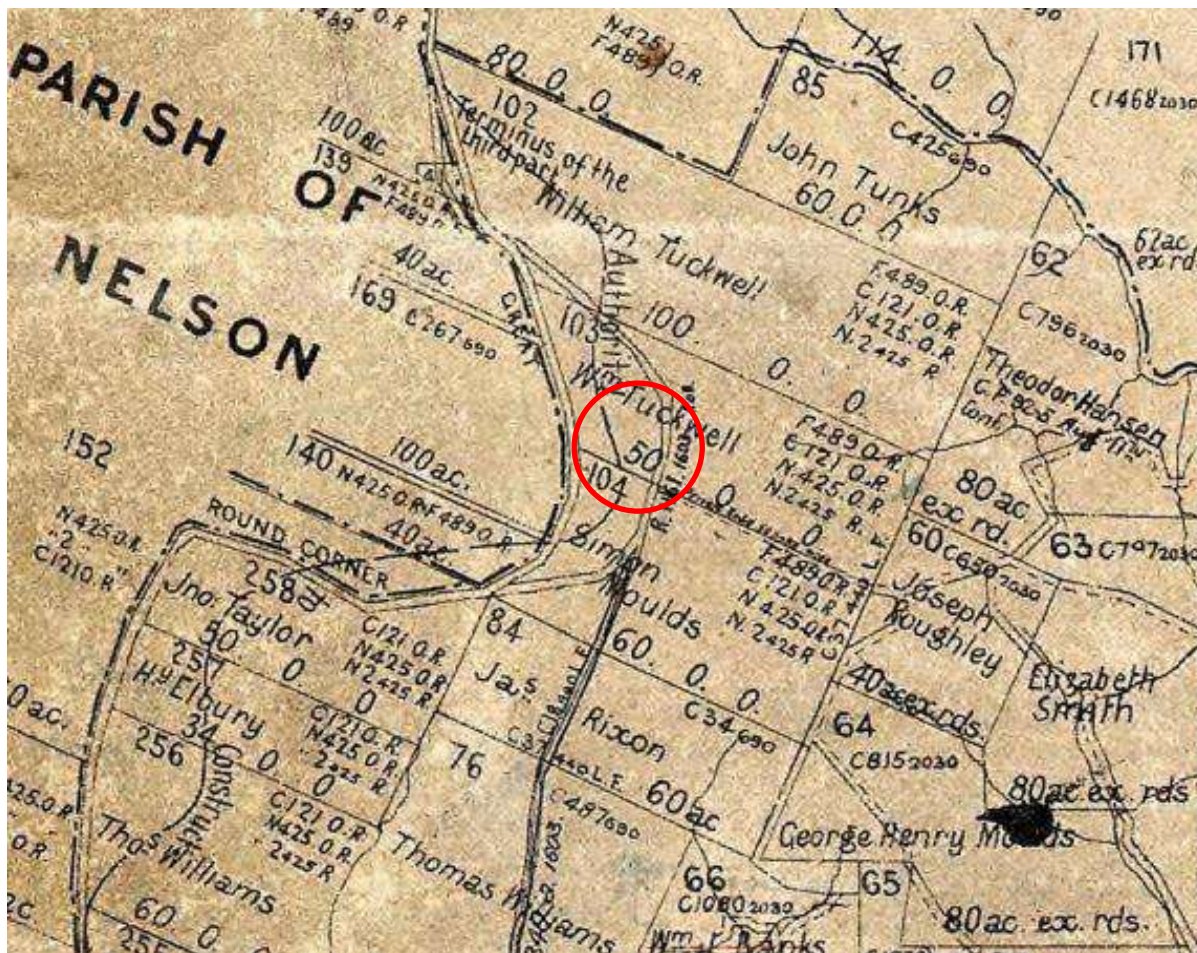
<sup>3</sup> Dural and Round Corner Chamber of Commerce - Dural History  
<sup>4</sup> Dural District Anglican Churches – St Judes  
<sup>5</sup> Rowland, J 2008 Dural Dictionary of Sydney [electronic resource]



### 3.2 SITE HISTORY

While a large part of The Hills and Hornsby district had been granted in 1840 and the Old Northern Road was the boundary between properties. The Parish map of 1840 shows the subject site in the Parish of South Colah was located on a 50 acre property granted to William Tuckwell, just to the north of Round Corner. Tuckwell had also been granted the adjoining 100 acres to the north. Thomas Williams was granted 100 acres on the opposite side of the Old North Road sometime after 1840. Williams sold 21 acres of his property to a group of Methodists in 1857 for the establishment of a cemetery. Simon Moulds was granted the 60 acres to the south. The current Quarry Road is the boundary between Tuckwell and Mould's property.

FIGURE 14 – 1897 PARISH OF SOUTH COLAH THE SUBJECT SITE IS INDICATED



SOURCE: DEPARTMENT OF LANDS - HLRV VIEWER 2015

Sometime before the 1870s, the Northern Road was extended to the east through Tuckwell and Mould's properties (Figure 14) to join a new line of road from the south. The New Line Road was surveyed as early as 1829, but remained an unsealed track well into the 20<sup>th</sup> century. By the 1870s the area was increasingly populated and new roads through large grants were required to transport fruit and vegetables grown in the area to Sydney. The previous western alignment of the Old North Road became part of Derriwong Road (Figure 13). The remainder of Derriwong Road was formed as the boundaries between properties to the north and west. Most of the properties in the area at this time were between 40 and 200 acres and primarily dedicated to orchard growing.

According to Parish maps of Nelson and South Colah the large allotments remained relatively unchanged until after 1907. Around 1915 the subject site was subdivided from the large Tuckwell allotment and the eight acres became portion 479 which includes 600 and 600A Old Northern Road. The property was in the ownership of T. Parker at this time who sold it to M. T. Pahlow around 1923. By 1931 Vera Martha Lamb was the owner of the property together with the adjoining portion 359 to the west. She and her daughter Vera and granddaughter Daphne held the property until 1975. 602, 604 and 606 Old Northern

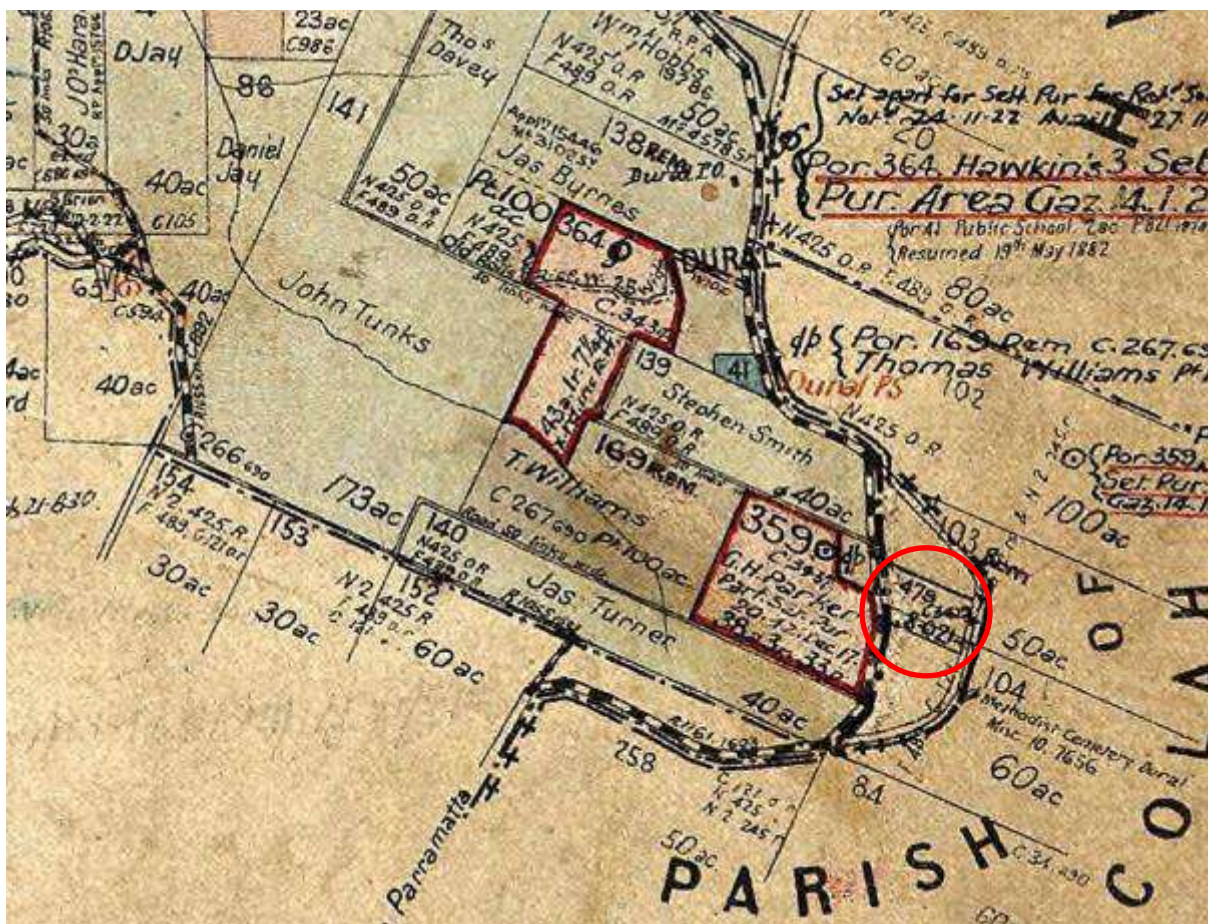


Road remained one large undeveloped allotment until the early 1920s. The Memorial Hall land was subdivided from 602 Old Northern Road prior to its construction in 1925.

Sometime between 1969 and 1972 the south eastern portion of 600 Old Northern Road was subdivided from portion 479 and the title for the property shows a fenced section on the north east part of the site which is where the house is situated. It appears that 600 and 600a have always been part of the same allotment and in 1979 the listed property at 600A was subdivided from 600 Old Northern Road. The property has changed hands several times since the 1970s. See table 1 below for details.

The weather-board cottage appears to have been constructed on Tuckwell's 50 acre grant sometime between 1880 and 1900. In 1986 a small section fronting Old Northern Road was excised by the Commissioner of Main Roads for widening the road. The property is located in an area of changing character, in particular the existing commercial development on the Old Northern Road to the south is of a different character to the rural dwellings and allotments to the north. Allotment boundaries in the immediate vicinity have followed the lay out of the original grants. Land in the southern part of Round Corer has been subdivided for residential dwellings.

FIGURE 15 – 1915 PARISH OF NELSON THE SUBJECT SITE IS INDICATED, SUBDIVIDED FROM THE LARGER PROPERTY. IN 1931 PORTIONS 479 AND THE ADJOINING PORTION 359 WERE UNDER THE SAME OWNERSHIP.



SOURCE: DEPARTMENT OF LANDS - HLRV VIEWER 2015

### 3.3 PROPERTY OWNERS 600 AND 600A OLD NORTHERN ROAD

Table 1 lists owners of the subject property from known historical records.

TABLE 2 – PROPERTY OWNERS

| DATE       | OWNER   |
|------------|---|
| 10/01/1986 | Franc and Guiseppa Burgio Part excised by Commissioner of Main Roads.     |
| 17/05/1979 | Franc and Guiseppa Burgio   |
| 18/02/1975 | JA Pope (Pastoral) PtyLtd   |
| 13/10/1972 | Daphne Ellen Pender and Harry Greenfields (grand children of Martha Lamb) |
| 10/07/1969 | Vera Daphne Lamb (Daughter of Martha)                                     |
| 1931       | Vera Martha Lamb  |
| 1923       | MT Pahlow   |
| 1915       | T Parker (Subject site subdivided from large allotment)                   |
| 1907       | William Tuckwell  |
| 1840       | William Tuckwell  |

### 3.4 DATE OF CONSTRUCTION

Stylistically, the house appears to have been constructed between the 1880s -1900. No historical information has been found to confirm this. It is currently in poor condition and uninhabited.

The Dural Memorial Hall was constructed in 1925 on land that was subdivided from 602 Old Northern Rd.

### 3.5 ALTERATIONS AND ADDITIONS

Alterations and additions to the property include the addition of a carport/garage adjoining the south of the house, additions to the rear which are possibly a bathroom and laundry (post 1940), infilling of the rear veranda, new doors, addition of iron railing to the front and rear verandahs, construction of sheds in the rear and addition of an above ground pool.

600 Old Northern Road was subdivided to form the current allotments in 1979.



## 4 Heritage Significance

### 4.1 WHAT IS HERITAGE SIGNIFICANCE?

Before making decisions to change a heritage item, an item within a heritage conservation area, or an item located in proximity to a heritage listed item, it is important to understand its values and the values of its context. This leads to decisions that will retain these values in the future. Statements of heritage significance summarise a place's heritage values – why it is important, why a statutory listing was made to protect these values.

### 4.2 SIGNIFICANCE ASSESSMENT

The Heritage Council of NSW has developed a set of seven criteria for assessing heritage significance, which can be used to make decisions about the heritage value of a place or item. There are two levels of heritage significance used in NSW: state and local.

The following assessment of heritage significance for 600A Old Northern Road has been prepared in accordance with the 'Assessing Heritage Significance' (2001) guides.

| CRITERIA  | SIGNIFICANCE ASSESSMENT  |
|---|--|
| <p><b>A – Historical Significance</b></p> <p><i>An item is important in the course or pattern of the local area's cultural or natural history.</i></p>  | <p>The house at 600A Old Northern Road is the first building on the property and is located on part of one of the early land grants in the area. The building and allotment is associated with farming and orcharding in the area and has been subdivided from a much larger allotment. The property is located close to the Old Northern Road which was important for moving produce to Sydney for sale.</p> <p>The Hall was built by the community as a memorial to the local soldiers of the first world war.</p> <p>Successive stages of subdivision in the area are evident and both buildings remain in their original position close to the road and the adjoining allotment boundary.</p> <p>The subject site therefore has historic significance.</p> |
| <p><b>Guidelines for Inclusion</b></p> <ul style="list-style-type: none"> <li>▪ shows evidence of a significant human activity <input type="checkbox"/></li> <li>▪ is associated with a significant activity or historical phase <input type="checkbox"/></li> <li>▪ maintains or shows the continuity of a historical process or activity <input checked="" type="checkbox"/></li> </ul> | <p><b>Guidelines for Exclusion</b></p> <ul style="list-style-type: none"> <li>▪ has incidental or unsubstantiated connections with historically important activities or processes <input type="checkbox"/></li> <li>▪ provides evidence of activities or processes that are of dubious historical importance <input type="checkbox"/></li> <li>▪ has been so altered that it can no longer provide evidence of a particular association <input type="checkbox"/></li> </ul>  |
| <p><b>B – Associative Significance</b></p> <p><i>An item has strong or special associations with the life or works of a person, or group of persons, of importance in the local area's cultural or natural history.</i></p>   | <p>The house at 600A Old Northern Road does not appear to have any association with any particular person, or group of persons although the house was home to several generations of the Lamb family for 44 years. The property also has associations with orcharding which was characteristic of the area and is likely to be associated with the subdivision of the large land parcels from the 1880s onward.</p> <p>The memorial hall has associations with the local community, but the hall and its allotment of land is not included in the proposed subdivision.</p> <p>The site has associative significance.</p>  |
| <p><b>Guidelines for Inclusion</b></p> <ul style="list-style-type: none"> <li>▪ shows evidence of a significant human occupation <input checked="" type="checkbox"/></li> </ul>   | <p><b>Guidelines for Exclusion</b></p> <ul style="list-style-type: none"> <li>▪ has incidental or unsubstantiated connections with historically important people or events <input type="checkbox"/></li> </ul>   |

| CRITERIA  | SIGNIFICANCE ASSESSMENT   |
|---|---|
| <ul style="list-style-type: none"> <li>▪ is associated with a significant event, person, or group of persons <input type="checkbox"/></li> </ul>  | <ul style="list-style-type: none"> <li>▪ provides evidence of people or events that are of dubious historical importance <input type="checkbox"/></li> <li>▪ has been so altered that it can no longer provide evidence of a particular association <input type="checkbox"/></li> </ul>   |
| <p><b>C – Aesthetic Significance</b></p> <p><i>An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in the local area.</i></p>   | <p>The house is in poor condition and has a number of alterations. There are numerous timber weatherboard houses in the area.</p> <p>The memorial hall has some aesthetic significance, but is not included in the subdivision proposal.</p> <p>The property does not fulfil this criterion.</p>  |
| <p><b>Guidelines for Inclusion</b></p> <ul style="list-style-type: none"> <li>▪ shows or is associated with, creative or technical innovation or achievement <input type="checkbox"/></li> <li>▪ is the inspiration for a creative or technical innovation or achievement <input type="checkbox"/></li> <li>▪ is aesthetically distinctive <input type="checkbox"/></li> <li>▪ has landmark qualities <input type="checkbox"/></li> <li>▪ exemplifies a particular taste, style or technology <input type="checkbox"/></li> </ul> | <p><b>Guidelines for Exclusion</b></p> <ul style="list-style-type: none"> <li>▪ is not a major work by an important designer or artist <input checked="" type="checkbox"/></li> <li>▪ has lost its design or technical integrity <input type="checkbox"/></li> <li>▪ its positive visual or sensory appeal or landmark and scenic qualities have been more than temporarily degraded <input type="checkbox"/></li> <li>▪ has only a loose association with a creative or technical achievement <input type="checkbox"/></li> </ul>  |
| <p><b>D – Social Significance</b></p> <p><i>An item has strong or special association with a particular community or cultural group in the local area for social, cultural or spiritual reasons.</i></p>  | <p>The house is likely to have some connection with the local community however it is unlikely that the property is esteemed but the community.</p> <p>The memorial hall is likely to be esteemed by the community as a memorial, meeting place and music venue, but is not included in the subdivision proposal.</p> <p>The property does not fulfil this criterion.</p>   |
| <p><b>Guidelines for Inclusion</b></p> <ul style="list-style-type: none"> <li>▪ is important for its associations with an identifiable group <input type="checkbox"/></li> <li>▪ is important to a community's sense of place <input type="checkbox"/></li> </ul>   | <p><b>Guidelines for Exclusion</b></p> <ul style="list-style-type: none"> <li>▪ is only important to the community for amenity reasons <input type="checkbox"/></li> <li>▪ is retained only in preference to a proposed alternative <input checked="" type="checkbox"/></li> </ul>  |
| <p><b>E – Research Potential</b></p> <p><i>An item has potential to yield information that will contribute to an understanding of the local area's cultural or natural history.</i></p>   | <p>A survey of the site did not reveal any evidence of previous archaeological structures or features. It is possible the site retains below ground historical archaeological features or deposits such as cesspits, wells and rubbish pits however these features and deposits are common and unlikely to be significant.</p> <p>The site was thickly vegetated and there was no evidence of aboriginal occupation of the site. The closest natural water source is some distance away and the site is likely to have been only infrequently visited by Aboriginal people in the past. The site has been cleared and subject to agricultural uses and it is unlikely that undisturbed Aboriginal objects would be present.</p> <p>The property does not fulfil this criterion.</p> |
| <p><b>Guidelines for Inclusion</b></p> <ul style="list-style-type: none"> <li>▪ has the potential to yield new or further substantial scientific and/or archaeological information <input type="checkbox"/></li> <li>▪ is an important benchmark or reference site or type <input type="checkbox"/></li> <li>▪ provides evidence of past human cultures that is unavailable elsewhere <input type="checkbox"/></li> </ul>   | <p><b>Guidelines for Exclusion</b></p> <ul style="list-style-type: none"> <li>▪ the knowledge gained would be irrelevant to research on science, human history or culture <input type="checkbox"/></li> <li>▪ has little archaeological or research potential <input checked="" type="checkbox"/></li> <li>▪ only contains information that is readily available from other resources or archaeological sites <input type="checkbox"/></li> </ul>   |

| CRITERIA  | SIGNIFICANCE ASSESSMENT  |
|---|--|
| <p><b>F – Rarity</b></p> <p><i>An item possesses uncommon, rare or endangered aspects of the local area’s cultural or natural history.</i></p>  | <p>Late Victorian weatherboard houses are common in the area.</p> <p>Memorial Halls are not uncommon in the Hills Shire.</p> <p>The site does not fulfil this criterion.</p>   |
| <p><b>Guidelines for Inclusion</b></p> <ul style="list-style-type: none"> <li>▪ provides evidence of a defunct custom, way of life or process <input type="checkbox"/></li> <li>▪ demonstrates a process, custom or other human activity that is in danger of being lost <input type="checkbox"/></li> <li>▪ shows unusually accurate evidence of a significant human activity <input type="checkbox"/></li> <li>▪ is the only example of its type <input type="checkbox"/></li> <li>▪ demonstrates designs or techniques of exceptional interest <input type="checkbox"/></li> <li>▪ shows rare evidence of a significant human activity important to a community <input type="checkbox"/></li> </ul>  | <p><b>Guidelines for Exclusion</b></p> <ul style="list-style-type: none"> <li>▪ is not rare <input checked="" type="checkbox"/></li> <li>▪ is numerous but under threat <input type="checkbox"/></li> </ul>  |
| <p><b>G – Representative</b></p> <p><i>An item is important in demonstrating the principal characteristics of a class of NSWs (or the local area’s):</i></p> <ul style="list-style-type: none"> <li>▪ <i>cultural or natural places; or</i></li> <li>▪ <i>cultural or natural environments.</i></li> </ul>  | <p>The timber weatherboard house is typical of vernacular dwellings of the late Victorian period in this area. The house could also be considered part of a group which collectively illustrates the settlement and development of farming and agricultural activities on the fringes of Sydney.</p> <p>The hall is also representative of the memorialisation of war and community engagement.</p> <p>The site is considered to have representative significance.</p> |
| <p><b>Guidelines for Inclusion</b></p> <ul style="list-style-type: none"> <li>▪ is a fine example of its type <input type="checkbox"/></li> <li>▪ has the principal characteristics of an important class or group of items <input type="checkbox"/></li> <li>▪ has attributes typical of a particular way of life, philosophy, custom, significant process, design, technique or activity <input type="checkbox"/></li> <li>▪ is a significant variation to a class of items <input type="checkbox"/></li> <li>▪ is part of a group which collectively illustrates a representative type <input checked="" type="checkbox"/></li> <li>▪ is outstanding because of its setting, condition or size <input type="checkbox"/></li> <li>▪ is outstanding because of its integrity or the esteem in which it is held <input type="checkbox"/></li> </ul> | <p><b>Guidelines for Exclusion</b></p> <ul style="list-style-type: none"> <li>▪ is a poor example of its type <input type="checkbox"/></li> <li>▪ does not include or has lost the range of characteristics of a type <input type="checkbox"/></li> <li>▪ does not represent well the characteristics that make up a significant variation of a type <input type="checkbox"/></li> </ul>   |

### 4.3 STATEMENT OF SIGNIFICANCE

The house at 600A Old Northern Road has historical significance as it is located on part of one of the early land grants in the area and is associated with the early development and subdivision of the area. The site is associated with one family for many years and with orcharding which is characteristic of the area. The timber weatherboard house is typical of vernacular dwellings of the late Victorian period and is representative of this period of rural dwellings.

# 5 Impact Assessment

## 5.1 HERITAGE LISTING

Numbers 600A and 604 Old Northern Road are heritage listed items under The Hills Local Environmental Plan 2012. Numbers 600, 602 and 606 Old Northern Road are located immediately adjacent to the heritage items.

FIGURE 16 – THE HILLS AND HORNSBY LEP HERITAGE MAPS 23 AND THE HORNSBY LOCAL ENVIRONMENTAL PLAN (LEP) 2013 SHOWING HERITAGE LISTED ITEMS IN AND WITHIN THE VICINITY OF THE SUBJECT SITE (OUTLINED RED).



PICTURE 7 – THE HILLS LEP 2012 HERITAGE MAP 23



PICTURE 8 – THE HORNSBY LEP 2013 HERITAGE MAP

## 5.2 STATUTORY CONTROLS

### 5.2.1 THE HILLS LOCAL ENVIRONMENTAL PLAN 2012

The proposed works are addressed in the table below in relation to the relevant clauses in the LEP.

TABLE 3 – RELEVANT LEP CLAUSES

| CLAUSE   | DISCUSSION   |
|--|--|
| <p><b>5.10 Heritage conservation</b></p> <p><b>Note.</b> Heritage items (if any) are listed and described in Schedule 5. Heritage conservation areas (if any) are shown on the Heritage Map as well as being described in Schedule 5.</p> <p><b>(1) Objectives</b></p> <p>The objectives of this clause are as follows:</p> <p>(a) to conserve the environmental heritage of The Hills,</p> <p>(b) to conserve the heritage significance of heritage items and heritage conservation</p> | <p>As set out in the table below, it is considered that the proposed subdivision would not diminish the significance of the subject site. A curtilage is proposed around the heritage item at 600A Old Northern Road so that subdivision of the land will not detract from or obscure views to the item and those in the vicinity (Figure 17).</p> |

| CLAUSE  | DISCUSSION   |
|---|--|
| <p>areas including associated fabric, settings and views,</p> <p>(c) to conserve archaeological sites,</p> <p>(d) to conserve Aboriginal objects and Aboriginal places of heritage significance.</p>  |  |
| <p><b>(2) Requirement for consent</b></p> <p>Development consent is required for any of the following:</p> <p>(a) demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):</p> <p>(i) a heritage item</p> <p>(ii) an Aboriginal object,</p> <p>(iii) a building, work, relic or tree within a heritage conservation area,</p> <p>(b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,</p> <p>(c) disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,</p> <p>(d) disturbing or excavating an Aboriginal place of heritage significance, (e) erecting a building on land:</p> <p>(i) on which a heritage item is located or that is within a heritage conservation area, or</p> <p>(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,</p> <p>(f) subdividing land:</p> <p>(i) on which a heritage item is located or that is within a heritage conservation area, or</p> <p>(ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.</p> | <p>The proposal concerns the subdivision of land that includes a heritage item and therefore requires approval from The Hills Council. As such, this HIS has been prepared to assess the heritage impact of the proposed subdivision on the subject site and the proximate heritage items.</p>   |
| <p><b>(4) Effect of proposed development on heritage significance</b></p> <p>The consent authority must, before granting consent under this clause in respect of a heritage item or heritage conservation area, consider the effect of the proposed development on the heritage significance of the item or area concerned. This subclause applies regardless of whether a heritage management document is prepared under subclause (5) or a heritage conservation management plan is submitted under subclause (6).</p>  | <p>No development is proposed at this time. It is generally considered that the proposed subdivision would be sympathetic to the significance of the heritage items.</p> <p>Urban zoning for the area would be in keeping with other development in the district. The site is located in an area of changing character, in particular the existing commercial development to the south.</p> <p>Subdivision and rezoning should aim to retain the same character and scale as that which is existing to the south at Round Corner and a curtilage separating the listed item from any new development would minimise impacts of future development.</p> |



| CLAUSE   | DISCUSSION  |
|--|---|
| <p><b>(5) Heritage assessment</b></p> <p>The consent authority may, before granting consent to any development:</p> <p>(a) on land on which a heritage item is located, or</p> <p>(b) on land that is within a heritage conservation area, or</p> <p>(c) on land that is within the vicinity of land referred to in paragraph (a) or (b), require a heritage management document to be prepared that assesses the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item or heritage conservation area concerned.</p>  | <p>This report has been prepared to fulfil this requirement.</p>  |
| <p><b>(6) Heritage conservation management plans</b></p> <p>The consent authority may require, after considering the heritage significance of a heritage item and the extent of change proposed to it, the submission of a heritage conservation management plan before granting consent under this clause.</p>  | <p>Not Applicable - the site does not require a Conservation Management Plan</p>  |
| <p><b>(7) Archaeological sites</b></p> <p>The consent authority must, before granting consent under this clause to the carrying out of development on an archaeological site (other than land listed on the State Heritage Register or to which an interim heritage order under the <i>Heritage Act 1977</i> applies):</p> <p>(a) notify the Heritage Council of its intention to grant consent, and</p> <p>(b) take into consideration any response received from the Heritage Council within 28 days after the notice is sent.</p>   | <p>Not Applicable - the site is not considered to be an archaeological site.</p> <p>As no physical works are currently proposed, there is no identified risk of harm to Old Northern Road, which is identified in part as an archaeological item under the Hills LEP 2012.</p> <p>There are therefore no identified archaeological constraints to the current proposal.</p> |
| <p><b>(8) Aboriginal places of heritage significance</b></p> <p>The consent authority must, before granting consent under this clause to the carrying out of development in an Aboriginal place of heritage significance:</p> <p>(a) consider the effect of the proposed development on the heritage significance of the place and any Aboriginal object known or reasonably likely to be located at the place by means of an adequate investigation and assessment (which may involve consideration of a heritage impact statement), and</p> <p>(b) notify the local Aboriginal communities, in writing or in such other manner as may be appropriate, about the application and take into consideration any response received within 28 days after the notice is sent.</p> | <p>Not Applicable - the site is not considered to be a place of Aboriginal significance.</p>  |
| <p><b>(9) Demolition of nominated State heritage items</b></p> <p>The consent authority must, before granting consent under this clause for the demolition of a nominated State heritage item:</p> <p>(a) notify the Heritage Council about the application, and</p>   | <p>Not Applicable - demolition is not proposed.</p>   |

| CLAUSE  | DISCUSSION     |
|---|----------------|
| (b) take into consideration any response received from the Heritage Council within 28 days after the notice is sent.  |                |
| <p><b>(10) Conservation incentives</b></p> <p>The consent authority may grant consent to development for any purpose of a building that is a heritage item or of the land on which such a building is erected, or for any purpose on an Aboriginal place of heritage significance, even though development for that purpose would otherwise not be allowed by this Plan, if the consent authority is satisfied that:</p> <p>(a) the conservation of the heritage item or Aboriginal place of heritage significance is facilitated by the granting of consent, and</p> <p>(b) the proposed development is in accordance with a heritage management document that has been approved by the consent authority, and</p> <p>(c) the consent to the proposed development would require that all necessary conservation work identified in the heritage management document is carried out, and</p> <p>(d) the proposed development would not adversely affect the heritage significance of the heritage item, including its setting, or the heritage significance of the Aboriginal place of heritage significance, and</p> <p>(e) the proposed development would not have any significant adverse effect on the amenity of the surrounding area.</p> | Not applicable |

## 5.2.2 THE HILLS DEVELOPMENT CONTROL PLAN 2012

The proposed works are addressed in the table below in relation to the relevant provisions in the DCP.

TABLE 4 – DEVELOPMENT CONTROL PLAN

| PROVISION  | DISCUSSION   |
|--|--|
| <p><b>3.2 Subdivision</b></p> <p><b>Objective</b></p> <p>To ensure that the subdivision of land on which a heritage building is located does not isolate the building from its setting or context, or adversely affect its amenity or privacy.</p> <p><b>Controls</b></p> <p>(a) Proposals for subdivision should define an appropriate setting or 'curtilage' for the heritage building as part of the heritage impact statement or conservation management plan.</p> <p>(b) In determining the curtilage of a heritage building consideration is to be given to the following:</p> <ul style="list-style-type: none"> <li>The type of structure and original form and function of the heritage building should be reflected in the curtilage.</li> </ul> | <p>A heritage curtilage should be imposed on the property at 600A old Northern Road that includes the current fence lines surrounding the house and rear yard. These fence lines are likely to date from the 1970s when the allotment was subdivided from 600 Old Northern Road. The house, however, maintains its relationship to the street and the surrounding allotments.</p> <p>The mature trees surrounding the house and within the</p> |

| PROVISION  | DISCUSSION  |
|--|---|
| <ul style="list-style-type: none"> <li>Gardens, Trees, Fencing, Gates and Archaeological Sites that are considered valuable in interpreting the history and setting of a building should be retained within the curtilage;</li> <li>The likely development expected to occur on the lots proposed to be created which will adjoin the heritage site shall have regard to setting, overshadowing and the views to and from the heritage site;</li> <li>It is desirable to retain where possible the original access arrangements to the site. The manner in which a heritage building is orientated in respect to public roads contributes to its significance.</li> <li>Council may impose restrictions upon lots adjoining a heritage item including height limitations, building setbacks, access arrangements, building orientation, and presentation to the streetscape;</li> <li>Visual Links such as street frontage, garden settings, important vegetation, outbuildings, stables, water features, or distant topographical features should be retained within the curtilage and should not be obscured by new work.</li> </ul> | <p>proposed curtilage or on the northern fence line should be maintained as a means of maintaining the setting of the heritage item.</p> <p>It is noted that the curtilage proposed in this figure does not reflect the current lot boundaries of the item; however, the current lot boundaries are considered generous, as the majority of the lot to the rear of the item does not contribute to the setting of the house, which is primarily derived from its street-front position. Rather, the existing item curtilage reflects only the legal lot boundaries, and does not necessarily reflect an appropriate curtilage for the item.</p> <p>Development to the rear of the house and outside of the curtilage shown in Figure 17 may be appropriate, provided that it is designed with regard to the scale and form of the heritage item. The curtilage identified in Figure 17 should be considered in the further stages of this proposal.</p> <p>Access to the property from Old Northern Road should be maintained although the existing garage is a late addition and obscures the view to side and rear of the building from the street.</p> <p>There are no outbuildings or archaeological sites that should be retained.</p> <p>Visual links to the site are unlikely to be impacted as the heritage items are located very close to the road.</p> |

### 5.3 HERITAGE OFFICE GUIDELINES

The proposed works are addressed in relation to relevant questions posed in the Heritage Office's 'Statement of Heritage Impact' guidelines

TABLE 5 – RELEVANT QUESTIONS

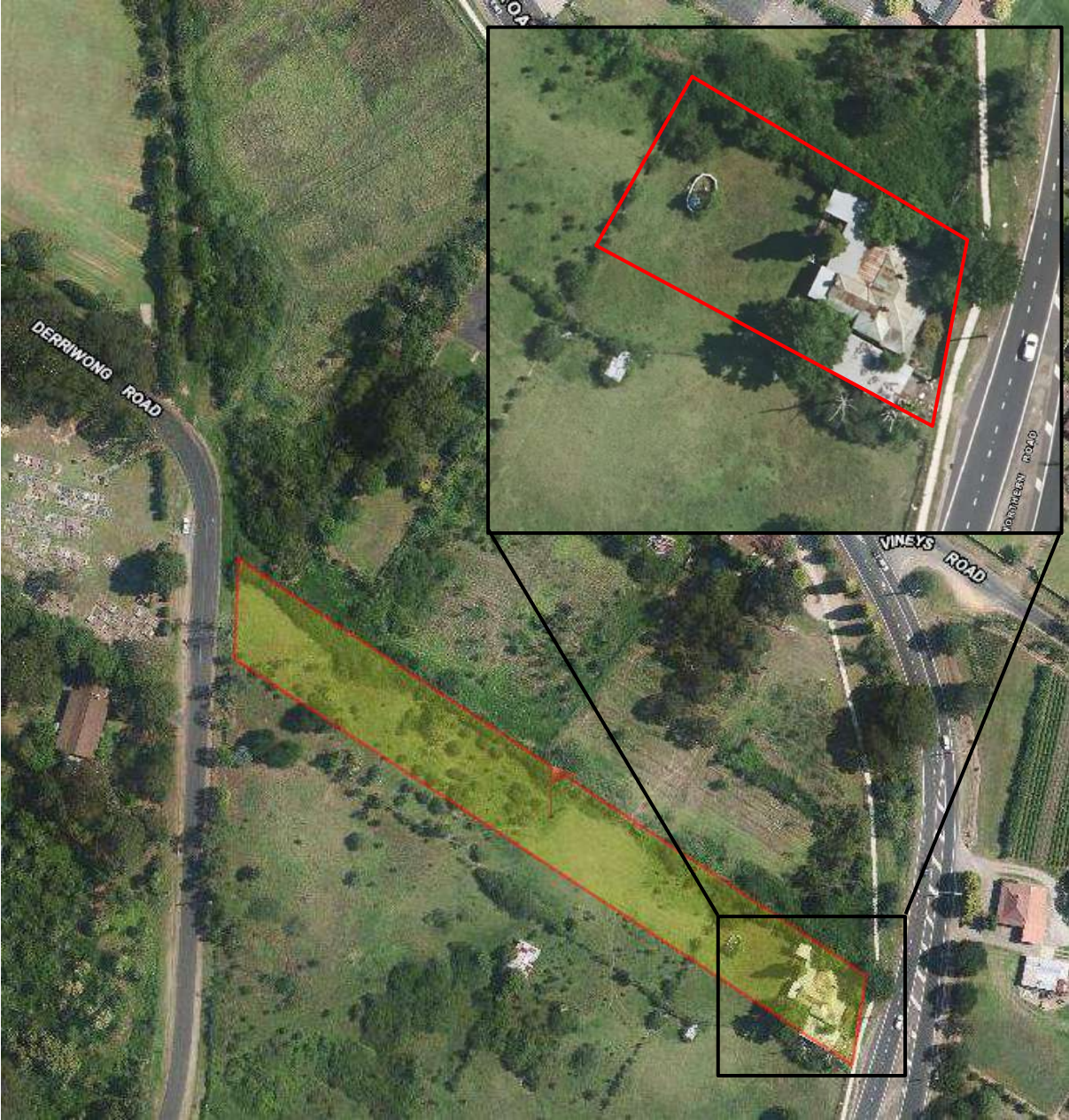
| QUESTION   | DISCUSSION   |
|--|--|
| <p>The following aspects of the proposal respect or enhance the heritage significance of the item or conservation area for the following reasons:</p>                                    | <p>Subdivision for low density residential purposes within the study area would be in keeping with the residential development already existing in the neighbourhood and the changing character of the semi- rural district.</p> |
| <p>The following aspects of the proposal could detrimentally impact on heritage significance.<br/>The reasons are explained as well as the measures to be taken to minimise impacts:</p> | <p>Residential development in the vicinity of the listed items may obscure the historic and rural character of the house and hall.</p>   |

| QUESTION   | DISCUSSION   |
|--|--|
|  | <p>A curtilage around the heritage listed house to separate it from future development would be appropriate. Subdivision and future development should not physically encroach on the curtilage of the heritage item that is shown in Figure 17.</p> <p>It is noted that the curtilage proposed in this figure does not reflect the current lot boundaries of the item; however, the current lot boundaries are considered generous, as the majority of the lot to the rear of the item does not contribute to the setting of the house, which is primarily derived from its street-front position. Rather, the existing item curtilage reflects only the legal lot boundaries, and does not necessarily reflect an appropriate curtilage for the item.</p> <p>Development to the rear of the house and outside of the curtilage shown in Figure 17 may be appropriate, provided that it is designed with regard to the scale and form of the heritage item. The curtilage identified in Figure 17 should be considered in the further stages of this proposal.</p> <p>The proposed subdivision should be designed with regard for the amenity and significance of the heritage item and neighbouring items.</p> |
| <p>The following sympathetic solutions have been considered and discounted for the following reasons:</p>  | <p>N/A</p>   |
| <p><b>Change of use</b></p> <p>Has the advice of a heritage consultant or structural engineer been sought?</p> <p>Has the consultant's advice been implemented? If not, why not?</p> <p>Does the existing use contribute to the significance of the heritage item?</p> <p>Why does the use need to be changed?</p> <p>What changes to the fabric are required as a result of the change of use?</p> <p>What changes to the site are required as a result of the change of use?</p> | <p>The subject site and surrounding land will be rezoned from rural to low density residential. This is considered appropriate as there is similar development in the area.</p>  |
| <p><b>New development adjacent to a heritage item</b></p> <p>How does the new development affect views to, and from, the heritage item?</p> <p>What has been done to minimise negative effects?</p> <p>How is the impact of the new development on the heritage significance of the item or area to be minimised?</p> <p>Why is the new development required to be adjacent to a heritage item?</p> <p>How does the curtilage allowed around the heritage item</p>                 | <p>Plans for future development of the site are unknown. A curtilage is proposed around the heritage listed house that contributes to the retention of its heritage significance. The existing front fence and garage currently presents a visual barrier to the front and side of the building.</p> <p>It is noted that the curtilage proposed in this figure does not reflect the current lot boundaries of the item;</p>  |

| QUESTION   | DISCUSSION  |
|--|---|
| <p>contribute to the retention of its heritage significance?</p> <p>Is the development sited on any known, or potentially significant archaeological deposits?</p> <p>If so, have alternative sites been considered? Why were they rejected?</p> <p>Is the new development sympathetic to the heritage item?</p> <p>In what way (e.g. form, siting, proportions, design)?</p> <p>Will the additions visually dominate the heritage item?</p> <p>How has this been minimised?</p> <p>Will the public, and users of the item, still be able to view and appreciate its significance?</p> | <p>however, the current lot boundaries are considered generous, as the majority of the lot to the rear of the item does not contribute to the setting of the house, which is primarily derived from its street-front position. Rather, the existing item curtilage reflects only the legal lot boundaries, and does not necessarily reflect an appropriate curtilage for the item.</p> <p>Development to the rear of the house and outside of the curtilage shown in Figure 17 may be appropriate, provided that it is designed with regard to the scale and form of the heritage item. The curtilage identified in Figure 17 should be considered in the further stages of this proposal.</p> <p>No subdivision is proposed on the Dural Memorial Hall site and therefore the item will not be impacted.</p> |
| <p><b>Subdivision</b></p> <p>How is the proposed curtilage allowed around the heritage item appropriate?</p> <p>Could future development that results from this subdivision compromise the significance of the heritage item? How has this been minimised?</p> <p>Could future development that results from this subdivision affect views to, and from, the heritage item?</p> <p>How are negative impacts to be minimised?</p>   | <p>Low density residential subdivision is already present in the area and is considered appropriate for the site. A curtilage surrounding the listed house conforming to the previous property boundaries would separate the new development from physical or visual impact on the heritage item. The existing front fence and garage of the house currently presents a visual barrier to the front and side of the building.</p>   |
| <p><b>Tree removal or replacement</b></p> <p>Does the tree contribute to the heritage significance of the item or landscape?</p> <p>Why is the tree being removed?</p> <p>Has the advice of a tree surgeon or horticultural specialist been obtained?</p> <p>Is the tree being replaced? Why? With the same or a different species?</p>  | <p>Several large mature trees are present close to the house and should be retained as they contribute to the Character of the house and the Old Northern Road. Several mature pine trees are located on the opposite side of the Old Northern Road. Trees on the northern boundary of the listed site separate the house from the adjoining property.</p>  |



FIGURE 17 – SUGGESTED HERITAGE CURTILAGE AROUND THE HERITAGE ITEM AT 600A OLD NORTHERN ROAD (IN INSET) SHOWN IN COMPARISON TO THE EXISTING LISTING CURTILAGE



SOURCE: GOOGLE MAPS 2015

## 6 Conclusion and Recommendations

Urbis was engaged to prepare this HIS for proposed subdivision of the subject site, located between Derriwong Road and old Northern Road, Dural. The subject site incorporates, or is in the vicinity of a number of locally listed heritage items on The Hills Local Environmental Plan 2012. These include a 'House' located at 600A Old Northern Road (Item No. I85) and the Dural Soldiers Memorial Hall located at 604 Old Northern Road (Item No. I86). In addition, the site is located in the immediate vicinity of the Uniting Church Cemetery on Derriwong Road (Item No. I81).

600A Old Northern Road is a beaded weatherboard cottage on brick footings with corrugated iron hipped roof that flows to a verandah. Stylistically the house appears to have been constructed between 1880 and 1900 and was associated with orcharding which was characteristic of the area. The study area was originally part of a land grant acquired by William Tuckwell prior to 1840. The current listed property was subdivided from 600 Old northern Road around 1979.

The subject proposal has been assessed in relation to the relevant controls and provisions contained within The Hills LEP 2012 and The Hills DCP 2012. Based on the results of this assessment, it has been determined that overall, the proposed low density residential subdivision is unlikely to impact on the heritage significance of any of the listed items on site or within the vicinity. Both the house and hall are located very close to the road and the visual prominence of the buildings within the streetscape will be maintained, and existing views to and from the principal (front) elevations of the items will not be obscured or adversely impacted. As no physical works are currently proposed, there is no identified risk of harm to Old Northern Road, which is identified in part as an archaeological item under the Hills LEP 2012.

- It is recommended that a heritage curtilage be formed for the house to protect the impacts of potential future development. This is identified in Figure 17.
- The house should be retained and restored as part of the proposed works so that the principal house form is wholly retained. This would ultimately conserve and enhance the heritage significance of the item, which is currently uninhabited.
- If developed, it is recommended that lower-scale residences (one to two storey) in the vicinity of the heritage items would be in keeping with other development in the area and would not impact on views and the heritage significance of the item. Development in the vicinity of the items must respond appropriate to their form and scale.

An appropriate, revised curtilage around the heritage item is shown in Figure 17, above. This curtilage is considered appropriate to maintain and conserve the significance of the item as well as to ensure that potential future development does not encroach on or negatively impact its setting.

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*[Note: Some government departments have changed their names over time and the above publications state the name at the time of publication.]*

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This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

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11 October 2016

Dear Sir,

## **Old Northern Road, Dural Subdivision Engineering Advice Note – Services Connections Feasibility**

This letter provides Arup's engineering advice in reference to the options for service utility connections to the proposed subdivision at Old Northern Road, Dural.

Arup's advice is limited to reviewing the existing local utility infrastructure and the feasibility of providing connections to service the proposed development as proposed by Urbis (refer to attached plans). This preliminary investigation will be developed in coordination with the relevant services utility providers during the subsequent stages of design development.

## **1 Existing Utility Services Connections**

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The following sections detail Arup's commentary on each utility service:

### **1.1 Water**

There are four water mains beneath the verges of the Old Northern Road, arranged such that there is a trunk main and a service main on each side. On the western/southern verge closest to the site there is a 500mm trunk main and a 200mm service main. There is an additional smaller 150mm diameter water main below Derriwong Road. This arrangement is illustrated on Sydney Water record drawings provided in the appendix and also on the excerpt.

Advice provided by Sydney Water in their feasibility letter reference 154616 (as provided in the Appendix) indicates there is sufficient capacity with the existing network to service the proposed development. Sydney Water have advised a preference for both development sites to be connected to the existing 200mm service main. The size of the mains off take will be subject to the forecast demands of the development and in particular the public/private open space which may require special approvals due to larger off takes.



The water network reticulation serving the proposed development is likely to consist of two connections for each site (north and south) off the existing 200mm cast iron cement lined water main situated alongside Old Northern Road. A new water main would be reticulated within each site to form a loop from the two connection points in order to offer redundancy in supply and options for isolation during maintenance. Creating mains loops is also important for providing good quality water.

In summary, there is sufficient capacity within the local water mains network and flexibility in where to provide the connection points and loop reticulation. To develop the design further, it is common to discuss these matters with Sydney Water through a Sydney Water Servicing Coordinator (WSC) once a Development Application (DA) has been secured.

## 1.2 Sewerage

There are several nearby gravity sewerage assets owned by Sydney Water, the closest of which services the subdivision to the south. There is a 225mm sewer running parallel to the creek within privately owned land and another smaller diameter sewer running along Pellit Lane. This is illustrated in Figure 2.

In addition there is a 180mm HDPEP (High Density Polyethylene) effluent pressure main located below Old Northern Road alternating between the eastern and western verges. This is illustrated in Figure 1.



Figure 1. Extract from DBYD records illustrating the water mains (shown in blue) and the newly constructed rising main (shown in orange) with reference to the northern site boundary (shown in red)

This effluent pressure main conveys wastewater from the north to south along Old Northern Road. It discharges sewage from two pumping stations located to the north of the development, one in Glenorie and the other in Galston.

The pressure main was recently constructed, and is currently undergoing assessment for potential capacity upgrades. Results of this assessment will be released in Q4 2016. Feasibility of connections to this pressure main will largely depend on the results of the assessment and consultation with Sydney Water.

Whilst a connection to the pressure main is feasible, Arup does not consider this a preferred option as this approach would require a pumping station to be built to lift sewage from the lowest point on each site up to the higher elevation of Old Northern Road. Additional telemetry equipment to time the release of the site discharge into the Sydney Water pressure main would also be required. Whilst technically feasible, this solution is likely to add capital cost and complicate the approval process with Sydney Water.

A preferred approach would involve the installation of pressure main to connect the northern site and a gravity main to connect the southern site to the existing sewer south of O'Hara's creek. This would necessitate the construction of one less pumping station than the approach above and would offer flexibility in the alignment of the rising main from the northern site.

As a further development of this approach it may also be possible to install a new gravity connections from both developments which would connect to the existing 225mm sewer main situated to the South of the Creek. There are several options for the alignment of these new gravity sewers which can be considered further in the subsequent stages of design development in consultation with Sydney Water. A preliminary option for the alignment is shown in Figure 2:

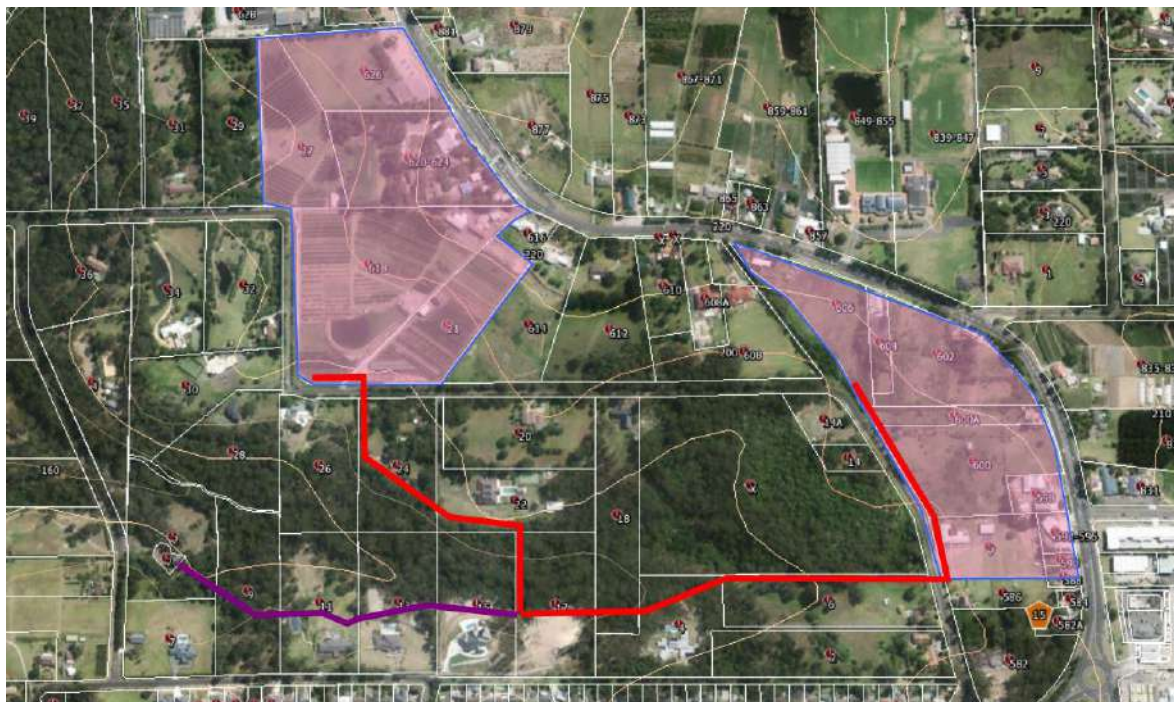


Figure 2. Arup proposal for future gravity sewer alignments (shown in red) to discharge the sewage from the two development sites (outlined in pink) into the existing gravity sewer (shown in purple)



The gravity lead-in sewer connection for the northern site is likely to be the more complex of the two branches due to the requirement to cross O'Hara's Creek and the topographic constraints this will impose on the pipe invert levels. Arup have made a preliminary assessment of the feasibility of this connection using invert levels provided by Sydney Water and topographic information available on Google Earth. These are presented below:

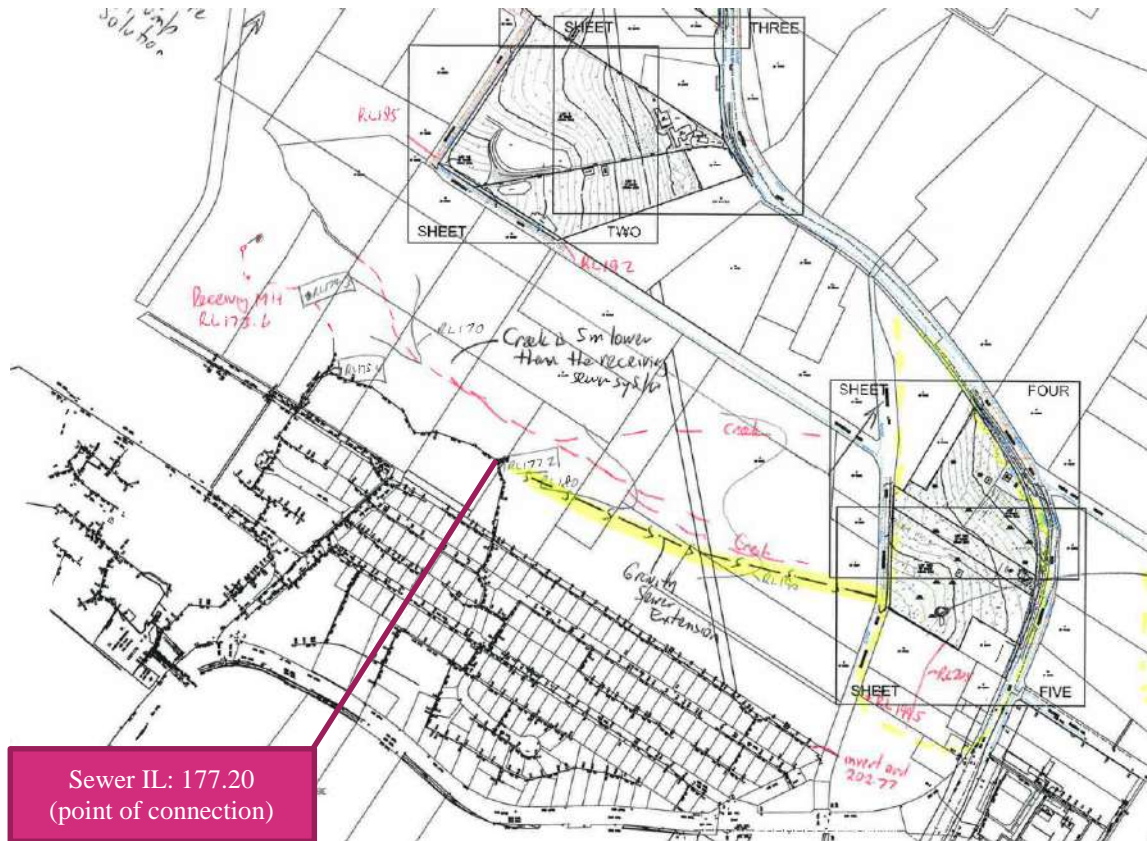


Figure 3. Extract of sketch information received from Sydney Water showing the existing sewer invert levels.

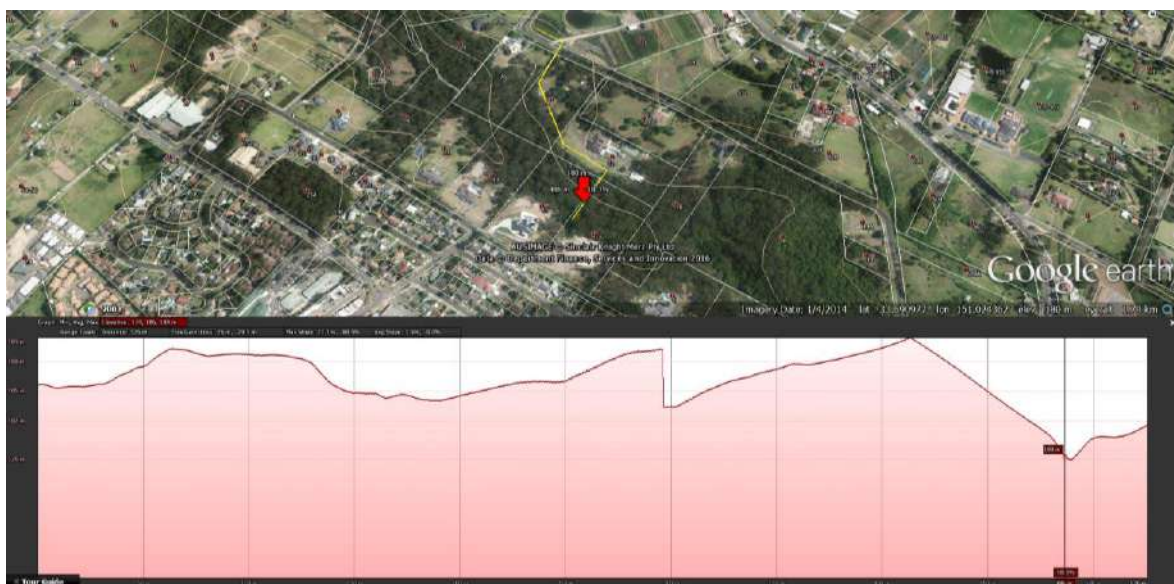


Figure 4. Cross sectional information for the proposed sewer alignment for the northern site taken from Google Earth. It should be noted this information is indicative only and must be verified with detailed topographic survey.

Figure 3 shows the existing sewer invert level at the point of connection is 177.20m and Figure 4 indicates that the invert level of the creek is approximately RL: 180m indicating



that it may be possible to make a gravity connection below the creek. However, it is noted that detailed topographic survey information will be required at the lowest point of the creek to verify this approach.

Whichever approach is adopted, sewage from the two development sites will be directed to an existing Sydney Water sewage pumping station that conveys water to the South via an existing pressure main. The capacity of this sewage pumping station will be reviewed with Sydney Water once the total catchment flows are understood in subsequent stages of the planning process. However, Arup considers that as a function of new Sydney Water specification requirements for sewerage design, the proposed development lots will be serviced by modern, low groundwater infiltration sewer systems. This will ultimately reduce the quantity of water discharged to the sewage pumping station than when it was previously designed. This will open up some residual capacity and provides the opportunity for the proposed development to be connected to the existing pumping station.

In summary, Arup considers the gravity lead-in sewers are preferred over that of the pumping station and pressure main approach, predominantly to simplify installation. Consultation with Sydney Water to clarify the lead-in details are ongoing and will inform the design development.

### 1.3 Power

Arup is working closely with Endeavour Energy Accredited Service Provider Level 3 (ASP3) designer Poles and Underground (P&U) on this project to review the contestable connections. The P&U notes several key observations in relation to the proposed development.

The development sites have an adequate provision of local high voltage (HV) power infrastructure and will need to make provision for padmount substations to supply the sites with low voltage (LV) electricity as suggested below:

| Site     | Estimated Electrical Demand | No. of Padmount Substations | Size of Padmount Easement |
|----------|-----------------------------|-----------------------------|---------------------------|
| Northern | 743 kVA                     | 2 no. 500 kVA               | 2750mm x 5500mm           |
| Southern | 600 kVA                     | 2 no. 500 kVA               | 2750mm x 5500mm           |

The subdivision layouts have adequate space to accommodate the inclusion of these substations which require spatial provisions as described in detail in the P&U reports. The location of substations will be further refined at the subdivision DA stage.

The P&U report also provides advice about the 66kV overhead transmission which runs through the northern site for approximately 800m. It offers 3 options for how to manage/relocate this overhead network which can be summarised as follows:

1. The first option is to avoid relocation by aligning a proposed development road alignment with the existing transmission. This will make the road corridor wider as the electrical assets would be centred on a new nature strip (approximately 5-10m wide) which will enhance maintenance access. The overall electrical easement required would be 18-25m and practically the 20m road corridor width provided is likely to be adequate subject to consultation with Endeavour Energy. An additional 4.5m-5.0m setback to the properties either side of the road would be required for cable “blow out” which is swinging of the cables driven by strong winds.

2. The alternative option is to relocate the overhead transmission to match the proposed road alignment. The same approach above in relation to easements widths, setbacks and enhanced access would be required.
3. The third option is to underground the cable which would require a 9.5m cable easement (5m for the cable plus 4.5m right of access).

In summary there is adequate local provision of HV electrical infrastructure to service the proposed development. Likewise there are options for managing the existing transmission infrastructure which can be considered in the subsequent stages of the planning process.

## 1.4 Gas

A 160mm Jemena gas main is situated below Old Northern Road adjacent to the development sites. In addition, Arup has also identified the following gas utilities:

- 50mm Nylon Main connection crossing the Old Northern Road adjacent to Dural Public School
- 110mm Nylon Main along the western verge of Old Northern Road, which appears to transition from the 160mm PE pipe

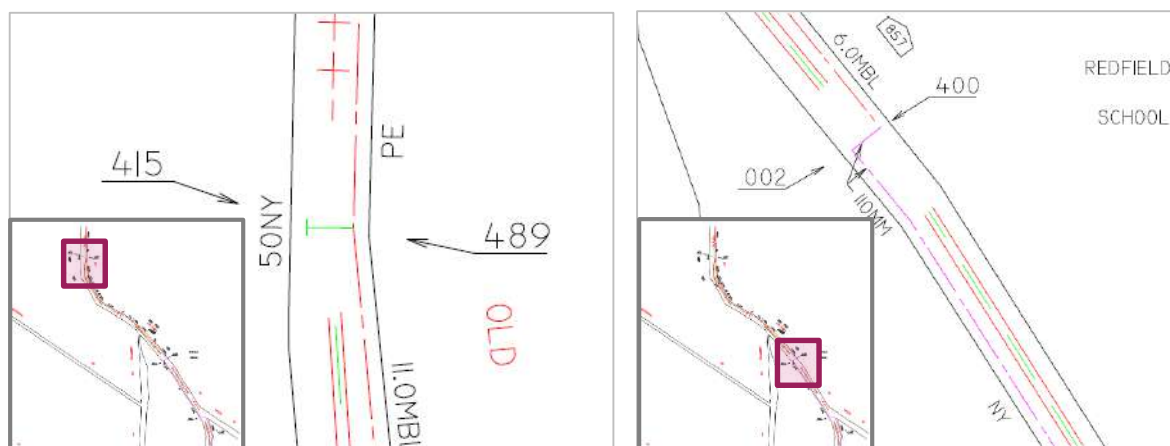


Figure 5. Extract from DBYD records illustrating the presence of a 50mm Nylon main (left: as green 'T') and 110mm Nylon gas main (right: in pink) both located alongside the western verge of Old Northern Road

Arup understands some preliminary consultation has been undertaken with Jemena and it is considered likely that there is capacity within the existing network to service the proposed developments.

As with the water supply, a connection to the gas network would be best created in a loop configuration requiring two connections per site from one of the Old Northern Road mains. This would provide redundancy in supply and options for isolation during maintenance.

In summary there is capacity in the network to supply the proposed subdivision with gas.

## 1.5 Communications

‘Dial Before you Dig’ indicate Telstra conduits and cables are located below Old Northern Road, Derriwong Road and overhead cables in Derriwong Lane immediately South of Dural Public School. Additionally Arup has identified the presence of Optus fibre optic telecommunications located along the eastern verge of Old Northern Road as shown below:

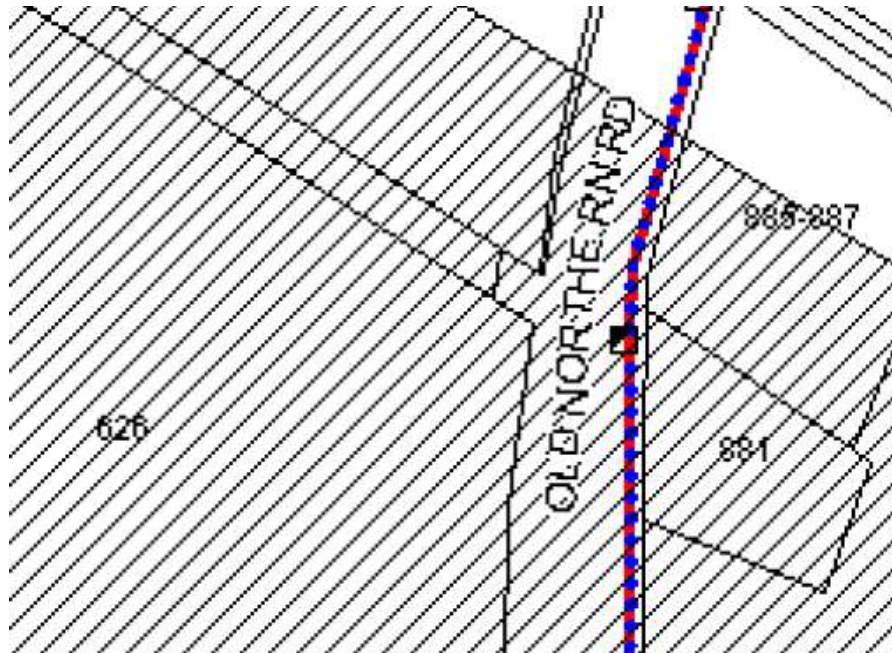


Figure 6. Extract from DBYD plans indicating the presence of Optus assets adjacent to development site

Arup have also identified the potential presence of a Telstra cable at the southern end of the South site as shown on Figure 7:

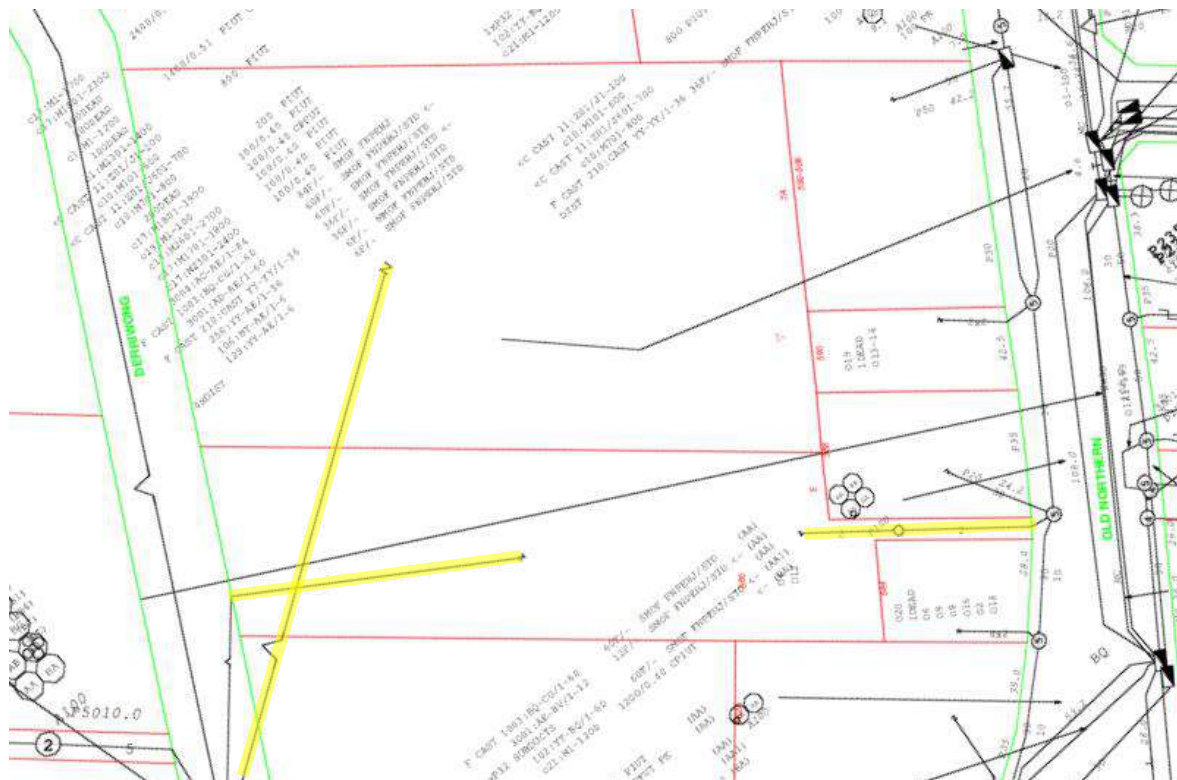


Figure 7. Existing Telstra cables located at the southern end of the South site (highlighted in yellow)

These existing telecommunications assets will either be avoided or are able to be diverted. The overhead cable along Derriwong Lane will likely need to be diverted underground or alternatively diverted elsewhere through the development subject to consultation with Telstra.

It is noted that there are good opportunities to provide connections to any and all of these existing communications networks (including the fibre optic network) to service the proposed development. Such infrastructure connections should help to increase the value of the private lots.

## 1.6 Stormwater

There is currently no formal in-ground pit and pipe drainage provision currently available on either site and that existing runoff flows overland towards O'Hara's Creek. Owing to increased impermeability and site regrading, the proposed development is likely to require new purpose built pit and pipe infrastructure to collect and drain surface water runoff to the creek. Additionally, the design of this site infrastructure will be subject to the Hills Shire Council DCP in relation to off-site discharge rates and water quality.

These requirements necessitate the provision of on-site detention (OSD) to temporarily store and attenuate the rate of surface water discharge from the site. The development proposals must take account of the ground slope, especially as flat (terraced) areas will require additional storage within OSD systems.

A more accurate slope can be measured when design is further advanced. It is noted that these storage volumes are commonly provided using one of two methods for sub-divisions:

1. Provide site wide OSD, normally in the form of a basin to detain water in one (or more) location/s. Typically this is provided in parks and can form an aesthetic addition to the landscaping.
2. Provide lot-by-lot OSD storage, normally in the form of an underground tank to detain water at source (i.e. within the lot) before release into the site network. This will necessitate a tank within each lot which can add cost but is more efficient from a precinct planning perspective and can be combined with rainwater harvesting (see Section 0).

It is also possible to combine the two approaches for each site e.g. provide option 2 for each lot and option 1 for the road corridor catchments.

Arup note that the sub-division layouts have adequate space to accommodate the inclusion of these site-wide OSD features and can offer several different configurations. Further calculations of the requirements for and provision of OSD systems will be considered in the subsequent stages of design development.

## 1.7 Water Quality

To achieve Council’s requirements for water quality, Arup supports an integrated approach to Water Sensitive Urban Design (WSUD). Such measures can be integrated with OSD features and the drainage of landscape areas. In addition, it is also recommended that multiple methods of WSUD be implemented to create a “treatment train” of measures to remove possible water contaminants.

As with OSD, this can be provided on a site-wide basis or at source within each lot. Similarly, there are synergies that can be exploited with each option e.g. if lot-by-lot OSD is selected in the form of tanks in each development lot, this can be complemented with rainwater harvesting tanks which can store water for reuse (e.g. for irrigation) to reduce water demand. These integrated tanks offer multiple benefits in addressing water quality and quantity requirements in an efficient footprint and can also help reduce the overall requirement for OSD subject to consultation with Council.

In summary there are technically feasible approaches available for the treatment of surface water prior to discharge from site.

## 2 Summary

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Arup considers from our assessment of current information available that the land can be readily serviced for future redevelopment following the rezoning process. For all services there is both an existing network nearby and sufficient capacity thereby enabling new connections.

There are existing services within the site curtilage that will need to be diverted or managed as part of future redevelopment. It is considered technically feasible to undertake these modifications.

Yours sincerely,



Duncan Crook  
Senior Civil Engineer







## Appendix

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- Urbis Preliminary Subdivision Development Plans
- Sydney Water Feasibility Advice
- “Dial Before You Dig” record information








**LEGEND**

|  |   |
|--|---|
|  | Subject site  |
|  | Typical Resi Lot A $700m^2$ (92)                                |
|  | Atypical Resi Lot $1000m^2$ (4)                                 |
|  | SP2 - Classified road (identified in <i>The Hills LEP2012</i> ) |





**LEGEND**

|  |   |
|--|---|
|  | Subject site  |
|  | Typical Resi Lot A 700m <sup>2</sup> (68)               |
|  | Atypical Resi Lot 1000m <sup>2</sup> (12)               |
|  | SP2 - Classified road (identified in The Hills LEP2012) |
|  | Open space  |





1 July 2016

Urbis Pty Ltd  
c/- MGP BUILDING & INFRASTRUCTURE SERVICE PL

### FEASIBILITY LETTER

**Developer:** Urbis Pty Ltd  
**Your reference:** SY07366  
**Development:** Old Northern Road and Derriwong Road, Dural  
(Lots 11 & 12 DP 866560, Lot 2 DP 567995, Lot 1 DP 73652, Lot 1 DP 656035, Lot 1 DP 656036, Lot 1 DP 564716, Lot 1 DP 656034, Lots 100 & 101 DP 713628, Lot 11 DP 825077, Lot 2 DP 565718, Lot D DP 38097, Lot X DP 501233 and Lot Y DP 39261)  
**Development Description:** A seniors living area is proposed comprising a day surgery/ medical centre of 3,000m<sup>2</sup> GFA, a seniors independent living village of 56 units and a residential aged care facility of approx. 150 beds. The development will also comprise a total of 170 residential lots in the remainder of the areas highlighted averaging 700m<sup>2</sup> in area.  
**Your application date:** 10 June 2016

Dear Applicant

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

If you obtain development consent for that development 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 (Coordinator).

Sydney Water will then send you either a:

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

These documents will be the definitive statement of Sydney Water's requirements.

There may be changes in Sydney Water's 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; and
- if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.



## 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 [www.sydneywater.com.au](http://www.sydneywater.com.au) > Plumbing, building & developing > Developing > Land development.

1. **Obtain Development Consent from the consent authority for your development proposal.**
2. **Engage a Water Servicing Coordinator (Coordinator).**

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

For a list of authorised Coordinators, either visit [www.sydneywater.com.au](http://www.sydneywater.com.au) > Plumbing, building & developing > Developing > Providers > Lists or call **13 20 92**.

The Coordinator will be your point of contact with Sydney Water. 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 Sydney Water costs).

3. **Developer Works Deed**

**After** the Coordinator has submitted your new application, they will receive the Sydney Water Notice and Developer Works Deed. You and your accredited Developer Infrastructure Providers (Providers) will need to sign and lodge both copies of the Deed with your nominated Coordinator. After Sydney Water has signed the documents, one copy will be returned to the Coordinator.

The Deed sets out for this project:

- your responsibilities;
- Sydney Water's responsibilities; and
- the Provider's responsibilities.

**You must do all the things that we ask you to do in that Deed.** This is because your development does not have water and sewer services and you must construct and pay for the following works extensions under this Deed to provide these services.

**Note:** The Coordinator must be fully authorised by us for the whole time of the agreement.

4. **Water and Sewer Works**

- 4.1 **Water**

Your development must have a frontage to a water main that is the right size and can be used for connection. The following information is provided to assist in planning the servicing

needs of the development, based on the information supplied:

- Strategic investigation shows that the trunk water has adequate capacity to service this development area.
- The preferred connection for each portion of the development is the DN 200 mm in Old Northern Road.
- This advice is not a formal approval of our servicing requirements. Formal requirements for servicing the developments will be determined as part of the Section 73 application phase. More information about the Section 73 application process is available on our web page in the [Land Development Manual](#).

#### 4.2 Sewer

Your development 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 your development's boundaries.

Sydney Water has assessed your application and found that:

- The development site currently is not serviced by a Sydney Water wastewater system. The nearest wastewater reticulation main is located in Pellit Lane. It is recommended that the flow is transferred by gravity to the existing sewer main in Pellit Lane.

There are two following options:

1. Build a new sewer main along the Pellit Lane and connect it to the 225mm main construed under WO 48473.
  2. Connect to the existing reticulation sewer main across the Derriwong Rd at the southern end of the development site. If this option is utilized, upsizing of the system may be required. Sizing of the mains must be in accordance with the Sewerage Code of Australia.
- The consultant will need to assess the options and come up with a suitable servicing strategy that meets all of Sydney Water requirements and submit it to Sydney Water for its review, at or prior to Section 73 application.
  - This advice is not a formal approval of our servicing requirements. Formal requirements for servicing the developments will be determined as part of the Section 73 application phase. More information about the Section 73 application process is available on our web page in the [Land Development Manual](#).
  - **You must construct a waste water main extension to serve your development.** The terms of the Deed define this extension as 'Major Works'.

- You must use Sydney Water's new **Technical Specifications for Leak Tight Sewer Systems** to plan, design and construct the sewer. This specification must be used in conjunction with (and have precedence over) the Sewerage Code of Australia, WSA02-2002 (Sydney Water Edition).

### Funding of works

Under Sydney Water's 'Funding of infrastructure to service growth' policy we may agree to contribute towards a portion of the cost of the works you are required to build. This is done either by Sydney Waters Schedule of Rates or via the Procurement process. Your Water Service Coordinator can advise you in relation to this policy, the likelihood of Sydney Water sharing a portion of the cost and the process you need to satisfy Sydney Water's probity requirements.

If you do choose to request a quote through the Schedule of Rates for Sydney Water's contribution you will avoid going through the full procurement process. Your WSC can advise you of this option.

The funding assessment will be made at the detailed design stage, prior to any construction works commencing. A firm commitment would not be made by Sydney Water until we:

- Have reviewed the detailed design and;
- Have reviewed the detailed construction quotations needed to meet our probity requirements and;
- Come to an agreement on the amount.

## 5. Ancillary Matters

### 5.1 Asset adjustments

After Sydney Water issues this Notice (and more detailed designs are available), Sydney Water may require that the water main/sewer main/stormwater located in the footway/your property needs to be adjusted/deviated. If this happens, you will 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**. Sydney Water will need to see the completed designs for the work and we will 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 Sydney Water's **Permission to Enter** form(s) for this. You can get copies of these forms from your Coordinator or the Sydney Water website. Your Coordinator 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.

### 5.3 Costs

Construction of these **future** works will require you to pay project management, survey, design and construction costs **directly to your suppliers**. Additional costs payable to Sydney Water may include:

- water main shutdown and disinfection;
- connection of new water mains to Sydney Water system(s);
- design and construction audit fees;
- contract administration, Operations Area Charge & Customer Redress prior to project finalisation;
- creation or alteration of easements etc; and
- water usage charges where water has been supplied for building activity purposes prior to disinfection of a newly constructed water main.

Note: Payment for any Goods and Services (including Customer Redress) provided by Sydney Water will be required prior to the issue of the Section 73 Certificate or release of the Bank Guarantee or Cash Bond.

Your Coordinator can tell you about these costs.

### **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 of Sydney Water 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 your building plans must be approved. This can be done at Sydney Water Tap in<sup>TM</sup>. Visit [www.sydneywater.com.au](http://www.sydneywater.com.au) > Plumbing, building & developing > Building > Sydney Water Tap in<sup>TM</sup> or call 13 20 92.

This is not a requirement of the Certificate but the approval is needed because construction/building works may impact on existing Sydney Water assets (e.g. water and sewer mains). In any case, these works **MUST NOT** commence until Sydney Water has granted approval.

Your Coordinator can tell you about the approval process including:

- Possible requirements;
- Costs; and
- Timeframes.

**Note: You must obtain our written approval before you do any work on Sydney Water's systems. Sydney Water will 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*.**

#### **Disused Sewerage Service Sealing**

Please do not forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to a Sydney Water sewer main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

### **Soffit Requirements**

Please be aware that floor levels must be able to meet Sydney Water's soffit requirements for property connection and drainage.

### **Requirements for Business Customers for Commercial and Industrial Property Developments**

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

#### **Trade Wastewater Requirements**

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

The permit application should be emailed to Sydney Water's Business Customer Services at [businesscustomers@sydneywater.com.au](mailto:businesscustomers@sydneywater.com.au)

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

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

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

#### **Backflow Prevention Requirements**

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

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

Separate hydrant and sprinkler fire services on non-residential properties, require the installation



of a testable double check detector assembly. The device is to be located at the boundary of the property.

Before you install a backflow prevention device:

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

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

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

### **Water Efficiency Recommendations**

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

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

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

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

### **Contingency Plan Recommendations**

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

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

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

Have you thought about a **contingency plan** for your business? Your Business Customer Representative will help you to develop a plan that is tailored to your business and minimises

productivity losses in the event of a water service disruption.

For further information please visit the Sydney Water website at: <http://www.sydneywater.com.au/OurSystemsandOperations/TradeWaste/> or contact Business Customer Services on **1300 985 227** or [businesscustomers@sydneywater.com.au](mailto:businesscustomers@sydneywater.com.au)

## **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 development and the ability of Sydney Water's system to provide that flow in an emergency. Sydney Water's Operating Licence directs that Sydney Water's mains are only required to provide domestic supply at a minimum pressure of 15 m head.

A report supplying modelled pressures called the Statement of Available pressure can be purchased through Sydney Water Tap in<sup>TM</sup> and may be of some assistance when defining the fire fighting system. The Statement of Available pressure, may advise flow limits that relate to system capacity or diameter of the main and pressure limits according to pressure management initiatives. If mains are required for fire fighting purposes, the mains shall be arranged through the water main extension process and not the Section 73 process.

## **Large Water Service Connection**

A water main will be available, once you have completed your drinking water main construction to provide your development with a domestic supply. The size of your development means that you will need a connection larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application with Sydney Water Tap in<sup>TM</sup>. You, or your hydraulic consultant, may need to supply the following:

- A plan of the hydraulic layout;
- A list of all the fixtures/fittings within the property;
- A copy of the fireflow pressure inquiry issued by Sydney Water;
- A pump application form (if a pump is required);
- All pump details (if a pump is required).

You will have to pay an application fee.

Sydney Water does not consider whether a water main 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.

## **Disused Water Service Sealing**

You must pay to disconnect all disused private water services and seal them at the point of connection to a Sydney Water water main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed

plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

**Other fees and requirements**

The requirements in this Notice relate to your Certificate application only. Sydney Water 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;
- trade waste requirements;
- large water connections and
  - council fire fighting requirements. (It will help you to know what the fire fighting requirements are for your development 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 Sydney Water and to the extent that it is able, Sydney Water limits 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**



**NOTE:**  
 THESE PLANS SHOULD BE READ IN CONJUNCTION WITH DIGITAL DATA ISSUED TO CLIENT. THE DIGITAL DATA CONTAINS NUMEROUS LAYERS OF INFORMATION WHICH ARE NOT SHOWN ON THESE PLANS FOR THE SAKE OF CLARITY.

*This area will require a pump solution*



CLIENT  
**URBIS**

PROJECT  
**DETAIL SURVEY OF LOT 1 IN DP 656036, LOT 100 & LOT 101 IN DP 713628 OLD NORTHERN ROAD DUAL**

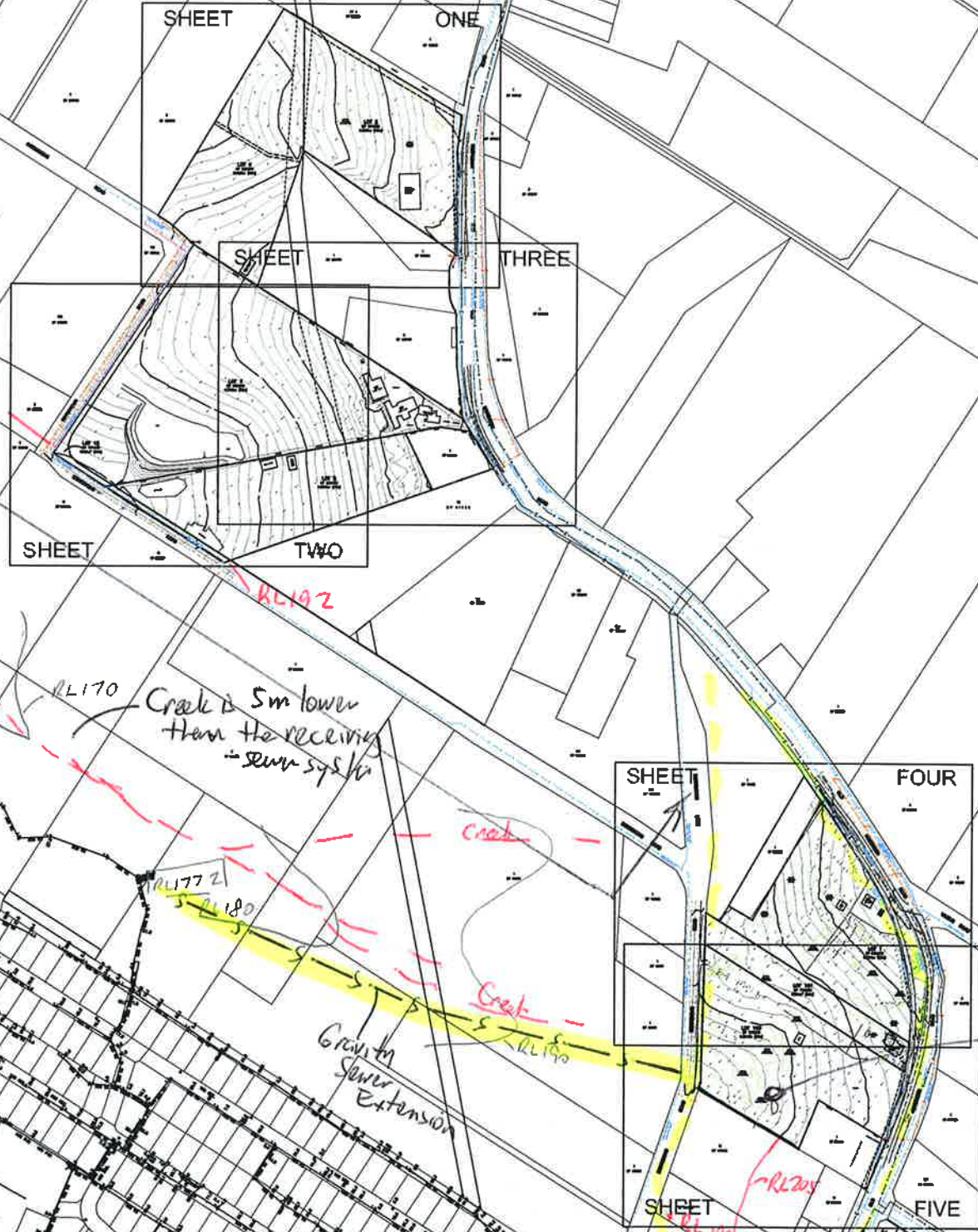
**NOTES**  
 The site boundaries shown herein were not marked at the time of survey and have been determined by plan dimensions only and not by field survey.  
 Services shown herein have been located where possible by field survey. If not able to be so located, services have been plotted from the records of relevant authorities where available and have been noted accordingly on the plan. Where such records do not exist or are inadequate a notation has been made thereon.  
 Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

| PPP/CF | LPL | DD/MM/YY | COMMENT |
|--------|-----|----------|---------|
|        |     |          |         |
|        |     |          |         |
|        |     |          |         |

**NOTES**

- BOUNDARY DIMENSIONS AND AREAS HAVE BEEN COMPILED FROM PLANS MADE AVAILABLE AT LPI, NSW AND ARE SUBJECT TO FINAL SURVEY.
- CONTOURS IF SHOWN ARE AN INDICATION OF THE TOPOGRAPHY AND SHOULD ONLY BE USED FOR PLANNING PURPOSES. IF DETAILED DESIGN IS TO BE UNDERTAKEN, SPOT LEVELS SHOULD BE USED.
- DO NOT SCALE OFF THIS PLAN - RELATIONSHIP OF IMPROVEMENTS AND DETAIL TO BOUNDARIES IS DIAGRAMMATIC AND IF CRITICAL SHOULD BE CONFIRMED BY A BOUNDARY SURVEY.
- NO SERVICES SEARCH HAS BEEN UNDERTAKEN. SERVICES SHOWN ARE BASED ON SURFACE INDICATORS EVIDENT AT THE DATE OF SURVEY DURING FIELD SURVEY & CHARTED AS A GUIDE TO THE POSITION & NATURE OF THE SERVICE.
- THE POSITIONS OF ANY UNDERGROUND SERVICES, INCLUDING FIBRE OPTIC CABLE, HAVE NOT BEEN DETERMINED.
- NO "DIAL BEFORE YOU DIG" SEARCH HAS BEEN UNDERTAKEN. CONTACT "DIAL BEFORE YOU DIG" ON PH: 1100 PRIOR TO COMMENCING WORK ON SITE.

NO CADASTRAL SURVEY HAS BEEN UNDERTAKEN TO CONFIRM THE LOCATION AND DIMENSION OF THE PROPERTY BOUNDARIES. SHOULD CONSTRUCTION BE PLANNED CLOSE TO THE PROPERTY BOUNDARIES, IT IS CRITICAL THAT A CADASTRAL SURVEY BE COMPLETED FIRST.



*This area could drain to gravity sewer extension*

Symbols shown are indicative only. The symbol size and orientation does not necessarily represent the real size or orientation of the feature.



Sydney Office  
 Level 2, 25/29 South Creek  
 Rydalmere NSW 2110  
 PO Box 1144  
 Dundas NSW 2117

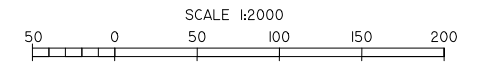
(02) 9655 2000  
 (02) 9685 2001  
 e sydney@landpartners.com.au  
 www.landpartners.com.au

|                                       |                                    |
|---------------------------------------|------------------------------------|
| HEIGHT DATUM<br>AHD                   | LOCAL AUTHORITY<br>THE HILLS SHIRE |
| HEIGHT ORIGIN<br>SSM 72130 RL 184.359 | SCALE<br>1:3000 (A1)               |
| MERIDIAN<br>56                        | CONTOUR INTERVAL<br>0.1m           |
| DO-ORD SYSTEM<br>MGA                  | SURVEYOR<br>LH                     |
| DATE OF SURVEY<br>01/07/15            | DATE<br>16/07/15                   |
| DRAWN<br>LJM                          | CHECKED<br>RWP                     |
| DATE<br>17/07/15                      | DATE<br>17/07/15                   |
| APPROVED<br>GKO                       | DATE<br>17/07/15                   |

PLAN NUMBER  
**SY073666.000**



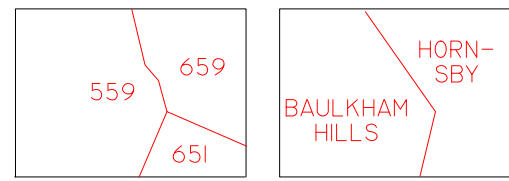
# DURAL 4B



THIS MAP UPDATED ON 16/12/2015  
 THIS PLAN IS DIAGRAMATIC ONLY. DISTANCES  
 SCALED FROM THIS PLAN MAY NOT BE ACCURATE.  
 DATE ALTERED:..... BY:.....

|     |     |     |
|-----|-----|-----|
| DIC | DID | D2C |
| D4A | D4B | D5A |
| D4C | D4D | D5C |

ADJOINING MAPS



NETWORK AREA MUNICIPALITY AREA

# Jemena

## KEY

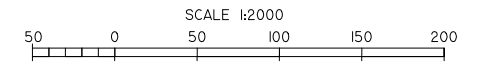
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|----------------------------------|--|
|                                  | TRUNK PIPELINE 7000 kPa                          |
|                                  | PRIMARY MAIN 3500 kPa                            |
|                                  | SECONDARY MAIN 1050 kPa                          |
|                                  | NETWORK MAIN 400 kPa                             |
|                                  | NETWORK MAIN 300 kPa                             |
|                                  | NETWORK MAIN 210 kPa                             |
|                                  | NETWORK MAIN 100 kPa                             |
|                                  | NETWORK MAIN 30 kPa                              |
|                                  | NETWORK MAIN 7 kPa                               |
|                                  | NETWORK MAIN 2 kPa                               |
|                                  | PROPOSED MAINS                                   |
|                                  | 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                                 |
|                                  | 110MM POLYETHYLENE/NYLON MAIN                    |
|                                  | 50MM NYLON INSERTED INTO 6NB MAIN CAST IRON MAIN |
|                                  | DISTANCE IN METRES OF MAIN FROM BOUNDARY LINE    |
|                                  | YEAR LAID  |
|                                  | MUNICIPALITY BOUNDARY                            |
|                                  | NETWORK BOUNDARY                                 |
|                                  | HOUSE NUMBER                                     |

DURAL 4B





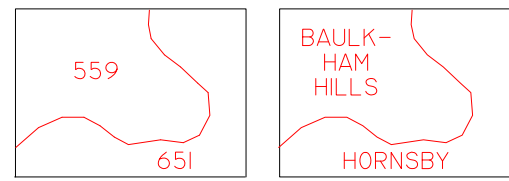
# DURAL 4D



THIS MAP UPDATED ON 11/12/2014  
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 SCALED FROM THIS PLAN MAY NOT BE ACCURATE.  
 DATE ALTERED:..... BY:.....

|     |     |     |
|-----|-----|-----|
| D4A | D4B | D5A |
| D4C | D4D | D5C |
| D7A | D7B | D8A |

ADJOINING MAPS



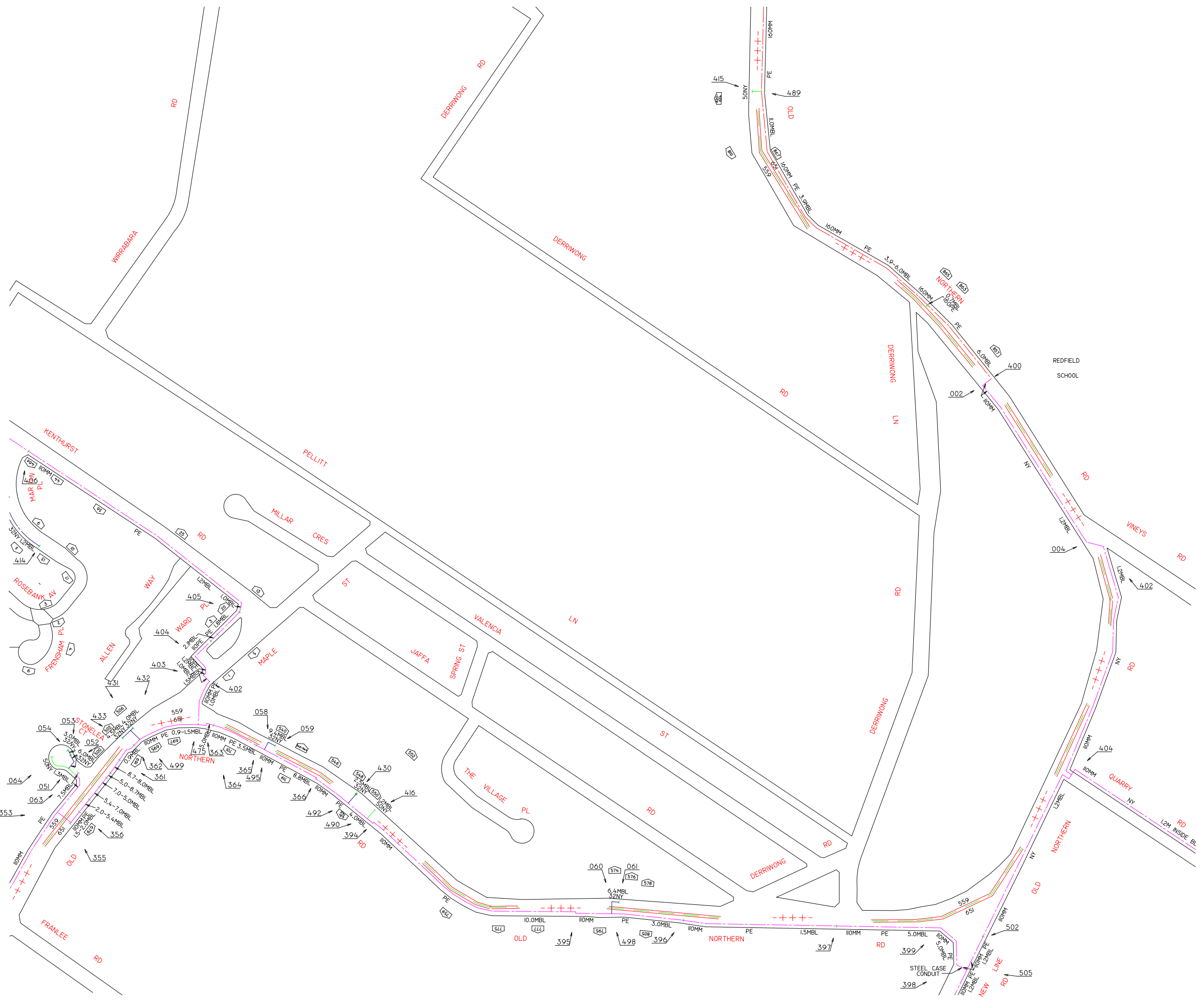
NETWORK AREA MUNICIPALITY AREA

# Jemena

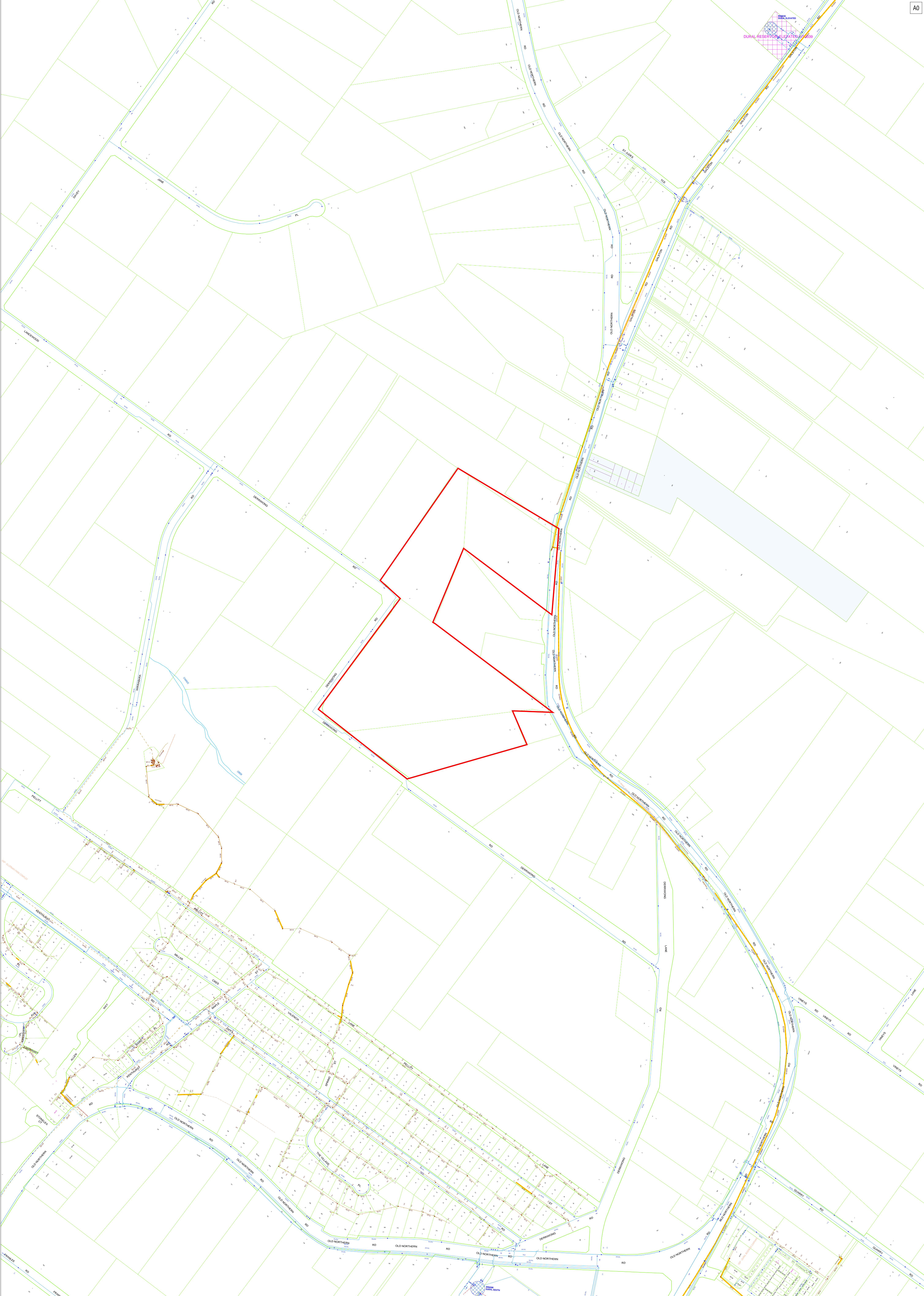
## KEY

- | 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                             |
| — 210 —                          | NETWORK MAIN 210 kPa                             |
| — 100 —                          | NETWORK MAIN 100 kPa                             |
| — 30 —                           | NETWORK MAIN 30 kPa                              |
| — 7 —                            | NETWORK MAIN 7 kPa                               |
| — 2 —                            | NETWORK MAIN 2 kPa                               |
| — + + + —                        | PROPOSED MAINS                                   |
| PR II-2 3                        | STEEL MAIN PROJECT NUMBER                        |
| △                                | PRESSURE MONITORING STATION                      |
| ▽                                | VALVE  |
| □                                | SYSTEM PRESSURE REGULATOR                        |
| •                                | SIPHON   |
| 123                              | NETWORK NODE                                     |
| 123S                             | NETWORK VALVE NODE                               |
| 123V                             | VALVE NUMBER                                     |
| 6NB                              | 6 INCH CAST IRON MAIN                            |
| 150MM                            | 150MM STEEL MAIN                                 |
| 110MM PE/NY                      | 110MM POLYETHYLENE/NYLON MAIN                    |
| ⊙NB 50MM NY                      | 50MM NYLON INSERTED INTO 6NB MAIN CAST IRON MAIN |
| 1.2MBL                           | DISTANCE IN METRES OF MAIN FROM BOUNDARY LINE    |
| 1957                             | YEAR LAID  |
| — + + + —                        | MUNICIPALITY BOUNDARY                            |
| — + + + —                        | NETWORK BOUNDARY                                 |
| 123                              | HOUSE NUMBER                                     |

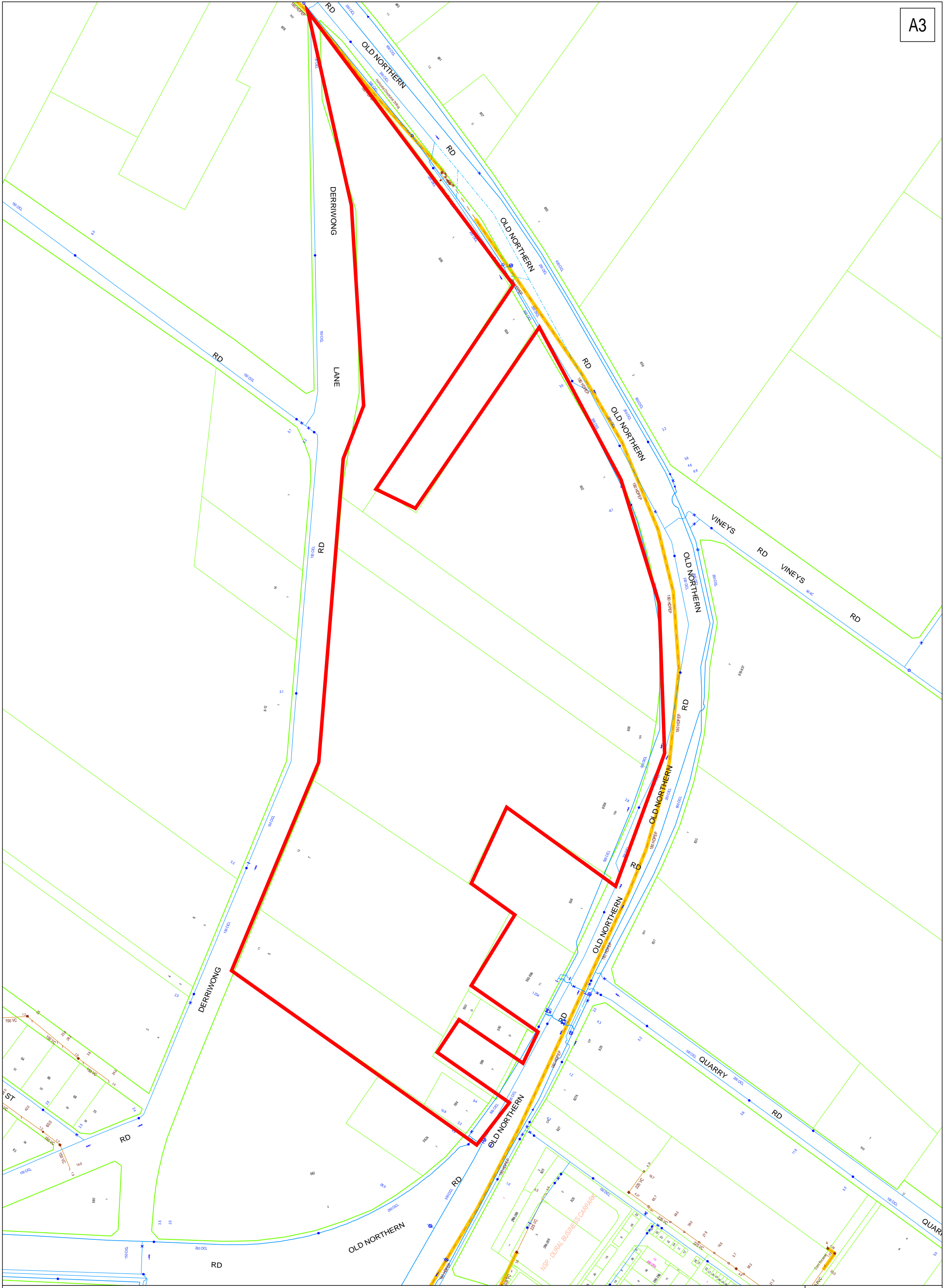
DURAL 4D











DBYD Address:  
602 Old Northern Road  
Dural NSW 2158

DBYD Job No: 10965331  
DBYD Sequence No: 54262111

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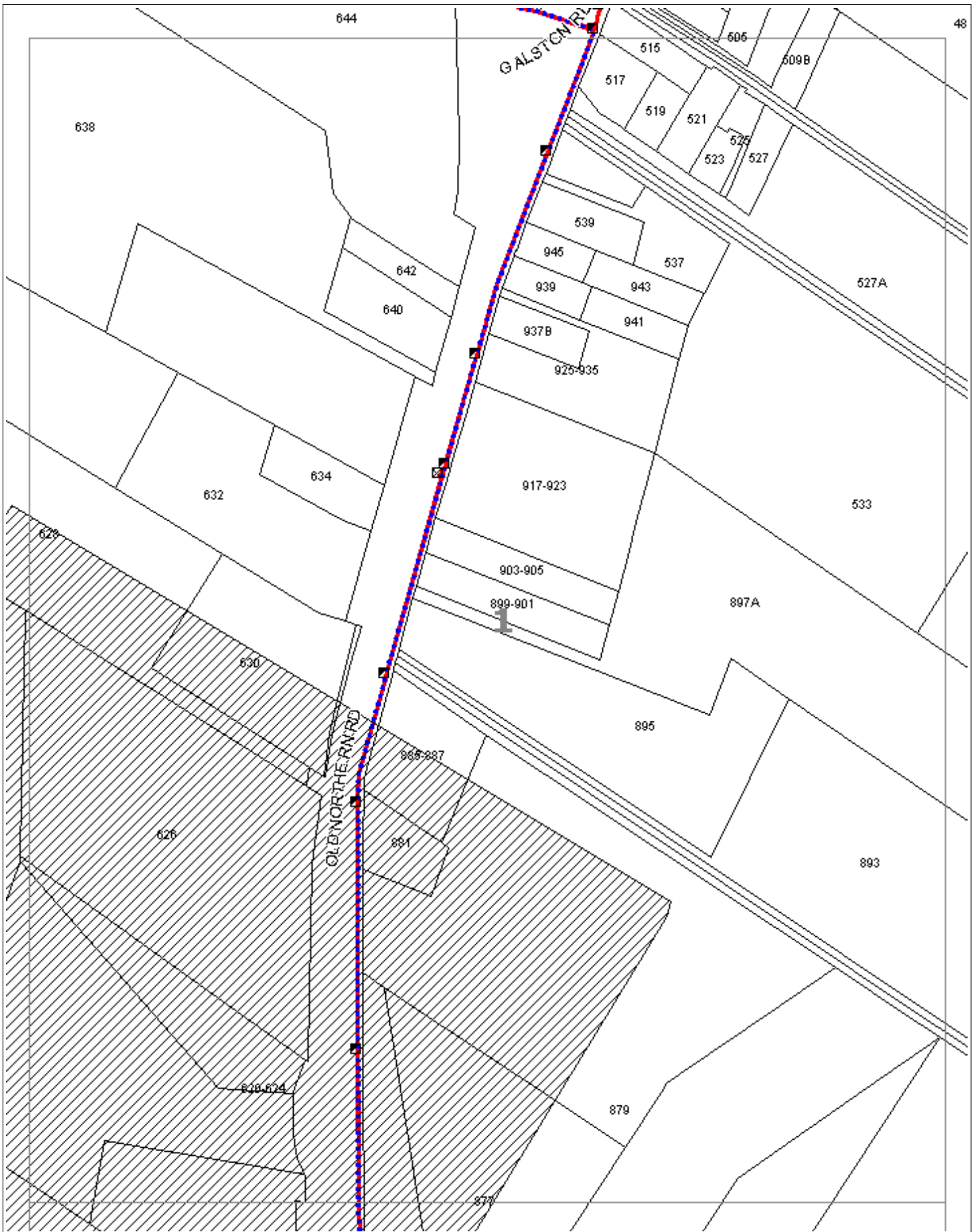
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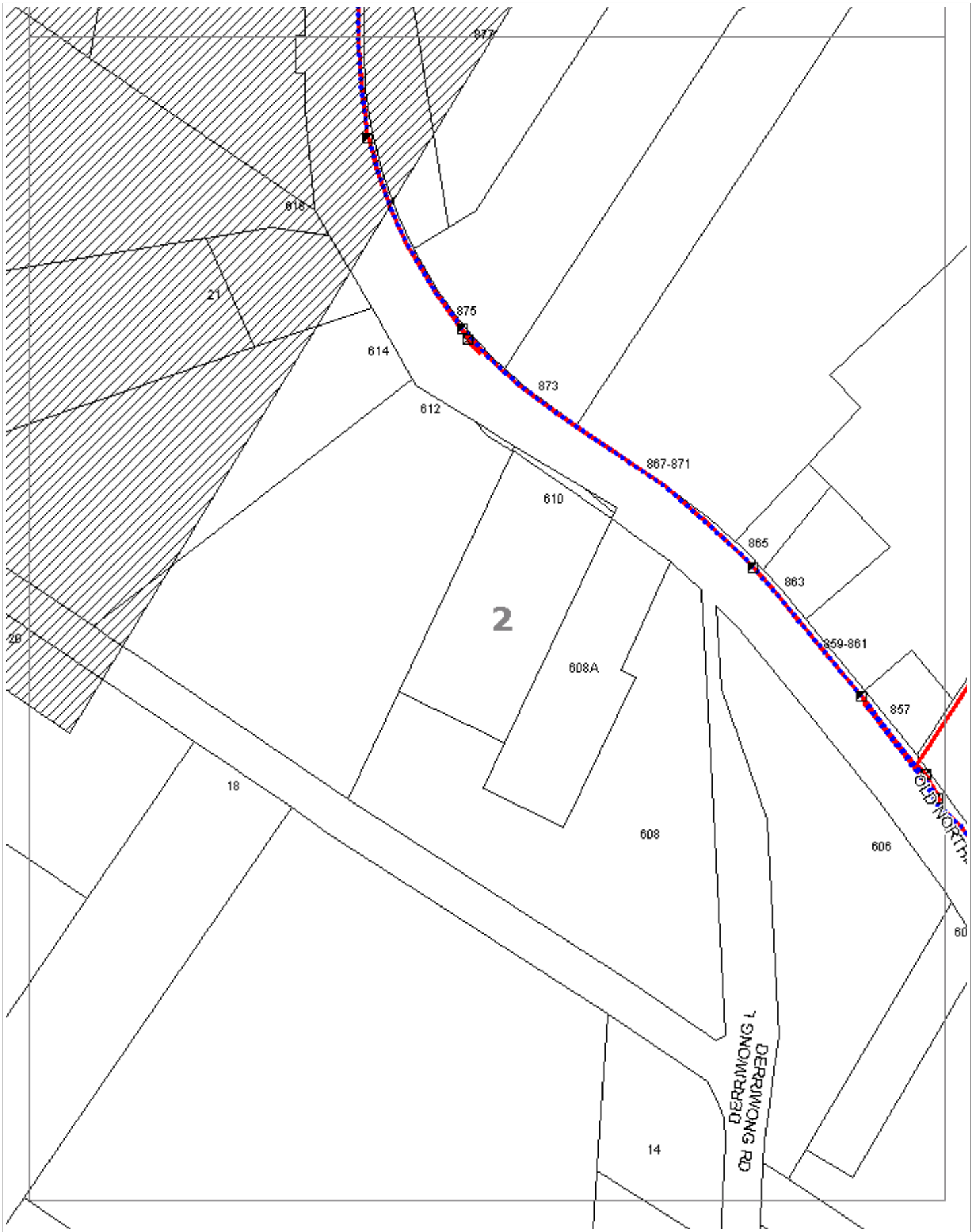
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 Email: [Fibre.Locations@optus.net.au](mailto:Fibre.Locations@optus.net.au)  
 For urgent onsite assistance contact 1800 505 777  
 Optus Limited ACN 052 833 208





DURAL DEVELOPMENT MANAGEMENT SERVICES PTY LTD

# Old Northern Road, Dural

DA ACOUSTIC ASSESSMENT

SEPTEMBER 2016

# Old Northern Road, Dural

## DA ACOUSTIC ASSESSMENT

Dural Development Management Services Pty Ltd

| REV | DATE       | DETAILS |
|-----|------------|---------|
| 00  | 23/09/2016 | Issue   |

### AUTHOR, REVIEWER AND APPROVER DETAILS

|              |            |                  |  |
|--------------|------------|------------------|--|
| Prepared by: | A Morris   | Date: 23/09/2016 | Signature:  |
| Reviewed by: | K Lloyd    | Date: 23/09/2016 | Signature:  |
| Approved by: | A Campbell | Date: 23/09/2016 | Signature:  |

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Filename: 2304730PA-160922-ARM-DA ASSESSMENT



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---

## EXECUTIVE SUMMARY

WSP | Parsons Brinckerhoff Acoustics has recently conducted an acoustic assessment of the proposed subdivision on Old Northern Road, Dural. Two sites are proposed to contain residential lots with an approximate size of 700 m<sup>2</sup>.

Unattended noise logging was conducted along Old Northern Road in locations representative of future residences. Noise levels during the Day period (7am – 10pm) were measured at 61-66 dBA L<sub>Aeq 15h</sub>, and during the Night period (10pm – 7am) a level of 56-62 dBA L<sub>Aeq 9h</sub> was recorded.

Noise goals were calculated with reference to Australian Standard AS 2107, which defines a recommended design level for various building types. A 'satisfactory' level for residences, as defined by the Standard, is 30 dBA within the room during both the Day and Night periods.

To meet the noise goal of 30 dBA within the dwelling, mitigation will be required. For ground floor receivers, this may be achieved using a solid barrier at the boundary (such as a Colorbond or capped-and-lapped fence) and single-glazed, sealed windows that meet a rating of 30 dB R<sub>w</sub>. Second storey receivers will require glazing such as 10mm single glazing or double glazing, with seals that ensure a rating of 30 dB R<sub>w</sub> is achieved.

# 1 INTRODUCTION

WSP | Parsons Brinckerhoff has been appointed to provide an acoustic assessment of a subdivision located on Old Northern Road, Dural. The purpose of this report is to assess the impact of noise from Old Northern Road on future residences within the subdivision.

## 1.1 Site and project description

The development consists of two sites, both bound by Old Northern Road and Derriwong Road. The northern site is located between 630 Old Northern Road (Hargraves Nursery) and 616 Old Northern Road, and surrounds Dural Public School. The southern site is situated between 600 Old Northern Road and 584 Old Northern Road, and lies between Old Northern Road and Derriwong Road. Both sites are to contain residential dwellings set back at least 14 meters from the boundary adjacent to Old Northern Road. Figure 1-1 provides an overview of the site.



Figure 1-1 – Site Overview

## 2 NOISE SURVEY

### 2.1 Site conditions and measurement location

Noise logging sound level meters were deployed at three locations along Old Northern Road, which are summarised in Table 2-1. The units were set to A-weighted and Fast, and recorded 15 minute statistical levels.

**Table 2-1 – Measurement locations**

| Logger ID | Address                      | Development area | Approximate distance from Old Northern Road lane edge, meters |
|-----------|------------------------------|------------------|---|
| N1        | 600 Old Northern Road, Dural | Southern         | 19  |
| N2        | 606 Old Northern Road, Dural | Southern         | 16  |
| N3        | 881 Old Northern Road, Dural | Northern         | 15  |

Analysis of the Bureau of Meteorology's daily weather data from the Terrey Hills weather station (the nearest weather station to the monitoring location) during the monitoring period indicated that the conditions were generally dry with relatively calm winds during the monitoring period and did not adversely affect the measurement results.

The noise environment consisted primarily of road traffic noise from Old Northern Road, and no other distinct sources could be identified when traffic was absent.

### 2.2 Methodology and equipment

The noise survey was conducted in accordance with AS1055.1 "Acoustics – Description and measurement of environmental noise Part 1: General Procedures" and guidance in *Environmental Protection Agency (Noise) regulations 1997*.

The microphones was located in a free-field position at least 3.5m away from any reflecting wall and at least 1.2m above the ground.

The sound level meters were field-calibrated using a Pulsar Model 105 acoustic calibrator both before and after noise measurements to monitor drifts in calibration. No drifts in excess of 1 dBA were noted throughout the monitoring exercise.

The sound level meters and calibrator were in current National Association of Testing Authorities (NATA) calibration at the time of use. Serial numbers and laboratory calibration due dates are shown below in Table 2-2.

**Table 2-2 – Equipment details**

|     | Equipment description | Manufacturer and type no. | Serial no. | Calibration due date |
|-----|-----------------------|---------------------------|------------|----------------------|
| NL1 | Sound Level Meter     | Svan 977                  | 36172      | 04/09/2017           |
|     | Microphone            | 7052E                     | 56445      | 04/09/2017           |
| NL2 | Sound Level Meter     | Svan 977                  | 36818      | 21/06/2018           |
|     | Microphone            | 7052E                     | 43609      | 21/06/2018           |
| NL3 | Sound Level Meter     | Svan 958                  | 36659      | 16/10/2017           |

| Equipment description | Manufacturer and type no. | Serial no.         | Calibration due date |
|-----------------------|---------------------------|--------------------|----------------------|
| Microphone            | 7052E                     | 47642              | 16/10/2017           |
| Calibrator            | -                         | Pulsar - Model 105 | 19/11/2016           |

## 2.3 Noise survey results

A summary of the averaged measured noise levels is presented in Table 2-3. Results have been presented in accordance with the NSW INP time period classifications. Time history graphs of the noise logging results are presented in Appendix A.

**Table 2-3 – Summary of measured noise levels**

| Logging location | Ambient noise level |                     | Rating background level |                       |                     |
|------------------|---------------------|---------------------|-------------------------|-----------------------|---------------------|
|                  | dBA $L_{eq}$ period |                     | dBA $L_{90}$ 15-minute  |                       |                     |
|                  | Day<br>7am – 10pm   | Night<br>10pm – 7am | Day<br>7am – 6pm        | Evening<br>6pm – 10pm | Night<br>10pm – 7am |
| NL1              | 61                  | 56                  | 53                      | 43                    | 30                  |
| NL2              | 63                  | 58                  | 56                      | 46                    | 30                  |
| NL3              | 66                  | 62                  | 57                      | 48                    | 30                  |



## 3 NOISE CRITERIA AND ASSESSMENT

### 3.1 Noise Goals - AS 2107

Australian Standard AS 2107 recommends design noise levels for within various spaces, including residences. A summary of the relevant design levels is provided in Table 3-1.

**Table 3-1 – AS 2107 internal noise levels**

| Type of occupancy/activity                              | Recommended design sound level, dBA L <sub>eq</sub> 15-minute |         |
|---|---|---------|
|   | Satisfactory  | Maximum |
| Houses and apartments near minor roads – Living areas   | 30  | 40      |
| Houses and apartments near minor roads – Sleeping areas | 30  | 35      |

The noise goal for residences within the development is summarised below in Table 3-2, and is based on the 'satisfactory' recommended design sound levels outlined in AS 2107.

**Table 3-2 – Internal noise goals**

| Land usage            | Applicable time period | Internal noise criteria<br>dBA L <sub>eq</sub> 15-minute |
|-----------------------|------------------------|--|
| Residential buildings | Day, Night             | 30   |

### 3.2 Assessment of Road Traffic Noise

Table 3-3 shows the levels predicted for the closest house to Old Northern Road in each development area, with a setback of 14 metres from the boundary and without mitigation.

**Table 3-3 – Predicted road noise levels at residential façades**

| Development site and land use | Setback from boundary, metres | Distance to Old Northern Road, metres | Predicted level at façade, dBA L <sub>eq</sub> period |                     | Required reduction to meet internal noise goal, dBA |
|-------------------------------|-------------------------------|---------------------------------------|---|---------------------|---|
|                               |                               |                                       | Day<br>7am – 10pm                                     | Night<br>10pm – 7am |   |
| Northern                      | 14                            | 39                                    | 63  | 59                  | 29  |
| Southern                      | 14                            | 17                                    | 63  | 58                  | 28  |

For residences with a setback of 14 meters, the following mitigation may be considered to meet the noise goal:

- Ground floor: 1.8 metre solid barrier, such as a Colorbond or a capped-and-lapped fence, on the boundary adjacent to Old Northern Road. Windows are to meet  $R_w$  30 dB, which may be achieved using 6mm single glazing and sufficient seals to meet this rating.
- First floor: windows are to have sufficient seals and glazing to meet  $R_w$  35 dB, which may be achieved using a double-glazed construction or 10mm single glazing.

Figure 3-1 shows an example of a Colorbond fence, Figure 3-2 illustrates a capped-and lapped fence construction, and Figure 3-3 depicts a block fence. These three constructions are examples of materials that can be used to form barriers.



Figure 3-1 – Colorbond fence. Source: [jnlandscapes.com.au](http://jnlandscapes.com.au)



Figure 3-2 – Capped and lapped fence. Source: [fencescape.com.au](http://fencescape.com.au)



Figure 3-3 – Block wall. Source: [arizonafencebuilders.com](http://arizonafencebuilders.com)

## 4 SUMMARY

WSP | Parsons Brinckerhoff has conducted an acoustic assessment in support of a Development Application for the proposed subdivision on Old Northern Road, Dural. Unattended noise monitoring was conducted at representative locations to determine the road traffic noise contribution from Old Northern Road. Noise goals were formed with reference to recommended design levels contained within Australian Standard AS 2107.

For houses adjacent to Old Northern Road, with a setback of 14 meters from the lot boundary, mitigation will be required to meet the noise goal of 30 dBA within the house. This goal may be achieved for ground-floor receivers through the installation of a solid barrier (such as a Colorbond or capped-and-lapped fence) and 6mm single-glazed windows with sufficient seals to ensure an  $R_w$  of 30 dB is achieved. For receivers on the second storey, the noise goal will be accomplished using a construction such as 10mm single glazing or double-glazed windows, with sufficient seals to ensure an  $R_w$  of 35 dB is achieved.

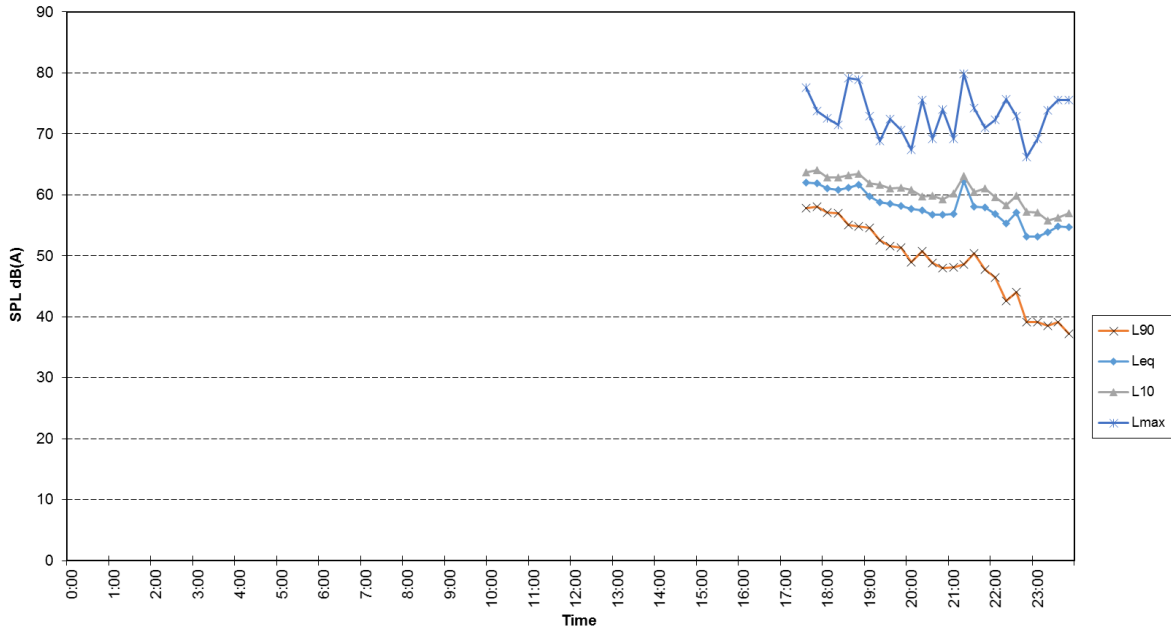
# Appendix A

**NOISE MEASUREMENT RESULTS**

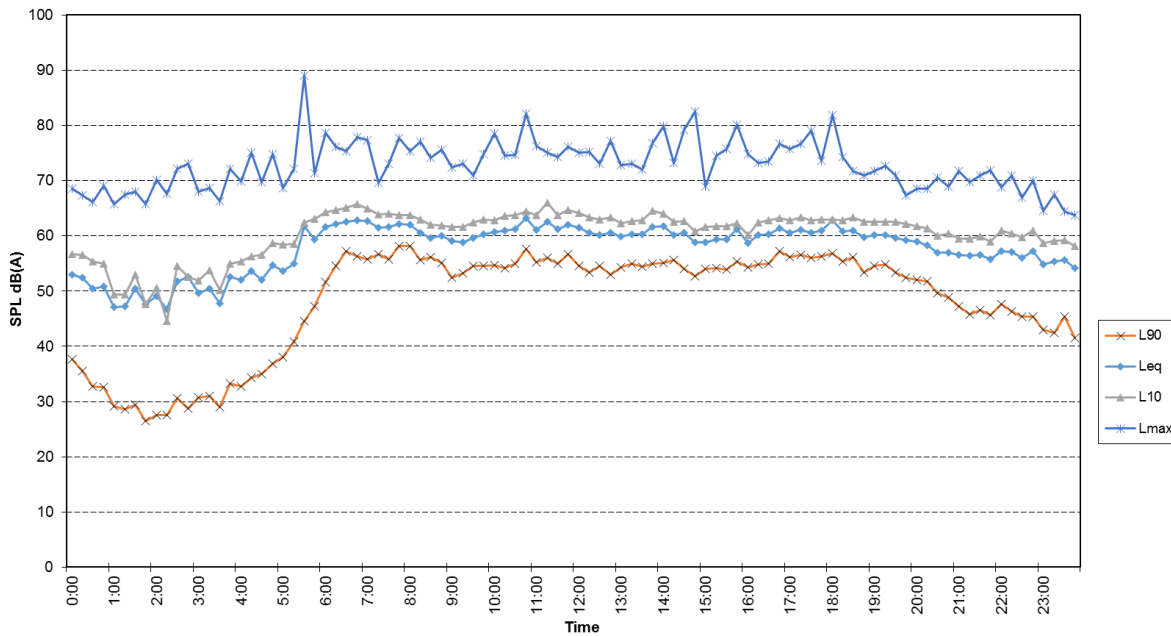


**NL1: 600 Old Northern Road, Dural**

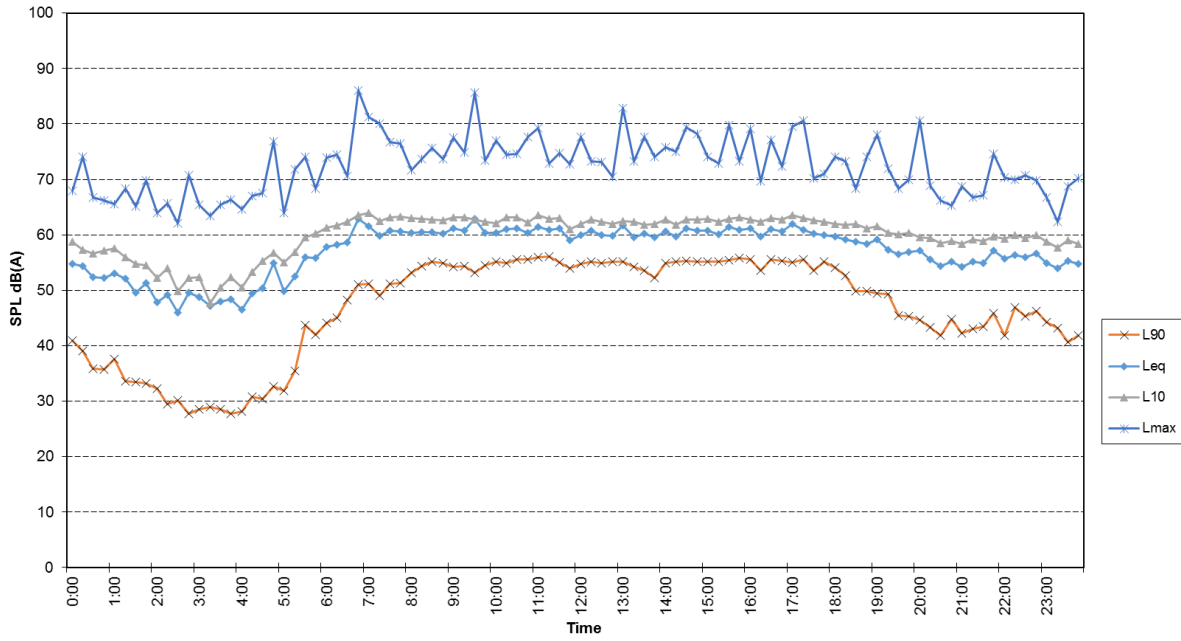
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 Measured Noise Levels - Thursday 15/09/2016



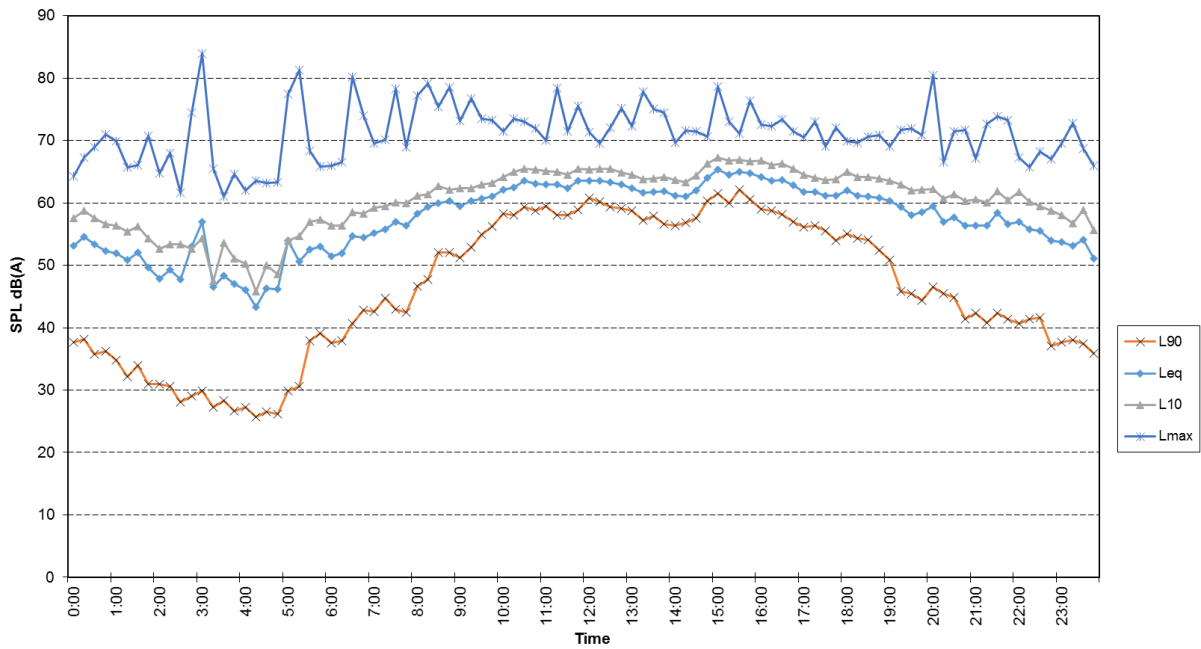
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 Measured Noise Levels - Friday 16/09/2016



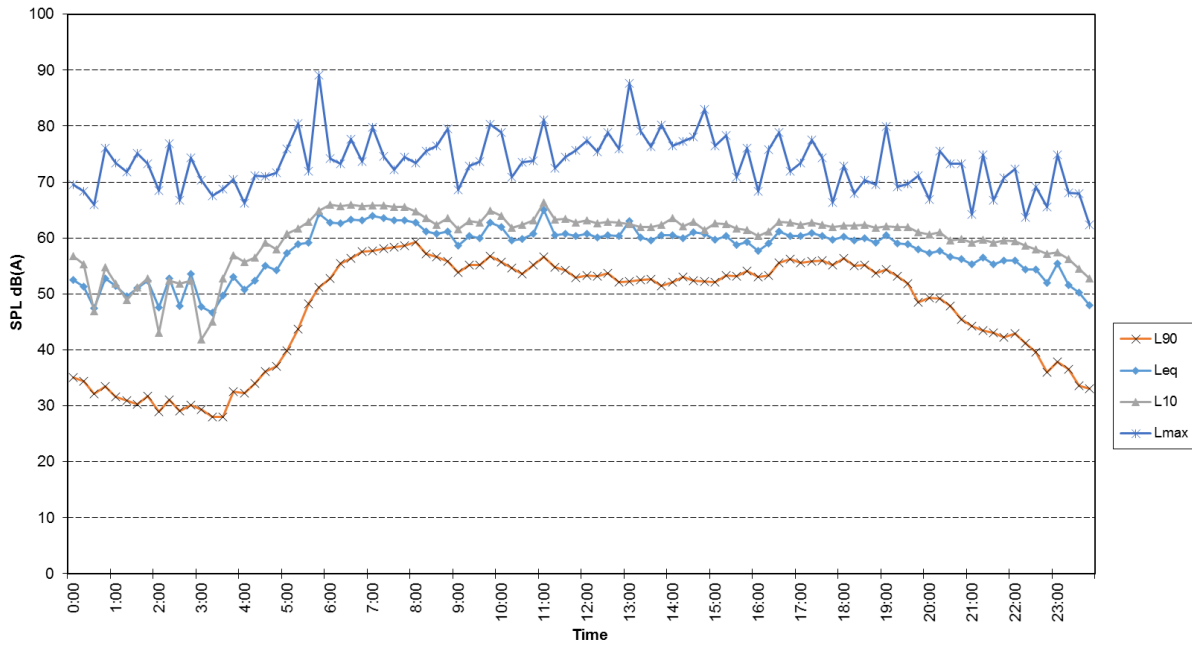
Location - NL1  
 Measured Noise Levels - Saturday 17/09/2016



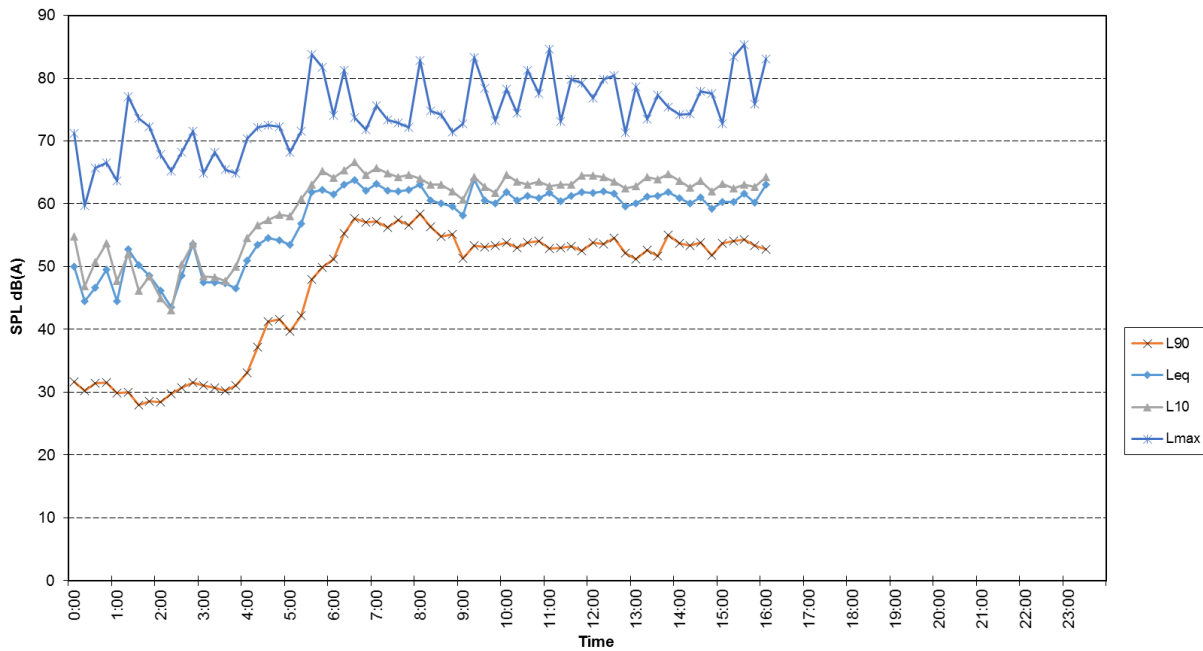
Location - NL1  
 Measured Noise Levels - Sunday 18/09/2016



Location - NL1  
Measured Noise Levels - Monday 19/09/2016

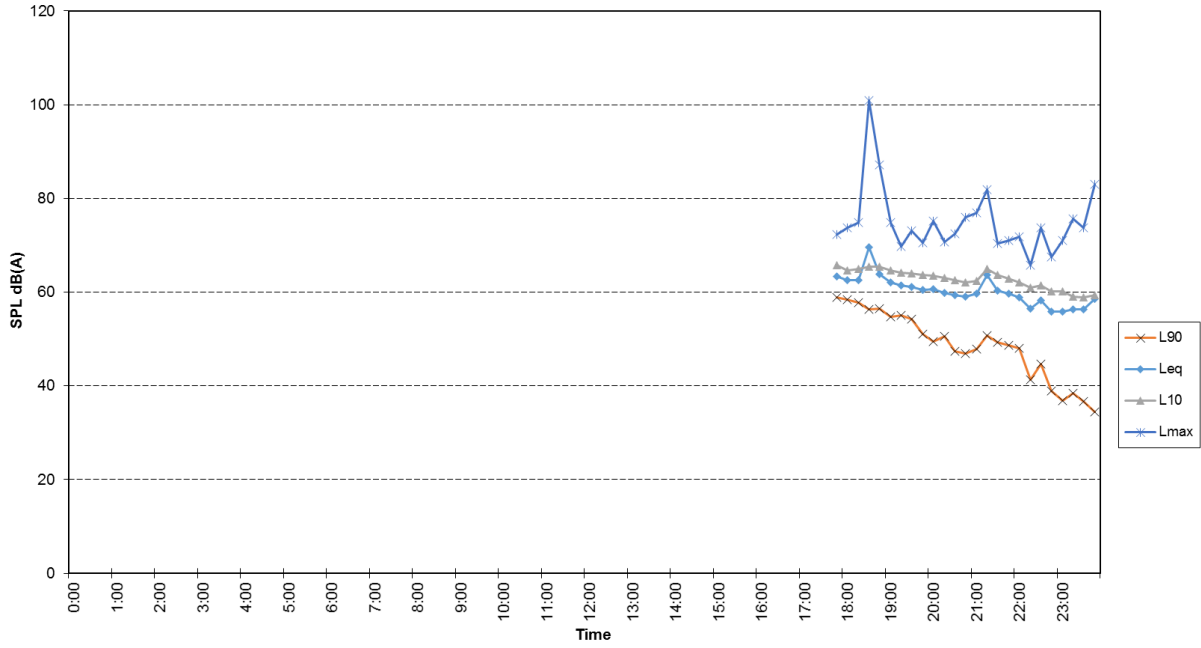


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Measured Noise Levels - Tuesday 20/09/2016

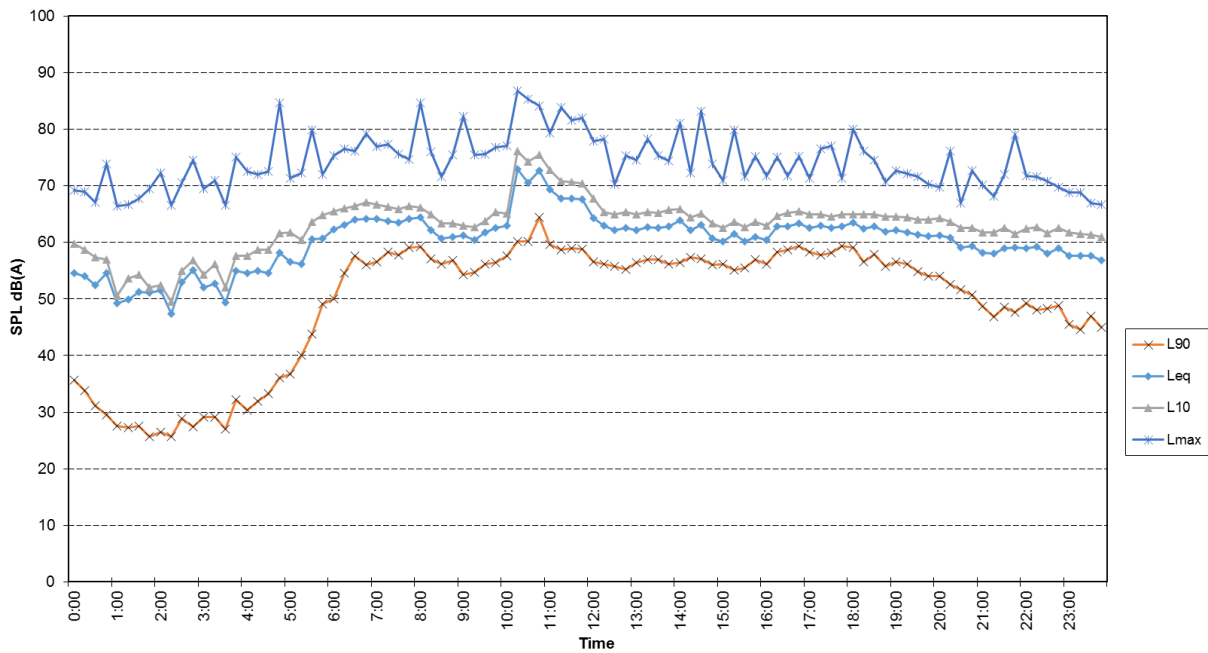


**NL2: 606 Old Northern Road, Dural**

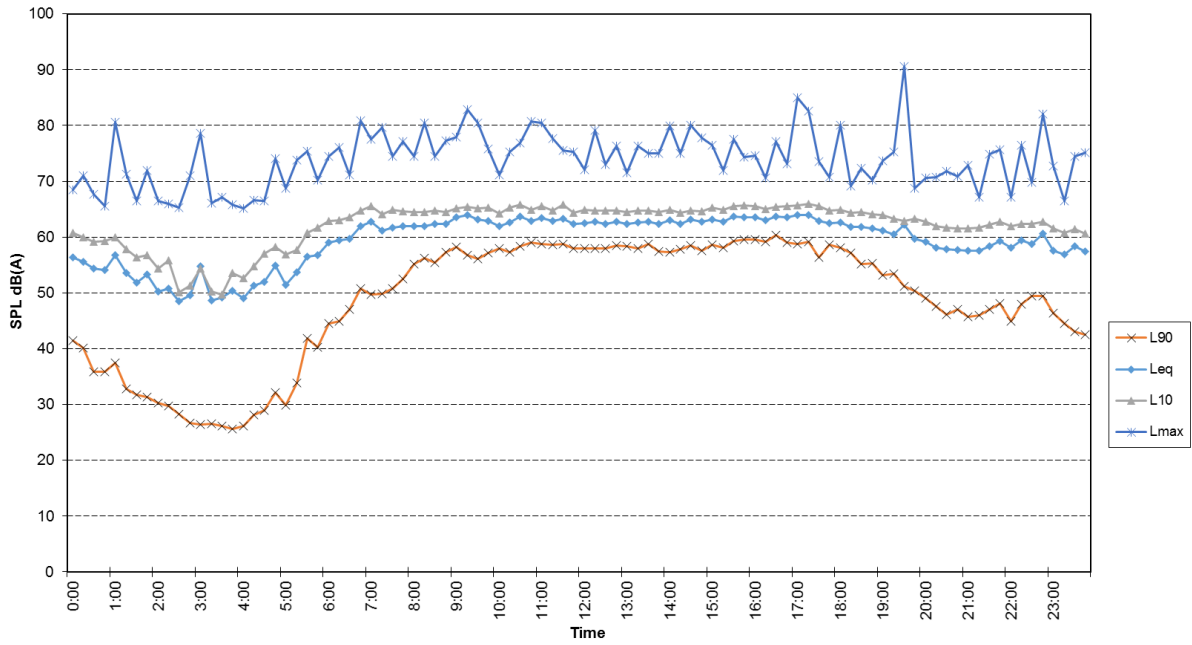
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Measured Noise Levels - Thursday 15/09/2016



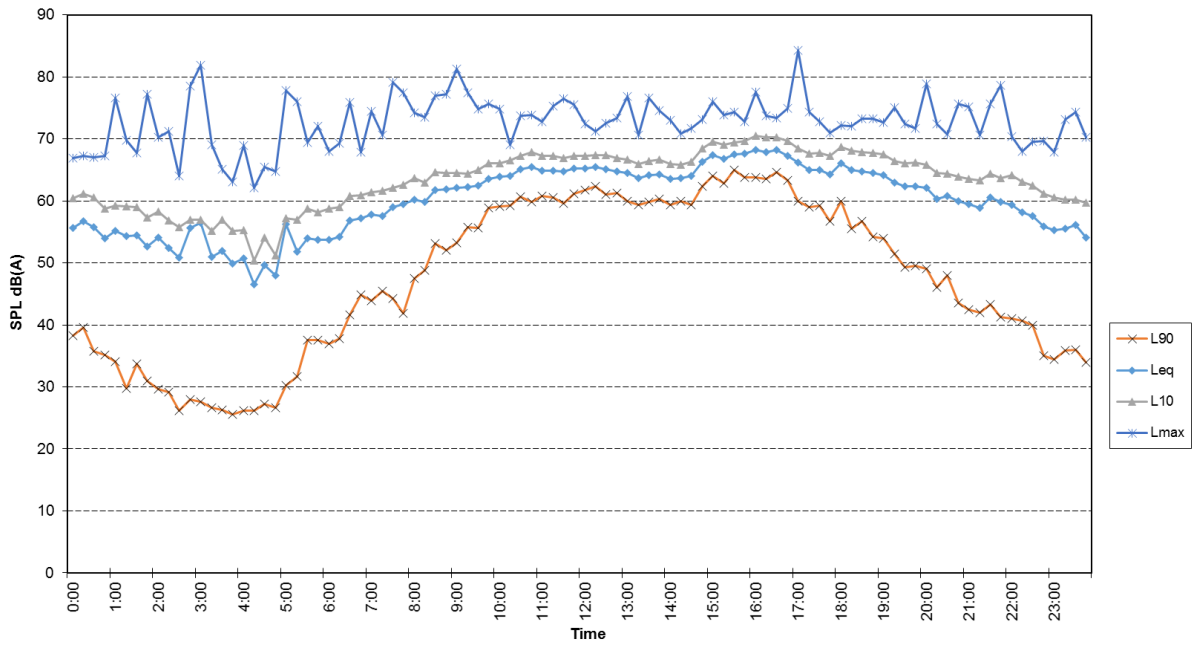
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Measured Noise Levels - Friday 16/09/2016



Location - NL2  
 Measured Noise Levels - Saturday 17/09/2016

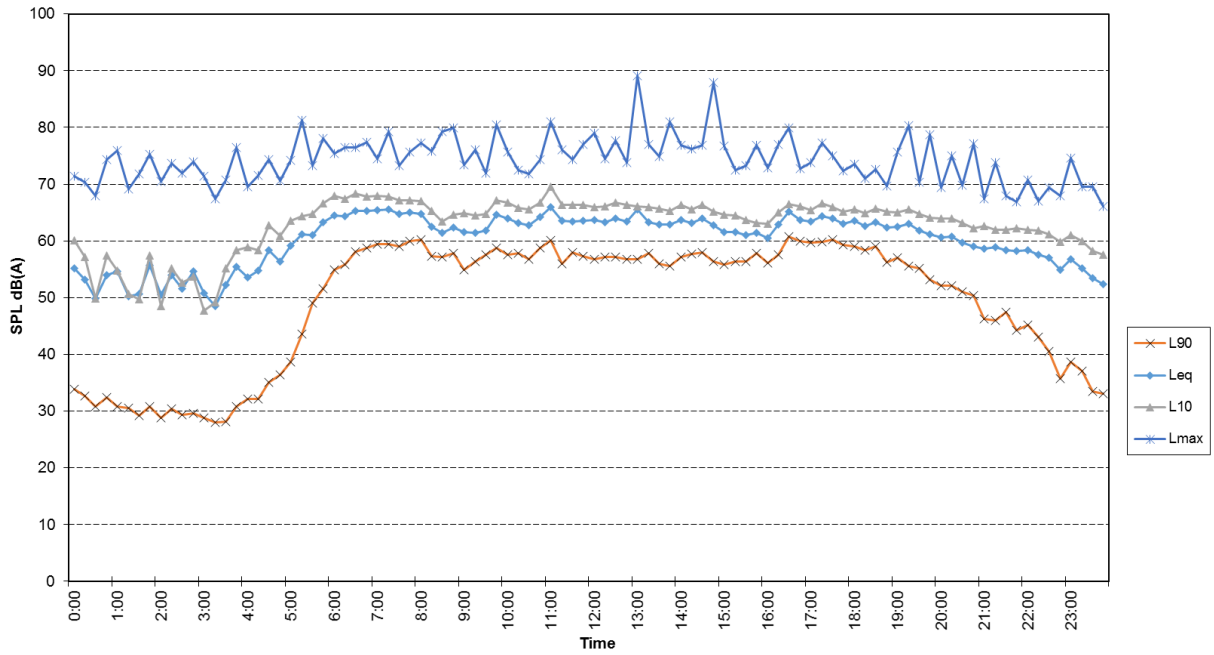


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 Measured Noise Levels - Sunday 18/09/2016

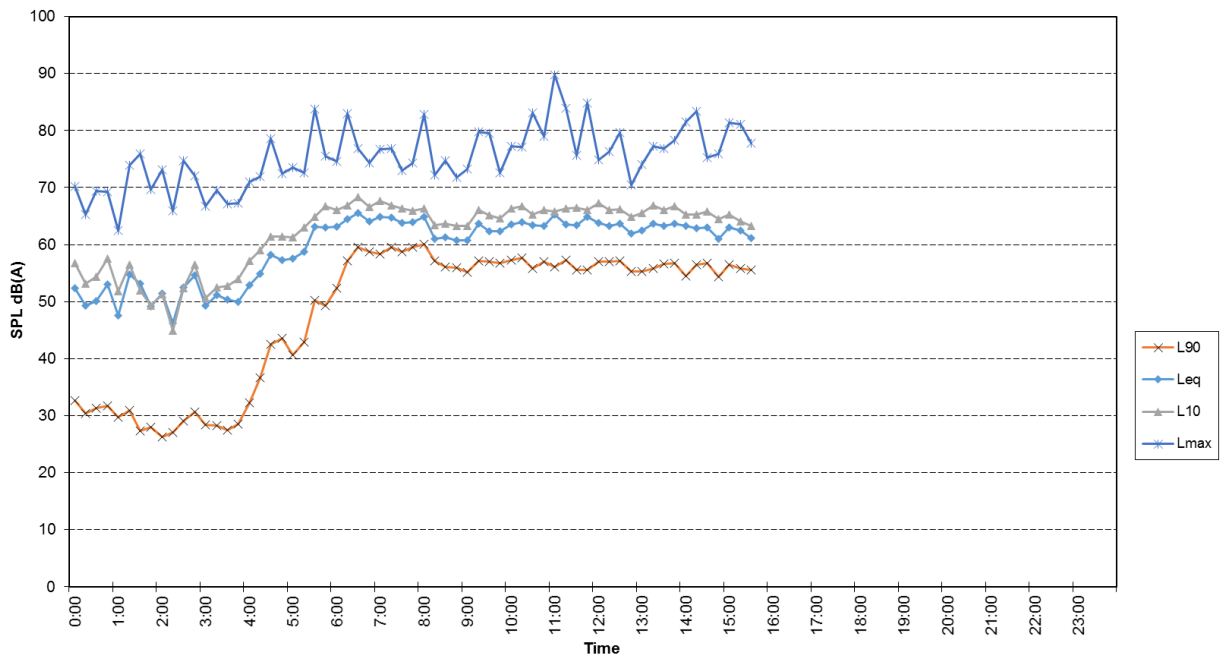




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 Measured Noise Levels - Monday 19/09/2016

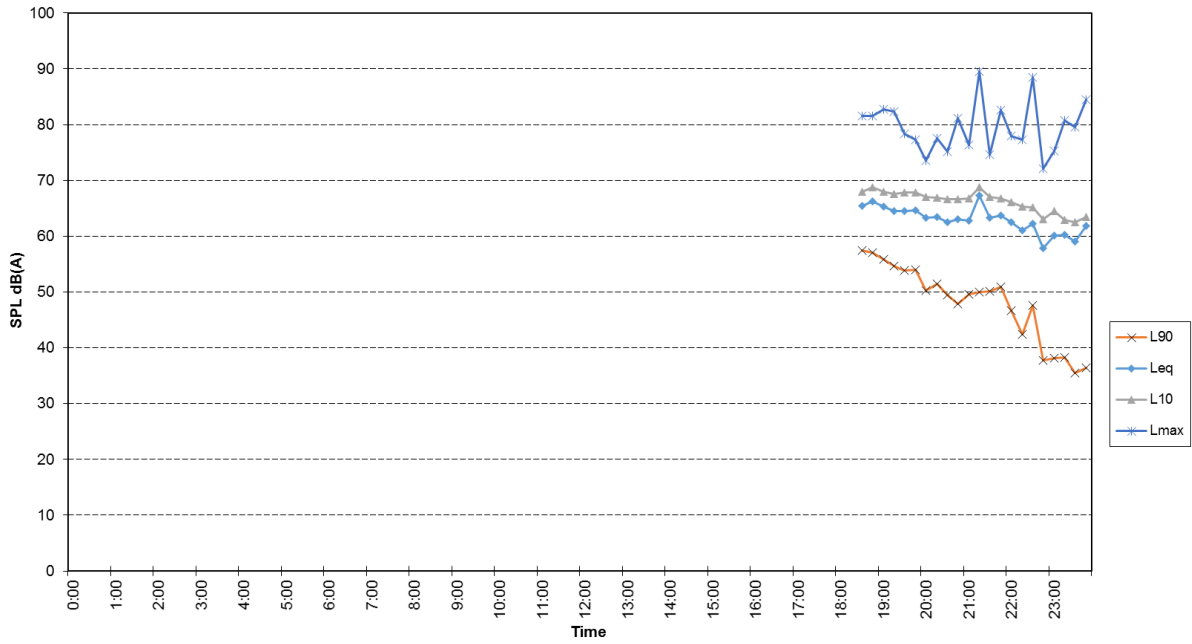


Location - NL2  
 Measured Noise Levels - Tuesday 20/09/2016

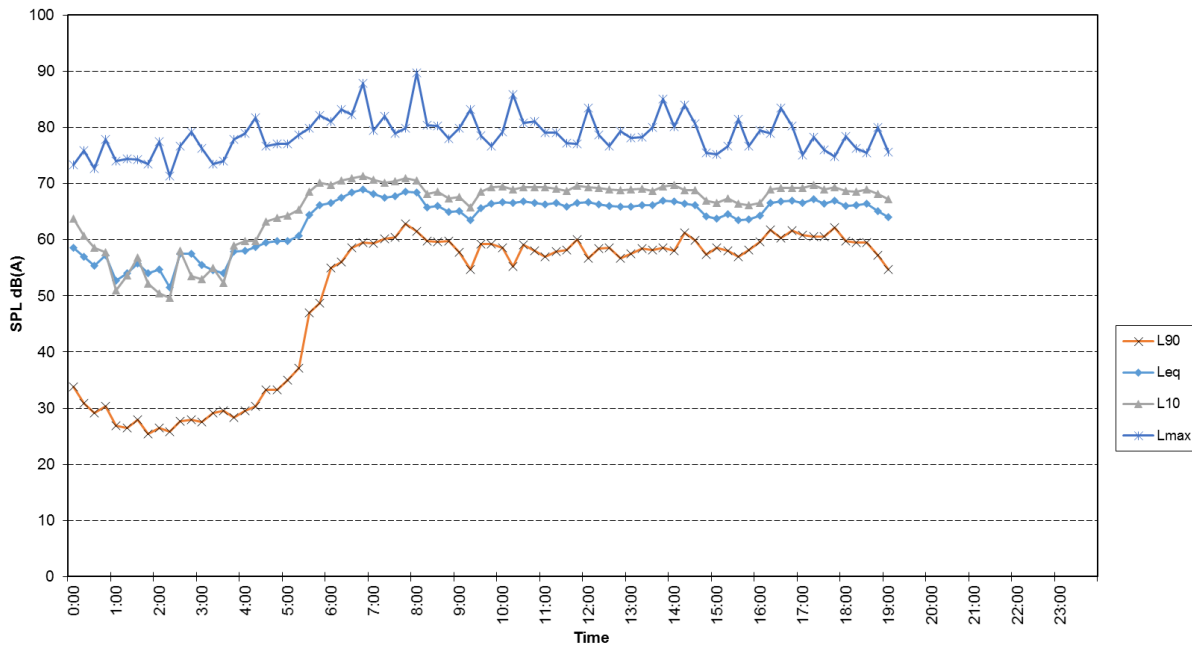


NL3: 881 Old Northern Road, Dural

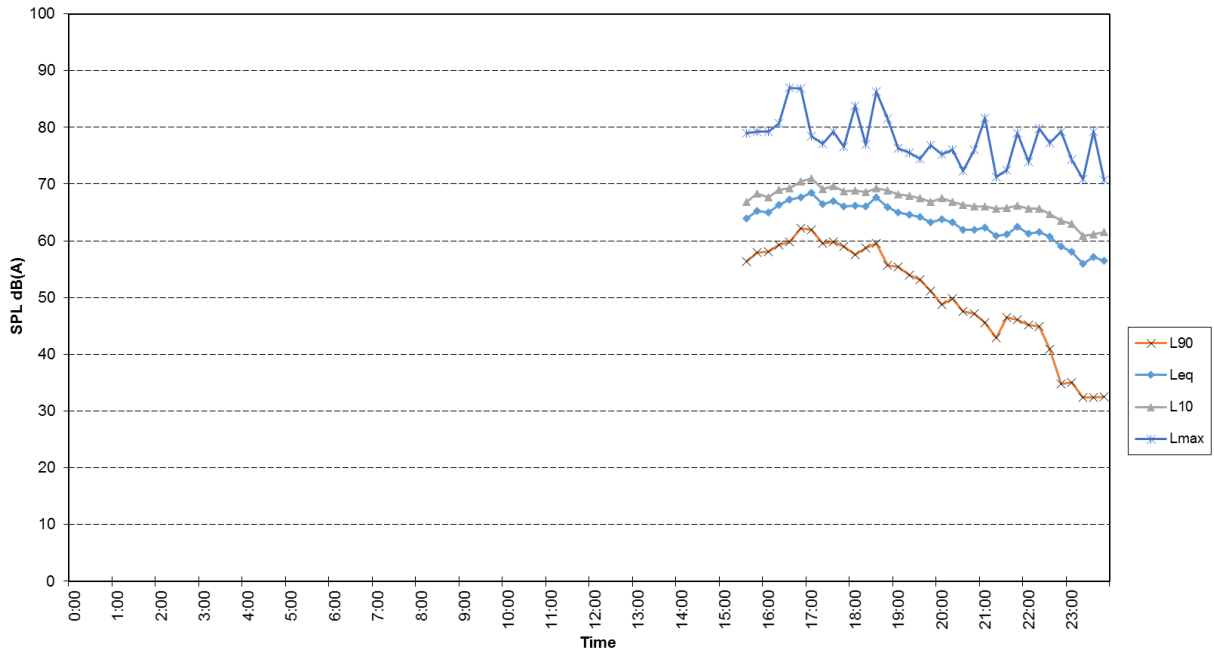
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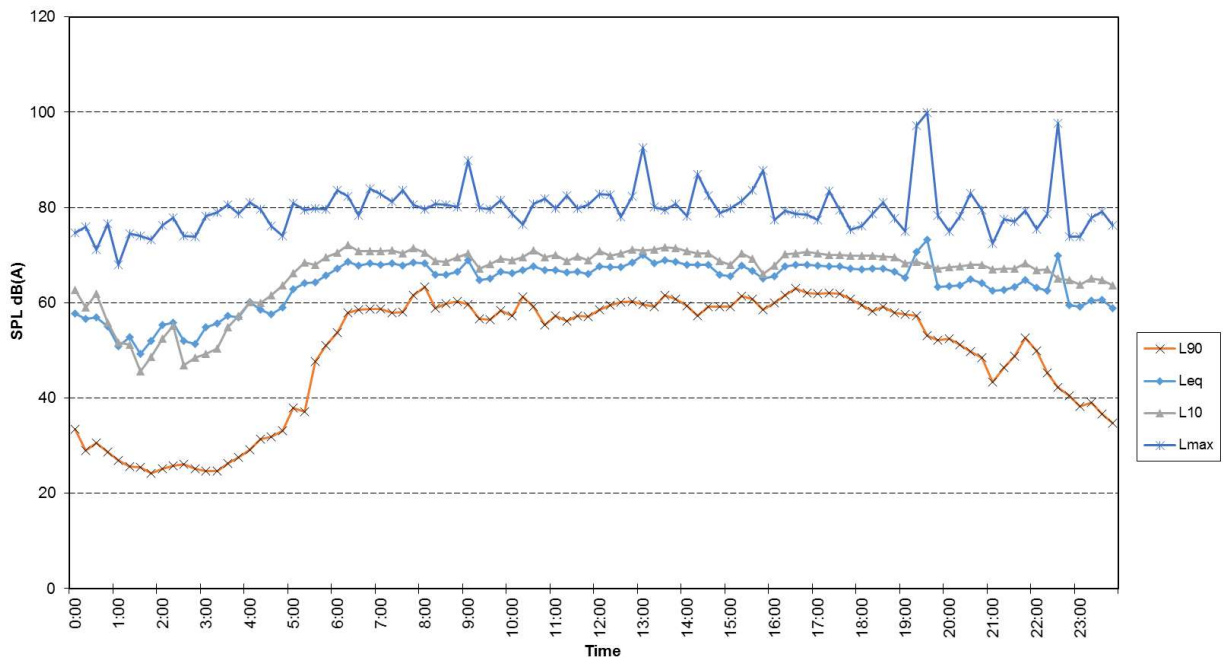
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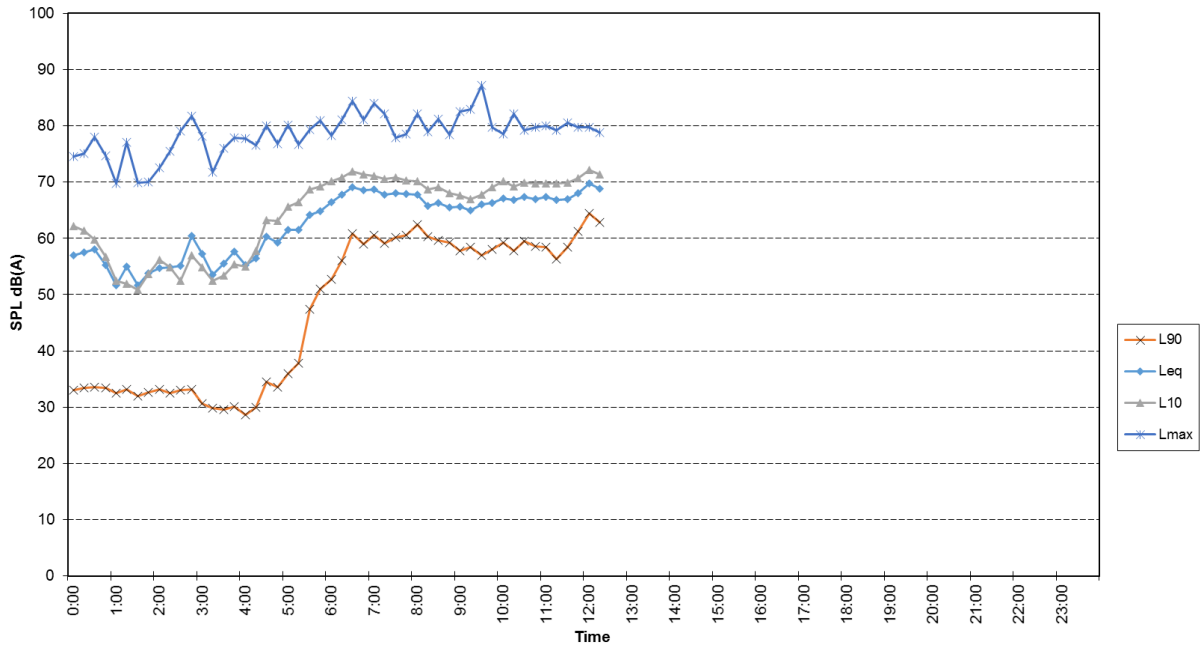
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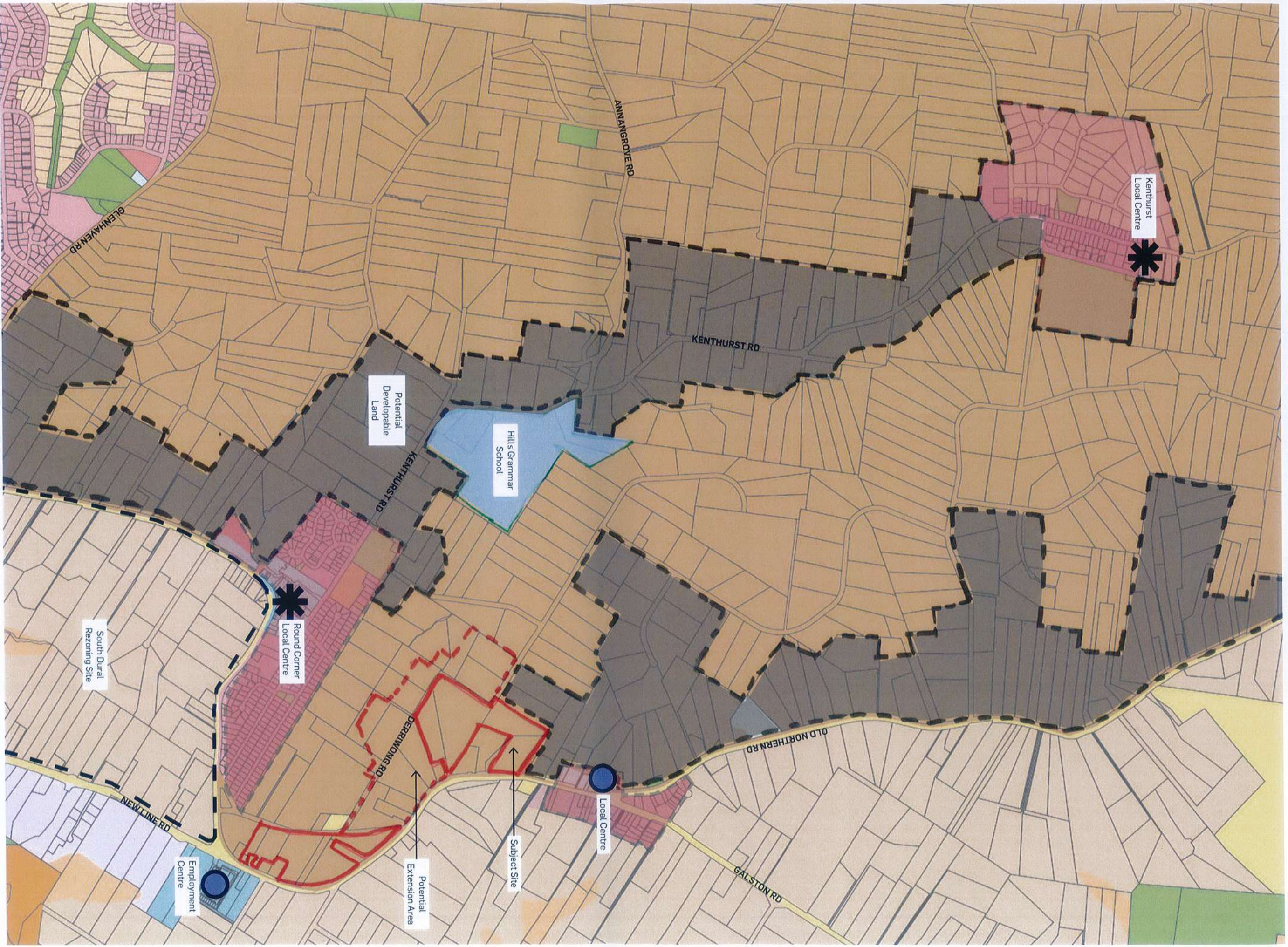


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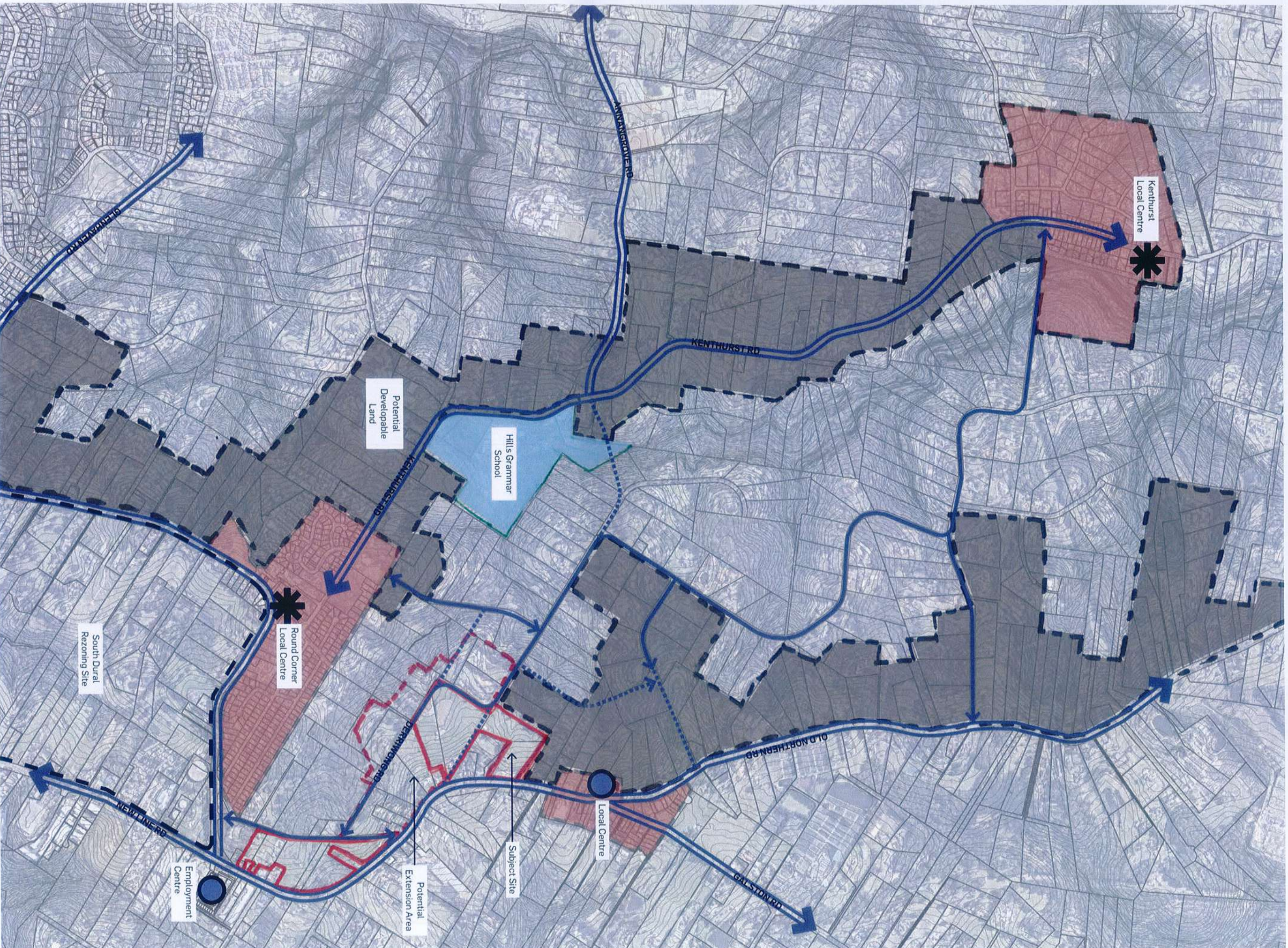




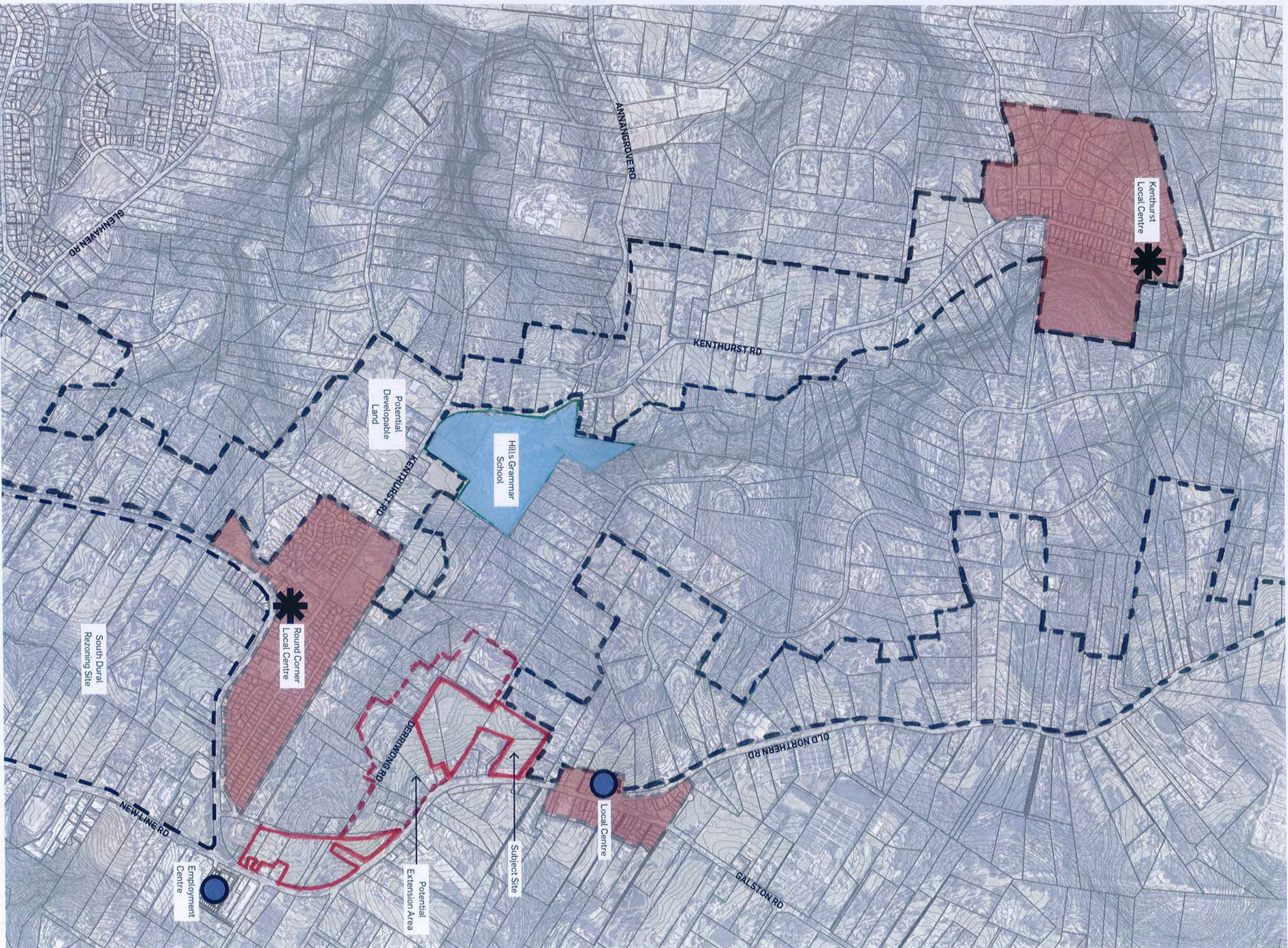












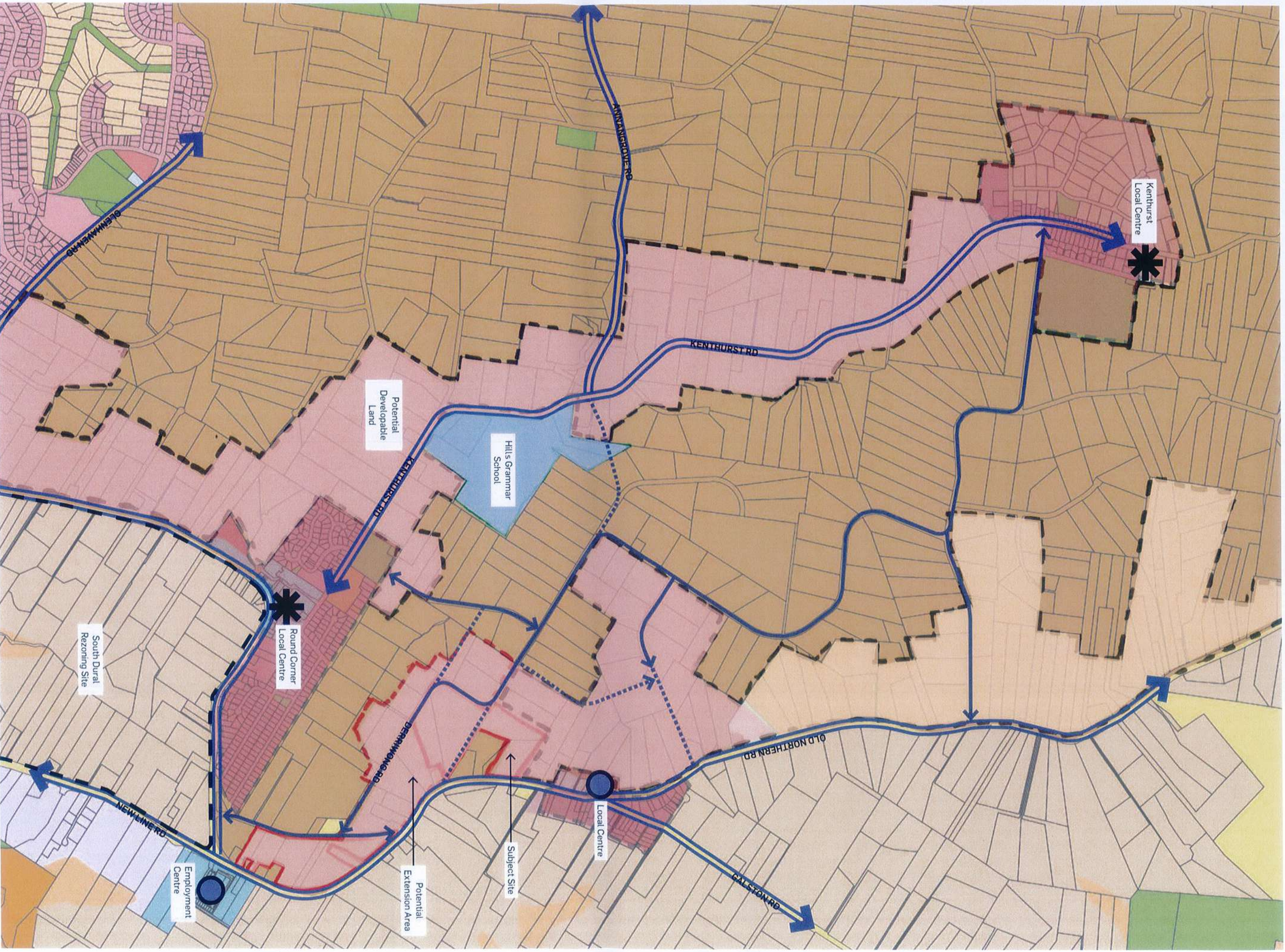
**DURAL**  
WIDER DURAL INVESTIGATION STUDY AREA  
OVERLAY ON AERIAL



1:15,000 @ A3

DATE: 13.07.2017  
JOB NO: SA6076  
DWG NO: X-XXD-XX000  
REV: X











19 September 2017

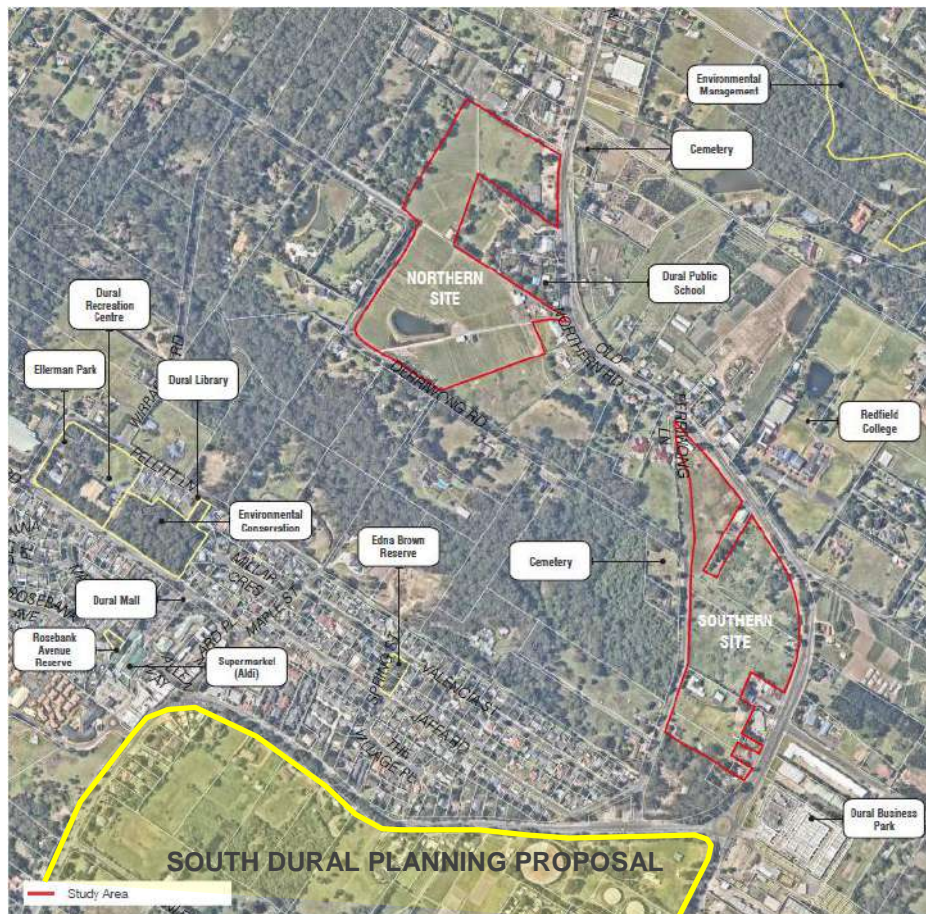
Ms Janelle Atkins  
Principal Forward Planner  
The Hills Shire Council  
C/- jatkins@thehills.nsw.gov.au

Dear Janelle,

## **DERRIWONG ROAD-OLD NORTHERN ROAD PLANNING PROPOSAL ADDENDA**

This letter concerns the ongoing consideration of the Derriwong Road- Old Northern Road Planning Proposal (2017SWC031 – The Hills Shire – PGR\_2017\_THILL\_001\_00). This Planning Proposal relates to multiple land parcels that are broadly divided into the Northern and Southern Sites along Old Northern Road and Derriwong Road, Dural. The location of these sites is illustrated in **Figure 1**.

Figure 1 – Aerial View of the Southern and Northern Sites and Surrounding Context (Source: Urbis, 2016)





At the rezoning review meeting held on 20 April 2017 the Sydney West Central Planning Panel (the Panel) determined that the above Planning Proposal would not be submitted for a Gateway Determination. At this meeting the Panel stated that the above Planning Proposal should not proceed prior to the completion of a strategic study programmed for the area. The Hills Shire Council (the Council) and the proponent were advised that the Panel would consider this Planning Proposal again if this strategic study was not completed by the end of 2017.

In the interests of progressing this strategic study, the proponent (as previously discussed with Council) has further considered how the Planning Proposal sits amongst a wider Dural Investigation Area. Whilst it is recognised the Council and their respective consultants will ultimately assess the future strategic direction for the area, additional constraints analysis has been undertaken by the proponent to assist the Council in identifying the relevant catchment and boundary for the wider Dural Investigation Area.

This investigation has included consideration of technical ecological constraints as outlined within the Ecological Assessment prepared by ELA at **Attachment B**, and associated bushfire asset protection zones associated with the highest order vegetation to be retained in the area (refer **Attachment C**). This information has been considered against good urban design practices to identify potential development 'precincts' that may be released for higher order urban development. Through these precincts, approximate residential yields can be determined.

While detailed precinct planning will need to occur, the study summarised in **Attachment A** provides a considered starting point for planning for and delivery of infrastructure needs and a broader understanding of the potential character of urban development in this area. In summary, the indicative zoning and densities nominated could result in an increase in approximately 1,400 dwellings in the Wider Dural Investigation Area as broken down in **Table 1**.

Table 1 – Indicative Yield Analysis for Wider Dural Investigation Area

|   | Potential Zoning | Potential Density (dw/ha) | Total developable land area (ha) | Approx. Potential Yield (excluding existing development potential) |
|---|------------------|---------------------------|----------------------------------|--|
| <b>Precinct 1</b><br><br>(including land identified in the Planning Proposal) | R2               | 14                        | 8.10                             | 294  |
|   | E4               | 1                         | 12.06                            | 12   |
|   | E4               | 0.5                       | 3.64                             | 2  |
| <b>Precinct 2</b>   | R2               | 14                        | 6.27                             | 88   |
|   | E4               | 1                         | 20.95                            | 21   |
|   | E4               | 0.5                       | 15.40                            | 8  |
| <b>Precinct 3</b>   | E4               | 2                         | 10.67                            | 21   |
|   | E4               | 1                         | 27.74                            | 28   |



|                   | Potential Zoning | Potential Density (dw/ha) | Total developable land area (ha) | Approx. Potential Yield (excluding existing development potential) |
|-------------------|------------------|---------------------------|----------------------------------|--|
|                   | E4               | 0.5                       | 59.37                            | 30   |
| <b>Precinct 4</b> | R2               | 14                        | 19.41                            | 272  |
|                   | E4               | 1                         | 16.53                            | 17   |
|                   | E4               | 0.5                       | 25.16                            | 13   |
| <b>Precinct 5</b> | E4               | 2                         | 51.33                            | 103  |
|                   | E4               | 1                         | 20.50                            | 21   |
| <b>Precinct 6</b> | R2               | 14                        | 29.03                            | 406  |
|                   | E4               | 1                         | 60.16                            | 60   |
|                   | E4               | 0.5                       | 3.61                             | 2  |
| <b>Total</b>      |                  |                           |                                  | <b>1,396</b>   |

Detailed precinct planning' has occurred for 'Precinct 1', being the land the4 subject of the submitted planning proposal. as previously submitted to the Council. This detailed precinct planning includes indicative subdivision layouts to provide context for the immediate surrounding lands of the subject Planning Proposal and is also included within the package at **Attachment A**.

The documentation contained within this Planning Proposal Addenda provides an urban design and environmental context of Precinct 1 and the potential future character and urban development for not only the 'missing middle' sites between the Northern and Southern Sites along Old Northern Road and Derriwong Road but also the broader Dural area.

We trust that this additional information will be considered by the Council in the further consideration of the Planning Proposal and the ongoing work to inform the strategic study for the area. We appreciate the opportunity to contribute to this strategic study where appropriate and to further demonstrate strategic merit for the Planning Proposal in the context of the future likely growth in the area.

Should you have any questions or comments to progress the status of the Wider Dural Investigation Area, please do not hesitate to contact the undersigned or Clare Brown, Director Planning, at (02) 8233 9900.

Yours sincerely,



A handwritten signature in black ink, appearing to read "A. Ryan".

Ashleigh Ryan  
Senior Consultant

Attachment A – Dural Investigation Urban Design Investigation (Urbis)

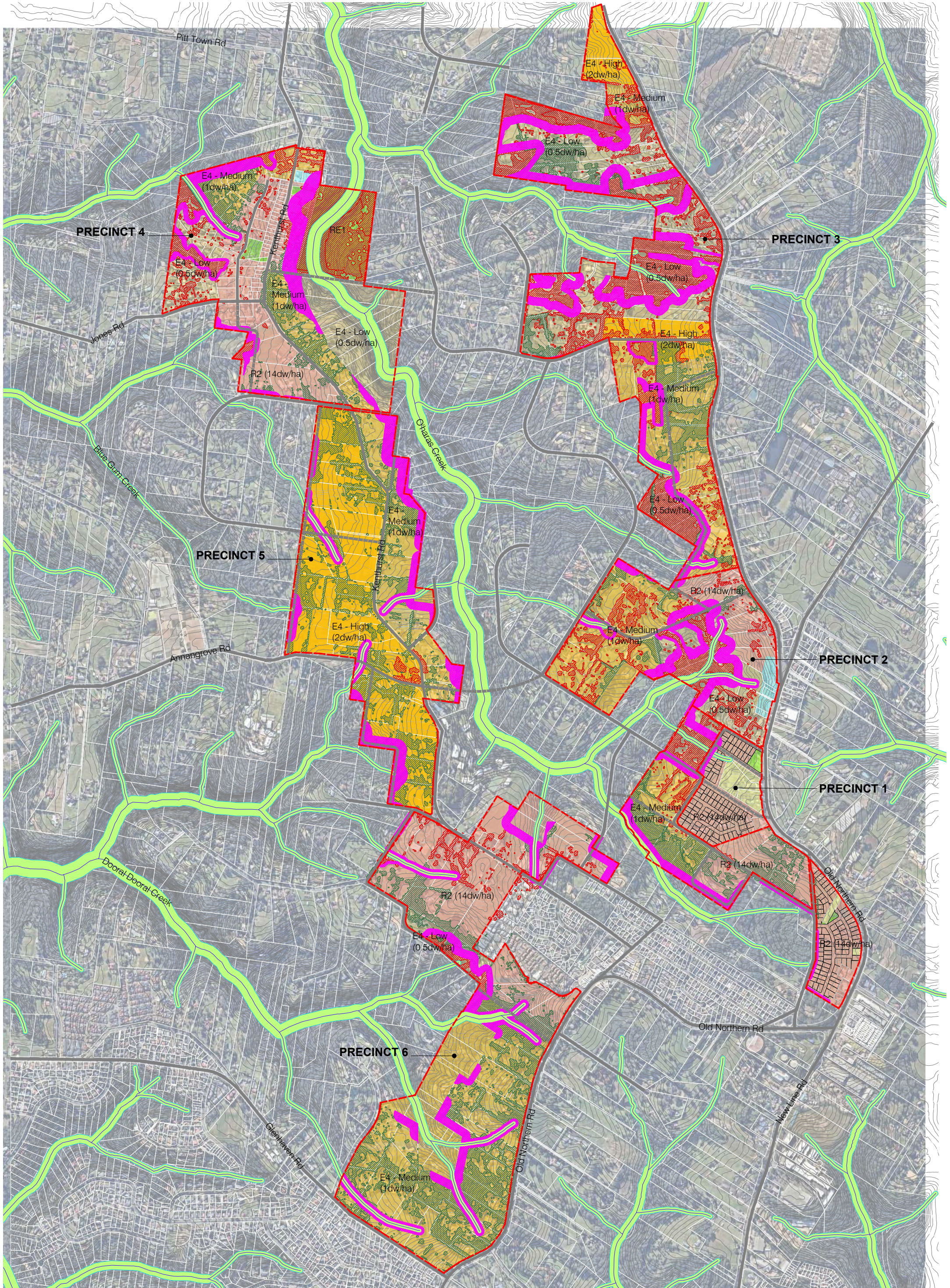
Attachment B – Ecological Assessment (ELA)

Attachment C – Bushfire Asset Protection Zones (ELA)

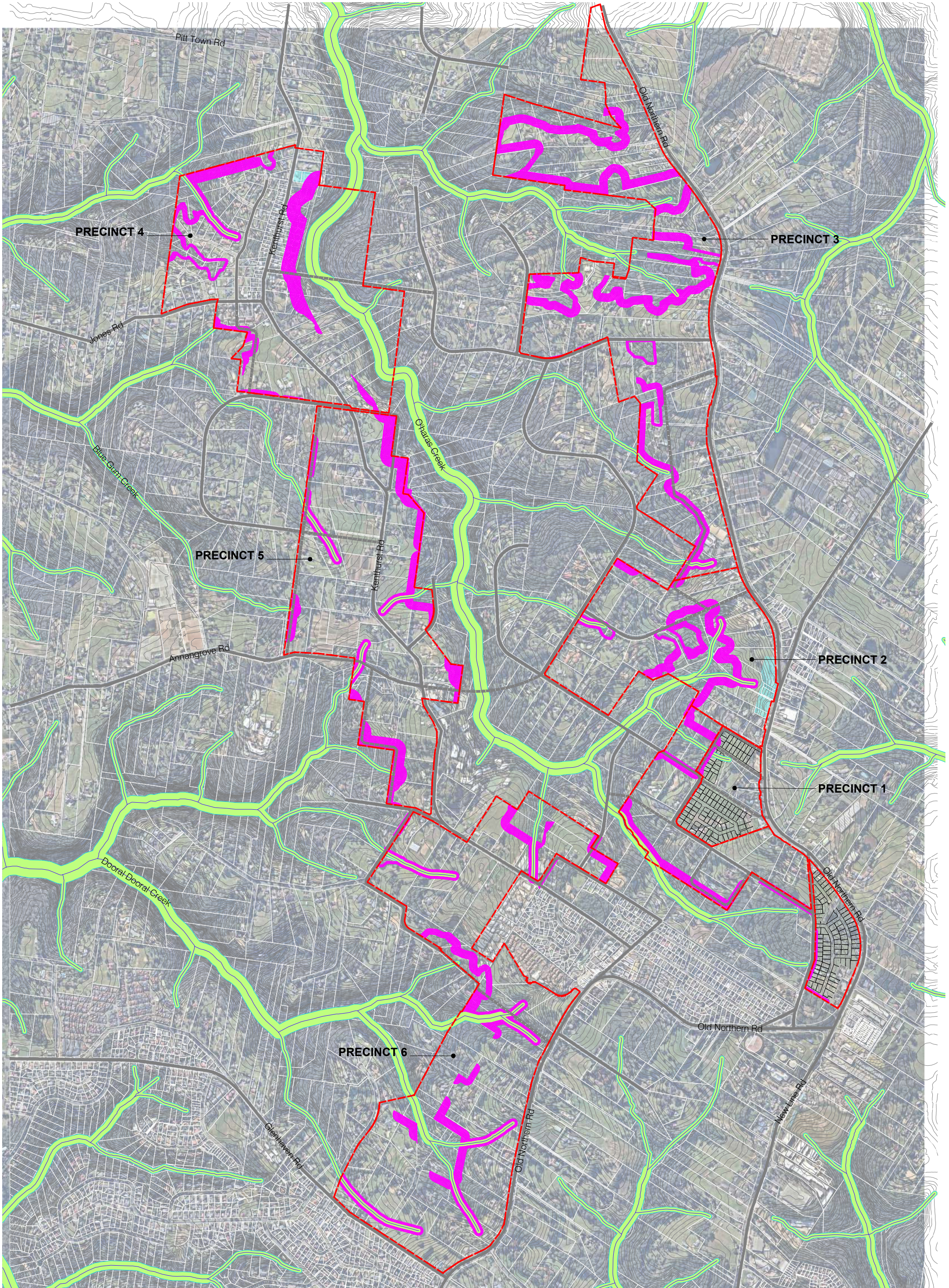




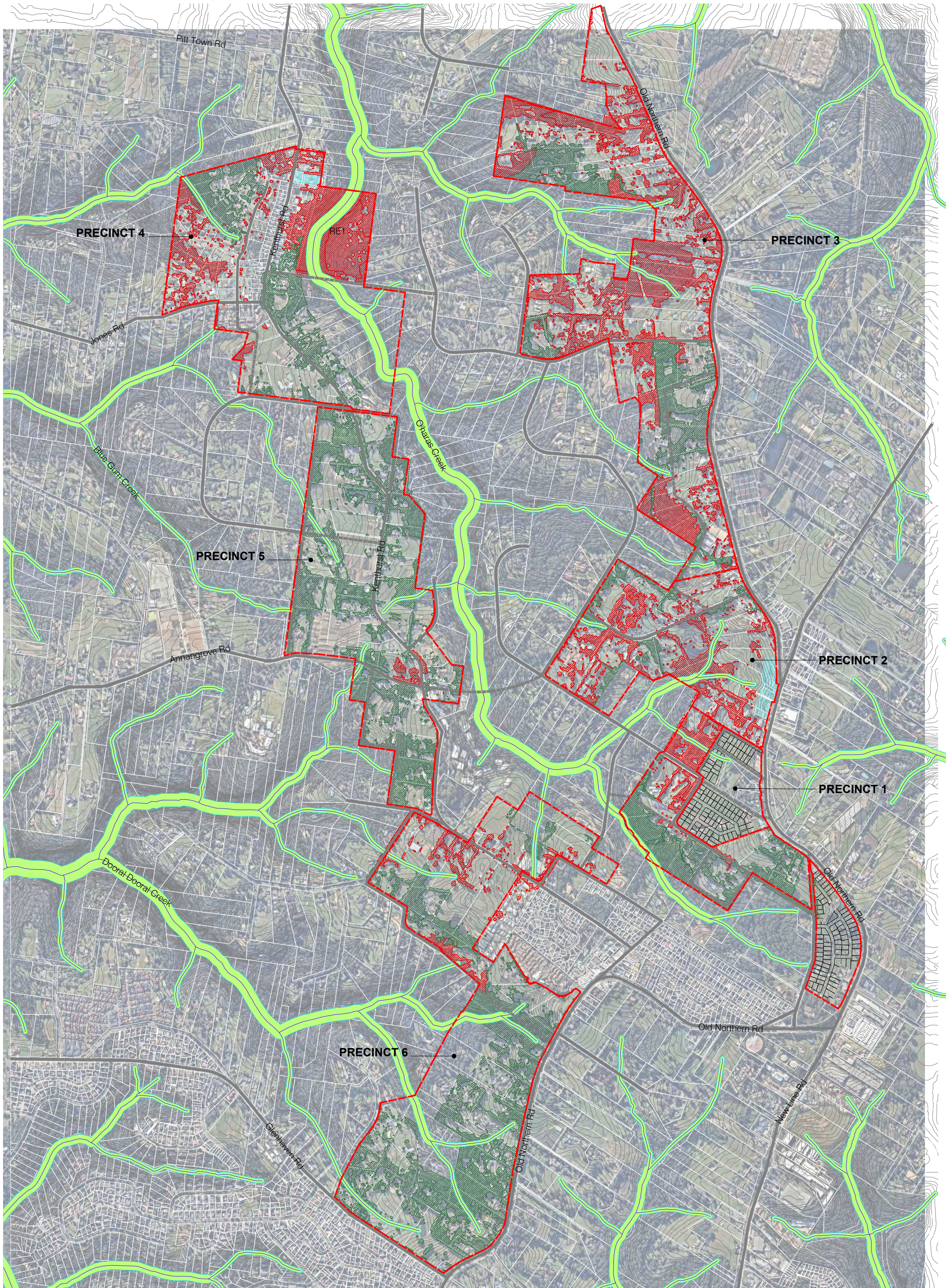




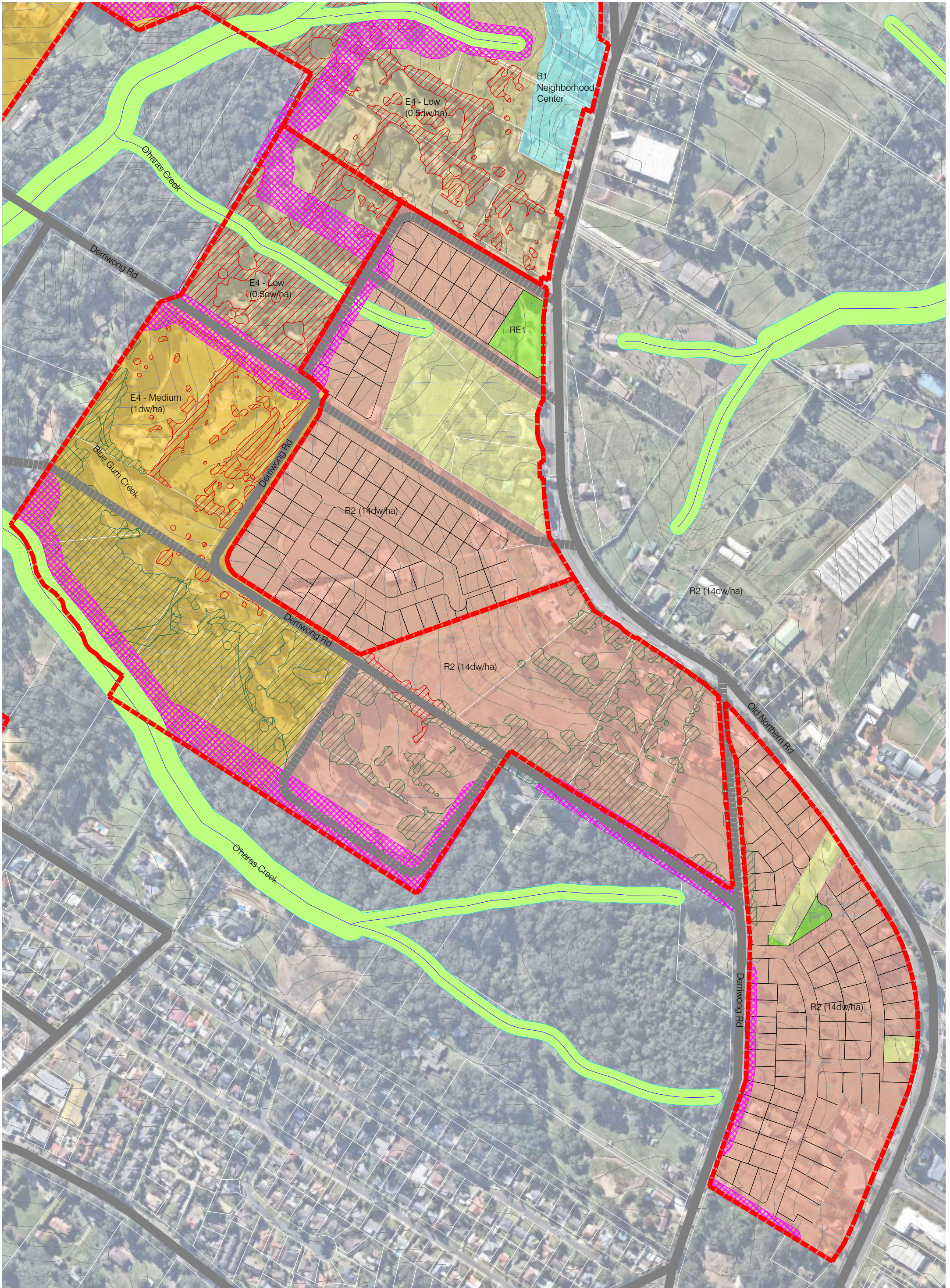
















Ashleigh Ryan  
Urbis  
Level 23, Darling Park Tower 2, 201 Sussex Street  
Sydney NSW 2000

**Project No. 15GOS\_1895**

12 September 2017

Dear Ashleigh,

**RE: Ecological Assessment – Dural Rezoning**

Eco Logical Australia Pty Ltd (ELA) was originally commissioned to prepare an Ecological and Bushfire Constraints Analysis for the proposed rezoning of the Dural Investigation Area. For this, ELA prepared a desktop preliminary constraints assessment of seven lots along Old Northern Road in late 2015. An additional five lots were added in early 2016. Since this time, Urbis (at the request from Council) has substantially increased the survey area for the current desktop assessment (**Figure 1**).

The focus of the desktop assessment was to identify possible ecological constraints and opportunities for future development within the semi-rural suburbs of Dural and Kenthurst, and identify areas which require field validation to inform more detailed assessments. The study area is split into two linear branches which flow in a north to south direction. The eastern branch aligns with Old Northern Road. The western branch lies along Kenthurst Road. Both start adjacent to Glenhaven Road in the south and extends towards Pitt Town Road in the north.

This letter outlines the combined ecological constraints across the entire study area, from desktop literature review and a small portion of vegetation validated during a brief field survey for the original study. Potential ecological constraints were assessed in relation to State and Commonwealth legislation, namely the NSW *Biodiversity Conservation Act 2016* (BC Act), formerly the *Threatened Species Conservation Act 1995* (TSC Act), and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The desktop analysis determined that the majority of the study area contains highly modified and scattered vegetation clumps. The significant portion of the intact remnant vegetation has been mapped as riparian buffers adjacent to the study area boundary.

Three threatened ecological communities have been previously mapped within the study area (THSC 2012 and NPWS 2002). These were Blue Gum High Forest (BGHF), listed as critically endangered under the BC and EPBC Acts, and Sydney Turpentine Ironbark Forest (STIF), listed as endangered under the BC Act and critically endangered under the EPBC Act. These communities were validated during the above field survey. The third community mapped, Shale-Sandstone Transition Forest (SSTF) requires validation. Shale-Sandstone Transition Forest is listed as critically endangered under the BC and EPBC Acts.

The study area includes important vegetative corridors along O'haras Creek and Dooral Dooral Creek and their tributaries which link vegetation across the study area. These links potentially support habitat for a number of threatened flora and fauna species. Additional surveys would be required to verify the extent and condition of threatened ecological communities and the presence of threatened species within the study area.



The *Biodiversity Conservation Act 2016* (BC Act) came into effect on 25 August 2017, changing the way biodiversity (ecological) impacts are assessed and approved in NSW. This includes a framework for the assessment methodology and introduces the new Biodiversity Offsets Scheme. As such, implications under the BC Act are likely to exist for development applications within the study area.

The three threatened ecological communities outlined above (mapped and/or validated) are currently listed under the BC Act as meeting the Serious and Irreversible Impact (SAII) principles. This means that impacts to these communities through a Development Application (DA) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) will not be allowed (depending on any thresholds that are yet to be developed by the Office of Environment and Heritage). However, impacts to these communities can be considered by the Environment Minister through Biodiversity certification of land (Biocertification), or through a Major Project (State Significant Development or State Significant Infrastructure) application.

Irrespective of the assessment pathway under the EP&A Act, development applications within the study area are likely to trigger the Biodiversity Offsets Schemes and impacts to biodiversity will be required to be offset.

Kind Regards,

Matthew Dowle  
Senior Ecologist

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## ATTACHMENT – ECOLOGICAL CONSTRAINTS ASSESSMENT

### Study Area Description

A desktop analysis was conducted for the entire Dural Investigation Area (**Figure 1**) (referred to as the “study area”) which is approximately 1083.66 ha in size and located wholly within The Hills Shire Council (THSC). The study area is split into two disjointed sections with Old Northern Road forming the eastern boundary and Kenthurst Road forming the western boundary. Old Northern Road also forms the boundary between two local government areas (LGAs), THSC and Hornsby Shire Council.

A tributary of O’haras Creek flows through the middle of the study area and much of the riparian vegetation has been omitted from the study area. The northern section tapers to a narrow point along Old Northern Road and aligns with Pitt Town Road in the north. The southern point ends at Glenhaven Road.

The study area contains a matrix of semi-rural properties, patches of native vegetation and commercial buildings. The majority of the study area is zoned as RU6 Transition (**Figure 2**) with the exception of several small linear sections along Old Northern Road in the south of the study area zoned SP2 (Classified Road) and a number of small parcels of land which are zoned for residential/commercial use.

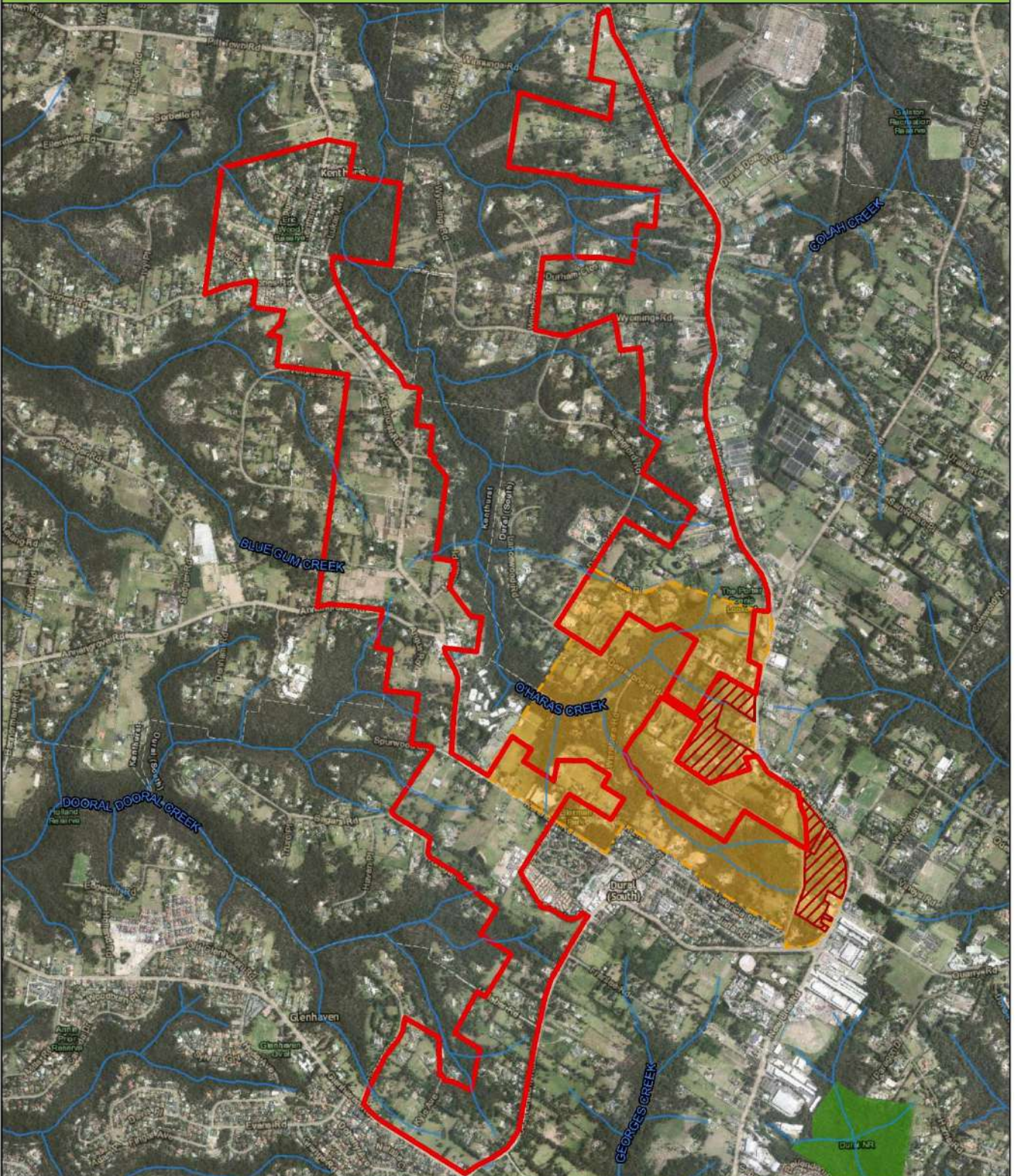
The entire study area has been zoned:

- RU6 Transition
- RE1 Public recreation
- RE2 Private recreation
- B1 Neighbourhood Centre
- B2 Local Centre
- SP2 Infrastructure.

A review of The Hills Local Environmental Plan 2012 (HLEP) Terrestrial Biodiversity layer has confirmed that a small portion of the study area has been mapped as part of the Terrestrial Biodiversity layer (**Figure 3**). The Terrestrial Biodiversity layer has mapped all the riparian buffers which flow adjacent to the study area. At times the study area encroaches into the riparian corridor, these areas has also been mapped as part of the ‘Biodiversity’ layer. This includes a large tract of vegetation west of Dural Street. Another substantial patch was located in the south of the study area along a tributary of Dooral Dooral Creek and an additional patch along O’haras Creek. These areas relate to clause 7.4 Biodiversity (Terrestrial) of THSC LEP and requires that certain objectives relating to biodiversity protection be considered when assessing development applications on land that have been shown on the Terrestrial Biodiversity Map.



**Location**



|   |  |  |
|---|--|--|
| <p><b>Legend</b></p> <ul style="list-style-type: none"> <li><span style="border: 2px solid red; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Study Area (Dural Investigation Area)</li> <li><span style="background-color: yellow; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Original Study Area</li> <li><span style="border: 1px solid black; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px); display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Original Subject Site</li> <li><span style="background-color: lightgreen; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> NPWS Estate</li> <li><span style="border-bottom: 1px solid blue; display: inline-block; width: 15px; margin-right: 5px;"></span> Drainage</li> </ul> |  | <p>0 200 400 800<br/>Metres</p> <p>Datum/Projection:<br/>GDA 1994 MGA Zone 56</p> <p>© Land and Property Information 2015</p> <p><b>eco logical</b><br/>AUSTRALIA</p> <p>www.ecoaus.com.au</p> <p>Prepared by: AS Date: 31/08/2017</p> |
|---|--|--|

**Figure 1: study area and hydrology**



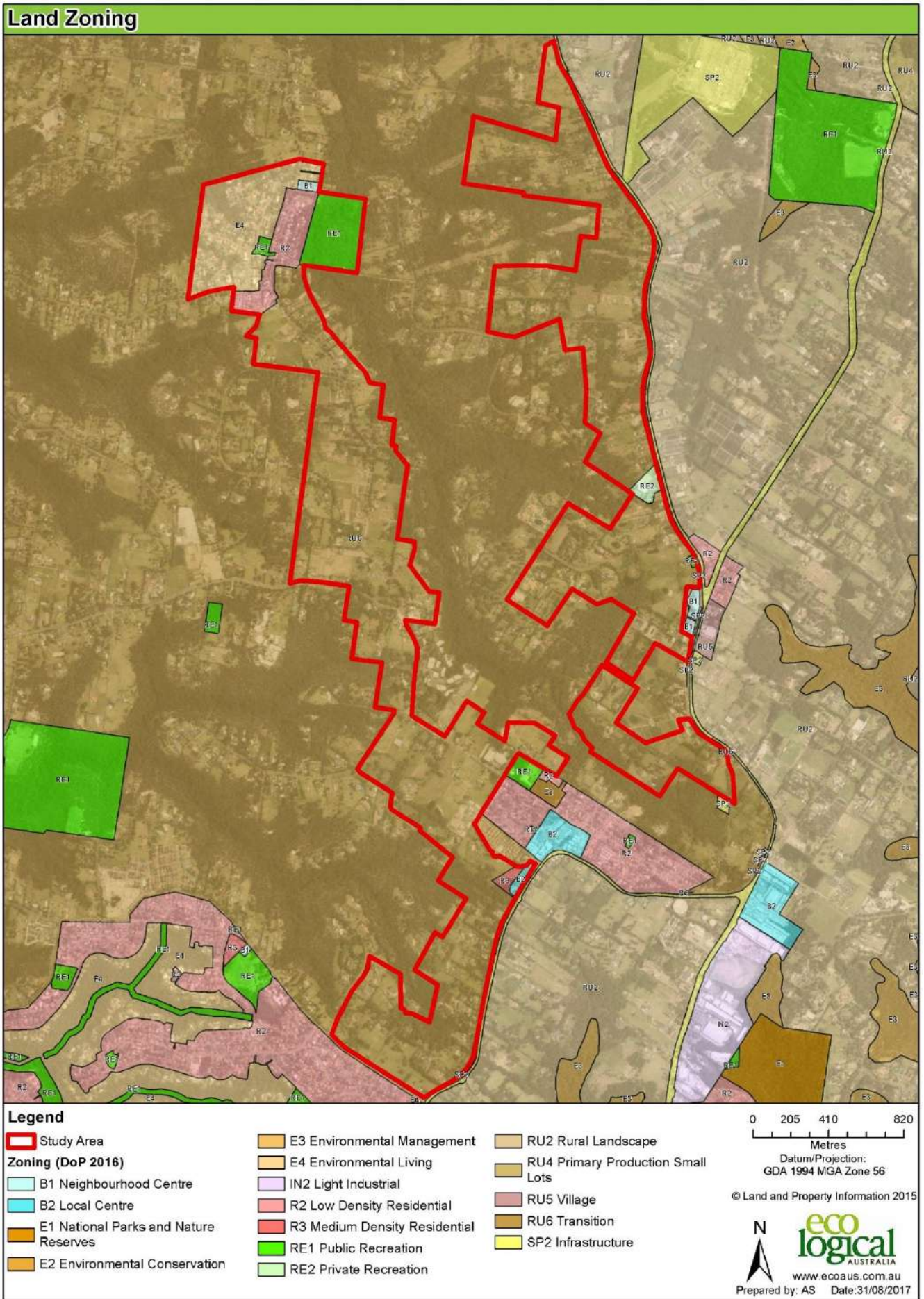


Figure 2: current THSC LEP 2012 zoning within the study area



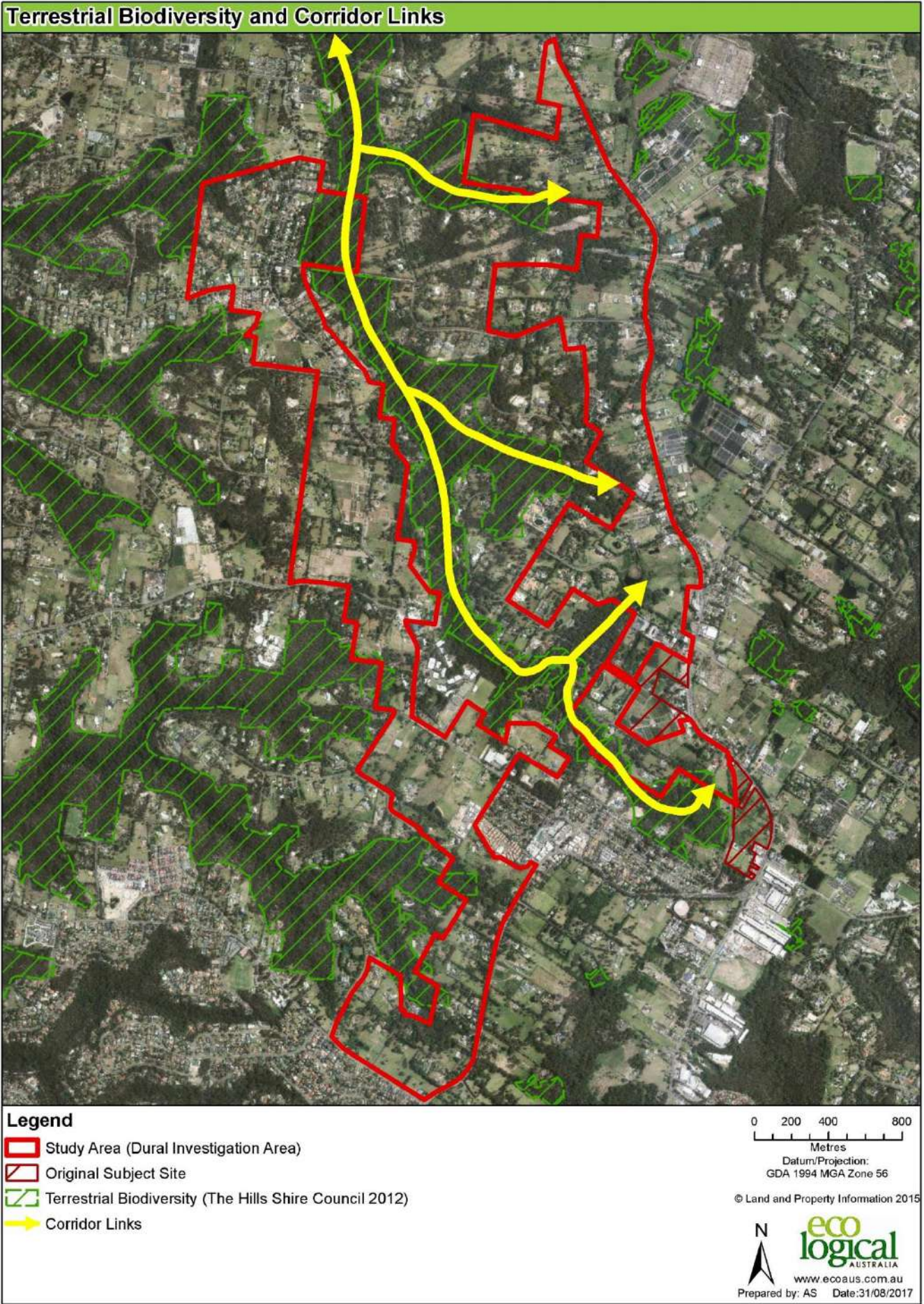


Figure 3: Terrestrial Biodiversity Layer (HELP) and potential corridor links

## Methodology

The following resources were reviewed during the desktop assessment of the study area:

- NSW BioNet, Atlas of NSW Wildlife database search (5 km ) (accessed 28 August 2017)
- EPBC Act Protected Matters Search Tool (5 km) (accessed 27 August 2017)
- *Soil Landscapes of the Sydney 1:100 000 sheet* (Chapman and Murphy 1989)
- Vegetation mapping:
  - Native vegetation of Western Sydney (NPWS 2002)
  - The Hills Shire Council vegetation mapping (THSC 2012) (Sheet 6)
- Local government planning instruments
  - The Hills Local Environmental Plan 2012 (HLEP)
  - The Hills Shire Council Terrestrial Biodiversity Map (Sheet CL1\_023)
- Aerial photography.

A review of available literature and database searches was conducted to determine potential ecological constraints, development opportunities and data gaps. This information was used to assist in the overall assessment of the study area. An assessment criteria using a high level and broad approach was used to determine the ecological constraints when conducting the desktop analysis (**Table 1**). It is noted that the ecological constraints criteria can be refined following field validation, but for the purposes of this report, was informed only through a desktop analysis. A riparian buffer zone was assigned to the waterways within the study area in accordance with the Office of Water Guidelines for Riparian Corridors on Waterfront lands (NSW OoW 2012) and mapped as moderate constraints (**Table 1**).

An assessment of the likelihood of occurrence of TECs and threatened flora and fauna species recorded from Atlas of NSW Wildlife and EPBC predicted search tool was undertaken to determine if these species and their habitats were likely to occur within the study area (**Appendix A**). This information was also used to determine the ecological constraint of the vegetation patch.

A brief site investigation was originally conducted on 22 October 2015 by Danielle Adams-Bennett to identify the presence and condition of TECs, threatened species and fauna habitat values (i.e. hollow-bearing trees) within two clusters of lots (Lot 100 & 102 (DP13628), Lot 1 (DP656036), Lot X (DP501233), Lot 2 (DP567995), Lot 9 (DP237576), Lot 2 (DP541329) and Lots 101 & 103 (DP713628)) as part of the original field survey along Old Northern Road for Urbis. A follow-up site investigation to incorporate the additional sites was conducted on 17 February 2016. A brief visual assessment from the roadside was conducted to identify vegetation in the broader study area. This method is suitable when trying to conduct broad validation. However, additional field surveys are required to confirm the boundaries of these vegetation communities and the presence of threatened species within the study area that are outside the subject site.

**Table 1: Constraints assessment criteria**

| Ecological Constraint | Criteria  |
|-----------------------|---|
| High constraint       | Threatened ecological communities, known records for threatened flora, or known breeding habitat for threatened fauna species.  |
| Moderate constraint   | Riparian buffers, important vegetative corridors or large tracts of native vegetation with potential to provide habitat for threatened flora and foraging habitat for threatened fauna species. |
| Low constraint        | Non-native or degraded native vegetation communities  |
| Nil                   | Cleared areas or developed lands  |



## Results

### *Literature review of study area*

#### Hydrology and Soils

The study area incorporates several creeks and their tributaries (**Figure 1**). These include 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Order Streams using the Strahler stream order. O'haras Creek flows through the middle of the two branches of the study area. The majority of O'haras Creek and its riparian buffer has been excluded from the study area boundary. The headwaters to Dooral Dooral Creek flows into the study area from the south-west. The study area also includes several tributaries which flow into Dooral Dooral and O'haras Creeks.

The majority of the site is located within Glenorie soil landscape, this transitions to Lucas Heights along O'Haras Creek. Small sections of Hawkesbury and Gynea soil landscapes feature within the western portion of the study area. Glenorie soil landscape (erosional) occurs on undulating or rolling hills. It is associated with the Wianamatta Group Shales and has low to moderate fertility and high erosional hazard (Chapman and Murphy 1989). Lucas Heights soil landscape (residual) is generally found on upper slopes or ridgetops and has a low fertility (Chapman and Murphy 1989). Gynea soil landscapes are associated with undulating hills on Hawkesbury Sandstone and contains quartz sandstones with minor shale and laminate lenses.

#### Vegetation communities

Vegetation within the study area has been previously mapped by broad-scale mapping projects (NPWS 2002 and THSC 2012). However, the two vegetation mapping datasets are inconsistent in the classification of native vegetation types within the study area (discussed below). Therefore, field validation is required to confirm the presence and identity of any native vegetation communities within the study area. For the purpose of this investigation, the updated mapping by THSC (2012) formed the basis of the vegetation layer with a small section of vegetation in the south-east validated by ELA in 2015/2016 (**Figure 4**).

Interpretation of aerial photography indicated the presence of semi-rural properties, market gardens, cleared lands and scattered clumps of trees. Large tracts of vegetation mapped within the study area adjoin the adjacent riparian corridors and provide important vegetative links with adjacent patches of vegetation.

There are six native vegetation communities mapped within the study area (**Figure 4**), of which two communities are represented as sub-groups, i.e. *Shale Sandstone Transition Forest with Shale / Sandstone influence* and *Sandstone Gully Forest with / without rainforest understorey* (**Table 2**). One non-native vegetation community was also mapped by THSC (2012). **Table 2** provides a brief description of the geographic location of each community and its conservation status.

Aerial photography interpretation and analysis of previous vegetation indicates that the majority of the TECs occur as scattered canopy trees in the north-east of the study area.

**Table 2: Summary table of vegetation communities mapped by THSC (2012) within the study area**

| Vegetation community   | BC Act                | EPBC Act              | Area (ha) | Description  |
|------------------------|-----------------------|-----------------------|-----------|--|
| Blue Gum High Forest   | Critically Endangered | Critically Endangered | 2.7       | One patch located in eastern fork of the study area. Potential for this vegetation community to continue outside the study area adjacent to O'haras Creek riparian buffer in the north-east of the study area. Validation is required to confirm listing under the BC and EPBC Acts. |
| Sandstone Gully Forest | N/A                   | N/A                   | 63.5      | Mapped across the southern portion of the study area and a small fragment in the north-west. Widely distributed and contains large patches and scattered trees.  |

| Vegetation community                                    | BC Act                | EPBC Act              | Area (ha) | Description   |
|---|-----------------------|-----------------------|-----------|---|
| Sandstone Gully Forest (rainforest understorey)         | N/A                   | N/A                   | 2.3       | A small patch was mapped as this vegetation community along the western boundary. This patch is continuous with the adjacent vegetation outside the study area.   |
| Sandstone Heath   | N/A                   | N/A                   | 7.7       | Several large patches in the far north-western corner of the study area. Includes a large chunk of intact vegetation and scattered canopy trees.  |
| Sandstone Ridgetop Woodland                             | N/A                   | N/A                   | 31.2      | Small patches of this community are scattered throughout the study area. Much of the vegetation is likely to be highly modified based on aerial photography interpretation.   |
| Shale Sandstone Transition Forest (Sandstone influence) | Critically Endangered | Critically Endangered | 22.3      | Isolated to a number of patches in the north. Much of the vegetation is connected to adjacent patches which may include the same community in similar condition. Validation is required to confirm listing under the BC and EPBC Acts.  |
| Shale Sandstone Transition Forest (Shale influence)     | Critically Endangered | Critically Endangered | 20.5      | This vegetation community appears to be fragmented and highly modified based on aerial photography interpretation. One large chunk of vegetation was recorded adjacent to O'haras Creek along the eastern corridor, however, the remaining patches look fragmented. Validation is required to confirm listing under the BC and EPBC Acts. |
| Sydney Turpentine-Ironbark Forest                       | Endangered            | Critically Endangered | 13.6      | The majority of the patches of this community are located in the far north-east or south-east of the study area. The southern patches are connected to larger adjacent patches of vegetation. Patches in the north appear fragmented and disturbed. Validation is required to confirm listing under the BC and EPBC Acts.                 |
| Gardens/Modified Vegetation Communities                 | N/A                   | N/A                   | 2.6       | Only a small amount of vegetation of either garden or modified native vegetation was mapped within the study area. These were limited to the north-west of the study area.  |

#### *Blue Gum High Forest and Sydney Turpentine Ironbark Forest*

The original study validated three small patches of vegetation as Blue Gum High Forest listed under the BC Act, due to the presence of the key diagnostic species for this community; *Eucalyptus saligna* (Blue Gum) and *Eucalyptus pilularis* (Blackbutt) (**Figure 4**). The two northern patches contained mature and regenerating Blue Gum individuals (**Plate 1**), while the southern patch contained just two mature Blackbutts (**Plate 2**). These patches did not satisfy the more stringent listing criteria under the EPBC Act, due to their small size (less than 1 ha), lack of native species diversity across all strata, and/or they contain a canopy cover less than 10%.

A small linear patch of Sydney Turpentine Ironbark Forest listed under the BC Act was validated in the original study along Derriwong Road and may be impacted by the rezoning. However, similar to Blue Gum High Forest, this patch did not satisfy the stringent criteria for listing Sydney Turpentine Ironbark Forest under the EPBC Act.

The site inspection beyond the original subject site also identified key characteristic species of Sydney Turpentine Ironbark Forest or Blue Gum High Forest, suggesting that these communities are located within the broader study area (**Figure 4**). Species include *Syncarpia glomulifera* (Turpentine), *Eucalyptus saligna*, *Eucalyptus pilularis* and *Angophora costata*. These were identified in previous mapping as Blue Gum High Forest or Sydney Turpentine Ironbark Forest by NPWS (2002) and Shale/Sandstone Transition Forest by THSC (2012).

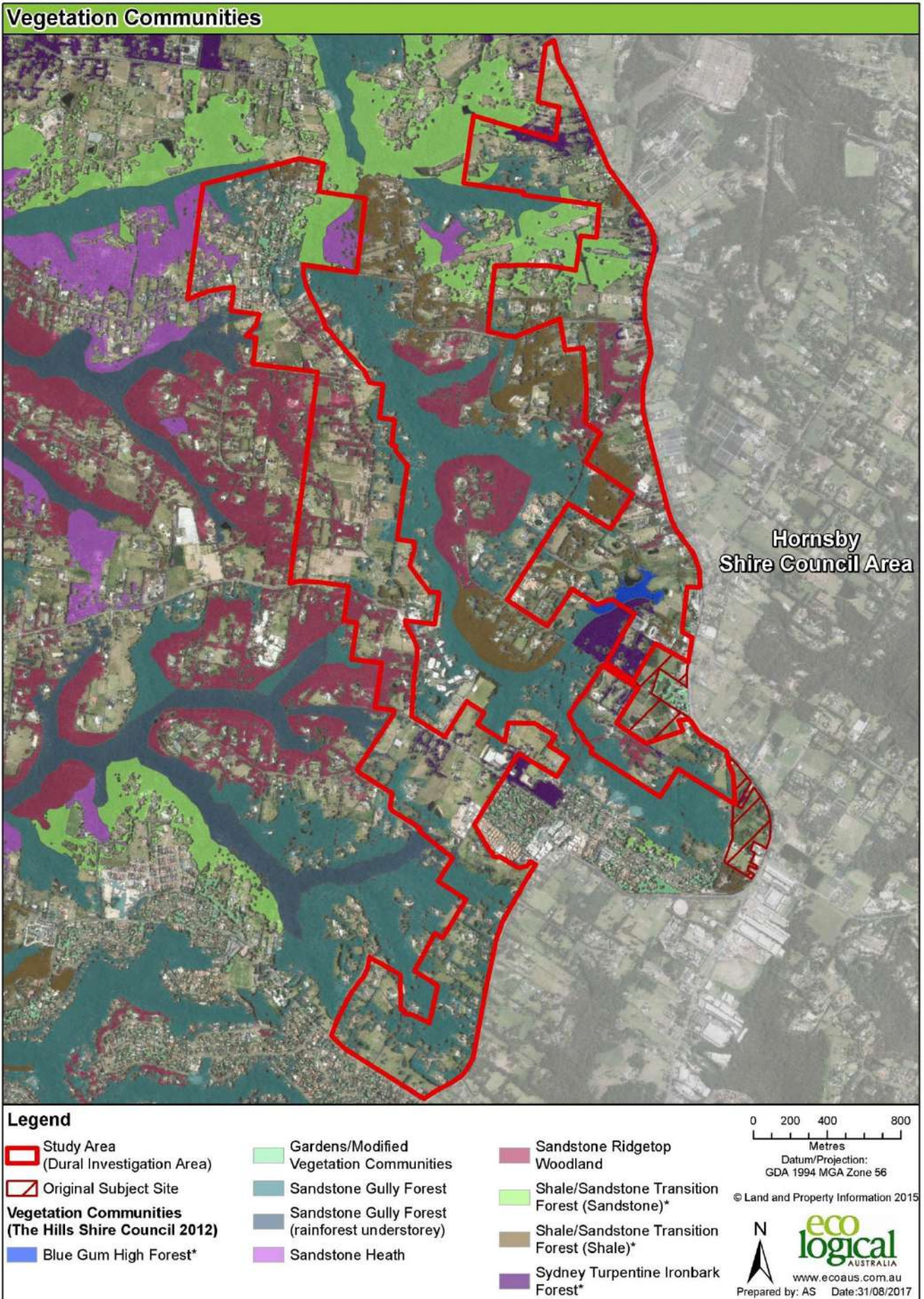


Figure 4: Vegetation communities





**Plate 1: Patch of Blue Gum High Forest in poor condition within the study area**



**Plate 2: Patch of Blue Gum High Forest consisting of two individual *Eucalyptus pilularis***

### Threatened species

Database searches identified the potential occurrence of seven threatened ecological communities, 35 threatened flora species and 62 threatened fauna species, which are listed under the BC or EPBC Acts in the study area. Fauna included 34 birds (including 10 migratory species), 15 mammals (including nine bats), five amphibians, two fish, two invertebrate and two reptiles that have been recorded or are likely to occur within a 5 km radius around the study area (**Figure 5** and **Figure 6**).

An assessment of the likelihood of occurrence for threatened species to occur within the study area is provided in **Appendix A**. The assessment identified that highly mobile fauna species such as microbats and bird species may utilise the study area. Additionally, there are a number of records for one threatened invertebrate *Pommerhelix duralensis* (Dural Land Snail) and one threatened amphibian *Pseudophryne australis* (Red-crowned Toadlet) which may inhabit the study area. Similar types of habitat were located in semi-rural properties adjacent to the study area. Provided that the vegetation within the study area contains important habitat features (i.e. hollow-bearing trees, fallen logs and intact native vegetation) the study area is likely to support patches of significant habitat for threatened fauna species, particularly in the undisturbed and intact areas.

Although no flora species were recorded during the site visit in 2015/2016 as part of the original study, there is potential that the study area contains a number of threatened flora species, particularly in unmodified habitats. There are three threatened flora species *Epacris purpurascens* var. *purpurascens*, *Leucopogon fletcheri* subsp. *fletcheri* and *Persoonia mollis* subsp. *maxima* previously recorded within the study area. There is potential for other threatened flora species including; *Acacia bynoeana*, *A. gordonii*, *A. pubescens*, *Darwinia biflora*, *Hibbertia superans*, *Melaleuca deanei* and *Tetratheca glandulosa* to occur within the study area.

Targeted field surveys or habitat assessments are required to determine if threatened species occur or whether suitable habitat is present within the study area.



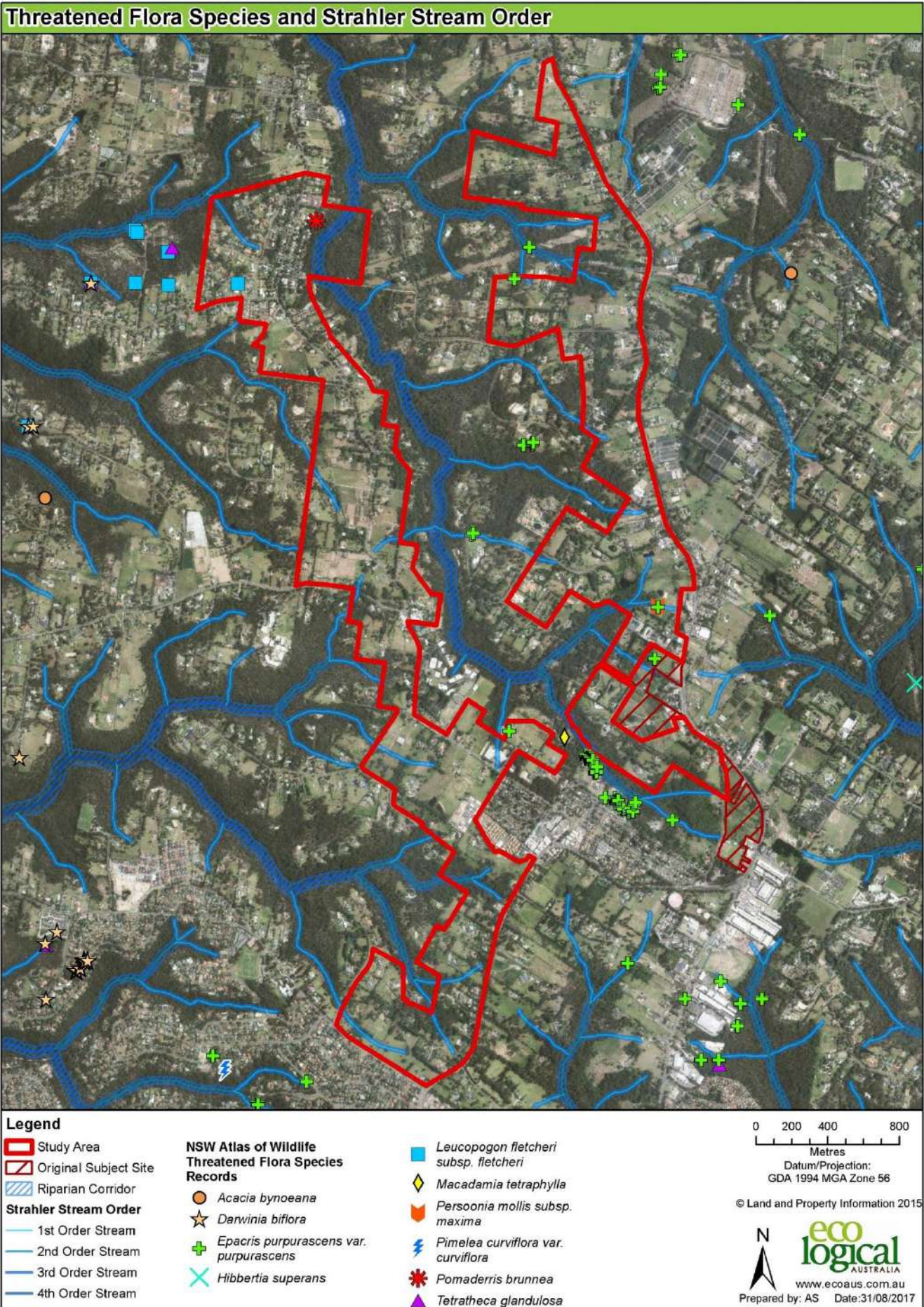


Figure 5: Threatened flora records from the BioNet Atlas of NSW Wildlife records within 5 km radius of study area



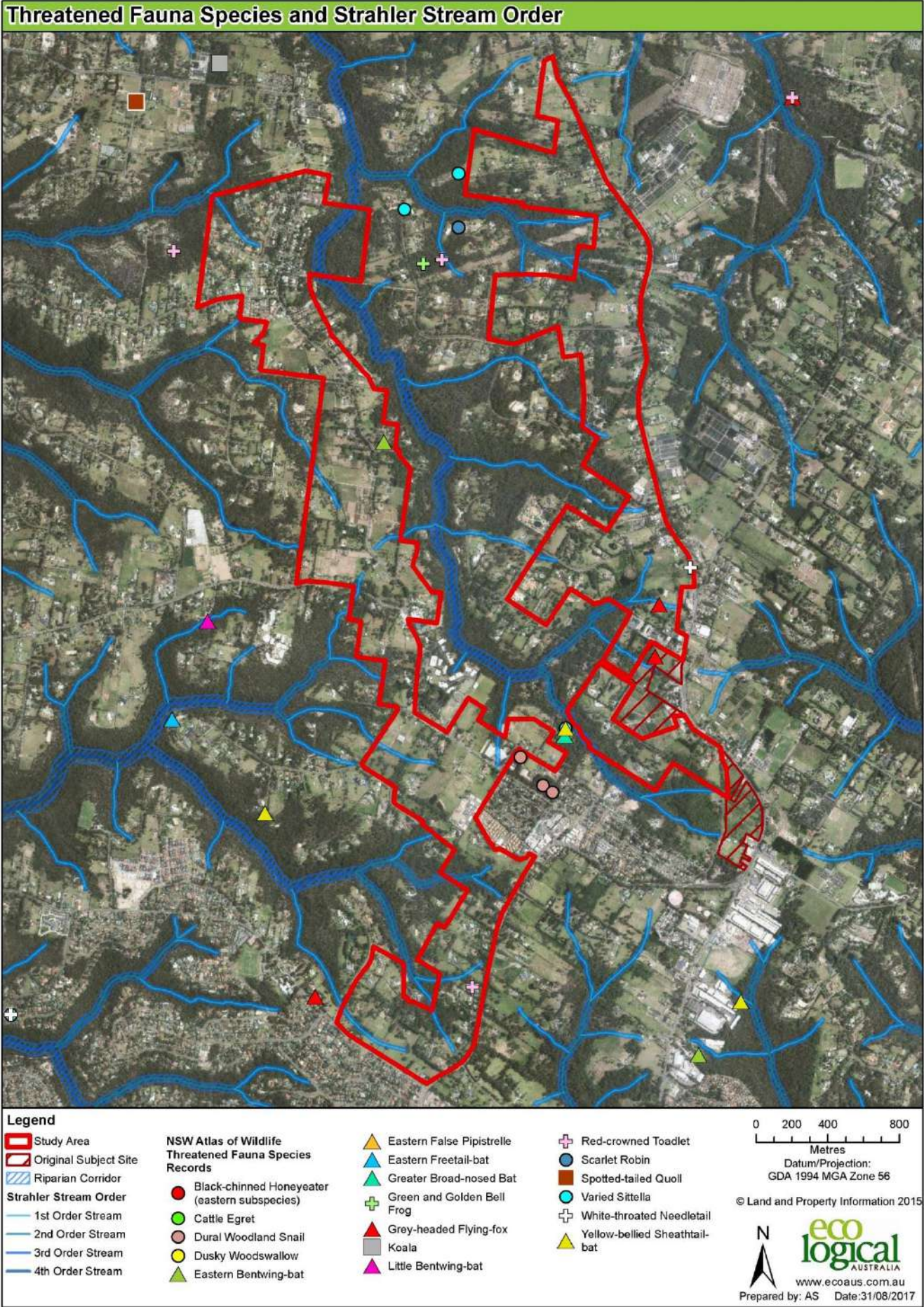


Figure 6: Threatened fauna records from the BioNet Atlas of NSW Wildlife records within 5 km radius of study area

## Ecological Constraints

An ecological constraint value using the criteria outlined in **Table 1** was assigned to the study area based on the information from both the desktop review and site inspections. The value relates to potential risk of the rezoning to be constrained by biodiversity.

These ecological constraints have been mapped (**Figure 7**) and discussed in the **Table 3** below.

**Table 3: constraints assessment of the subject site**

| Constraint | Value present on site  | Constraint ranking criteria   | Recommendation   |
|------------|--|---|--|
| High       | <ul style="list-style-type: none"> <li>Blue Gum High Forest and</li> <li>Sydney Turpentine Ironbark Forest</li> <li>Shale Sandstone Transition Forest</li> </ul> | <ul style="list-style-type: none"> <li>vegetation communities listed as threatened under the BC Act and EPBC Act</li> <li>potential foraging habitat for threatened bird species (e.g. Little Eagle, Powerful Owl) and microbats</li> </ul> | <ul style="list-style-type: none"> <li>removal of the vegetation should be avoided</li> <li>these communities are identified as meeting the Serious and Irreversible Impacts (SII) Principals outlined under the BC Act. As such, impacts will not be allowed through a Part 4 EP&amp;A Act development. However, impacts can be considered through a Biocertification, or Major Project application. Offsets will be required for any impacts.</li> <li>retain vegetation if possible and consider assisted revegetation with diagnostic species for the ecological community</li> <li>minimise impacts during development design and construction phase including establishing a buffer area adjacent to the vegetation.</li> <li>educate local community on significance of these ecological communities and threatened species through interpretative signage</li> </ul> |
| Moderate   | Native vegetation with a canopy  | <ul style="list-style-type: none"> <li>potential foraging habitat for threatened fauna species</li> <li>corridor for native fauna dispersal</li> </ul>  | <ul style="list-style-type: none"> <li>retain native vegetation where possible</li> <li>incorporate into landscape planting design if possible</li> </ul>  |
| Moderate   | Patch of native shrubs   | <ul style="list-style-type: none"> <li>contains some native resilience, although it does not represent a native vegetation community</li> <li>potential corridor or shelter for native fauna</li> </ul>                                     | <ul style="list-style-type: none"> <li>suitable for some forms of development</li> </ul>   |
| Moderate   | Planted non-indigenous native vegetation   | <ul style="list-style-type: none"> <li>does not represent a native vegetation community</li> <li>potential corridor or shelter for native fauna</li> </ul>  | <ul style="list-style-type: none"> <li>suitable for some forms of development</li> </ul>   |
| Low        | Farm dam   | <ul style="list-style-type: none"> <li>potential foraging habitat for some microbats</li> <li>potential habitat for some native fauna species</li> </ul>  | <ul style="list-style-type: none"> <li>conduct dewatering plan and relocation of native fauna species prior to disturbance, if required</li> <li>suitable for development</li> </ul>   |



| Constraint | Value present on site | Constraint ranking criteria   | Recommendation  |
|------------|-----------------------|---|---|
| Low        | Exotic vegetation     | <ul style="list-style-type: none"> <li>suitable foraging habitat for some threatened species (and other native fauna), such as Little Eagle, microbats and migratory birds</li> <li>waterbodies support limited vegetation cover for fauna</li> </ul> | <ul style="list-style-type: none"> <li>suitable for development</li> <li>development should be confined to areas of low constraint wherever possible</li> <li>implement management techniques to prevent the dispersal of weed species into adjacent woodland areas particularly during construction</li> </ul> |
| Low        | Landscape gardens     | <ul style="list-style-type: none"> <li>planted tree species</li> <li>potential foraging habitat for fauna species such as birds, reptiles</li> </ul>  | <ul style="list-style-type: none"> <li>suitable for development</li> <li>development should be confined to areas of low constraint wherever possible</li> <li></li> </ul>   |

### Biodiversity Conservation Act 2016 (BC Act) and Biodiversity Offsets Scheme

The *Biodiversity Conservation Act 2016* (BC Act) came into effect on 25 August 2017, changing the way biodiversity (ecological) impacts are assessed and approved in NSW. This includes a framework for the assessment methodology and introduces the new Biodiversity Offsets Scheme. As such, implications under the BC Act are likely to exist for development applications within the study area.

Blue Gum High Forest, Sydney Turpentine Ironbark Forest, and Shale / Sandstone Transition Forest are all currently listed under the BC Act as meeting the Serious and Irreversible Impact (SII) principles. This means that impacts to these communities through a Development Application (DA) under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) will not be allowed (depending on any thresholds that are yet to be developed by the Office of Environment and Heritage). However, impacts to these communities can be considered by the Environment Minister through Biodiversity certification of land (Biocertification), or through a Major Project (State Significant Development or State Significant Infrastructure) application.

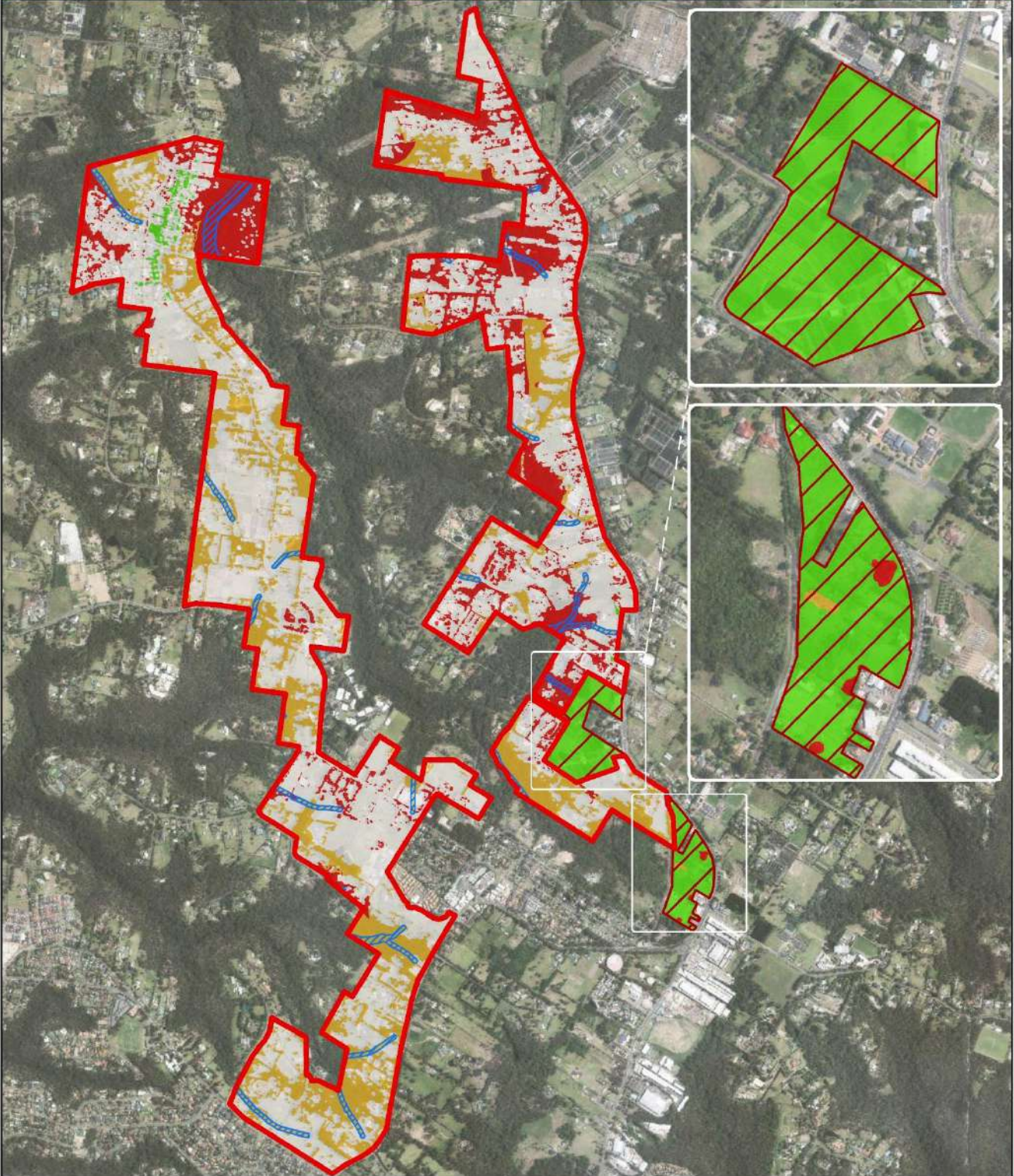
Under a Biocertification, areas of high conservation (constraint) value can be avoided and protected while identifying areas suitable for development. Biodiversity certification also offers a range of secure options for offsetting impacts on biodiversity.

Irrespective of the assessment pathway under the EP&A Act, development applications within the study area are likely to trigger the Biodiversity Offsets Schemes and impacts to biodiversity will be required to be offset. A number of potential offsets options are available and include:

- Purchasing and retiring a calculated number of credits relative to the impact of the proposed works, as identified by the Biodiversity Assessment Method Credit Calculator.
- Paying money into the 'Biodiversity Conservation Fund' with a premium.
- Fund a Biodiversity Action (available in some circumstances).



**Ecological Constraint**



|   |   |   |
|---|---|---|
| <b>Legend</b>   |   | <br>Datum/Projection:<br>GDA 1994 MGA Zone 56 |
| Study Area (Dural Investigation Area)<br>Original Subject Site<br>Riparian Corridor | <b>Ecological Constraint (ELA 2017)</b><br>High<br>Moderate<br>Low<br>Nil |   |

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Figure 7: Constraints assessment

## Recommendations – high level

The study area is likely to contain some habitat for threatened flora and fauna species, particularly in areas of intact, or undisturbed vegetation. Based on the desktop assessment, the study area contains potential Blue Gum High Forest, Sydney Turpentine Ironbark Forest and Shale Sandstone Transition Forest (previous vegetation mapping, THSC 2012).

These three threatened ecological communities are listed as potential Serious and Irreversible Impacts under the BC Act, and impacts to these ecological communities should be avoided. It is noted that field surveys would be required to validate the extent of the ecological communities and confirm the presence of threatened species within the study area.

The following recommendations have been provided for the proposed rezoning of the study area:

- Avoid impact to areas of high ecological constraint.
- If high ecologically constrained areas are to be impacted by future road networks or lot layouts, further investigations are to be undertaken at the subdivision stage.
- Any plantings as part of future developments incorporate native species indigenous to the study area.
- Prepare a soil and erosion control plan as part any Development Application process.
- Consider implementing a Vegetation Management Plan (VMP) for the long-term conservation threatened ecological communities and management of weeds to prevent their spread.
- Alternatively, consider the Biocertification of the study area. Under the Biocertification, areas of high conservation (constraint) value can be avoided and protected while identifying areas suitable for development. Biodiversity certification also offers a range of secure options for offsetting impacts on biodiversity.
- Set aside the high ecological constraint areas conforming to Blue Gum High Forest, Sydney Turpentine Ironbark Forest and Shale Sandstone Transition Forest, and convert these areas to a Biodiversity Stewardship Site. These stewardship sites could be used to offset impacts associated with the Biocertification, or retired as required for other developments.



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## APPENDIX A - Likelihood of occurrence

Searches of the Atlas of NSW Wildlife and EPBC Protected Matters search tool were performed for the study area, based on a 5 km buffer around the study area. Marine species (including whales, seabirds, turtles and seals) have been removed from the list as these species were not considered relevant to the current proposal. The likelihood of occurrence was considered for all listed species, and is provided for each species under the 'likely' column.

Each species likely occurrence was initially informed through a desktop assessment and was used to guide the site inspection. The final assessment of the likelihood of occurrence was completed following the site inspection and was based on database or other records, presence or absence of suitable habitat, features of the study area, results of the field survey and professional judgement.

The terms for likelihood of occurrence are defined below:

- “yes” = the species was or has been observed in the study area
- “likely” = a medium to high probability that a species uses the study area
- “potential” = suitable habitat for a species occurs in the study area, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- “unlikely” = a very low to low probability that a species uses the study area, and
- “no” = habitat in the study area and in its vicinity is unsuitable for the species

Those species considered as potentially, likely or known to occur (likelihood of potential, likely or yes) are considered subject species for this project.

The following abbreviations have been used in the likelihood assessment:

- *TSC\_Status* = Listing under the NSW Threatened Species Conservation Act 1995
- *EPBC\_Status* = Listing under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999
- *CE* = Critically Endangered
- *E* = Endangered
- *E2* = Endangered Population
- *V* = Vulnerable
- *M* = Migratory

| SCIENTIFIC NAME  | COMMON NAME | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|--|-------------|---------|----------|---|--------------------------|
| <b>Ecological Communities</b>  |             |         |          |   |                          |
| Blue Gum High Forest in the Sydney Basin Bioregion                               |             | CE      | CE       | Occurs mainly in areas with deep clay soil derived from shale, generally at altitudes greater than 100 m above sea level, and that have an annual rainfall of more than 1050 mm. Also known to occur in isolated valleys on soils associated with localised volcanic intrusions. Remnants mainly occur in the Lane Cove, Willoughby, Ku-ring-gai, Hornsby, Baulkham Hills, Ryde and Parramatta local government areas.  | Known                    |
| Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion |             | E       | E        | Occurs on sandy soils of Hawkesbury-Nepean river system typically with low nutrient value and flat topography. The vegetation community contains low woodland, canopy up to 15m tall and dense mid layer of sclerophyll shrubs and scattered sedges. Species include <i>Angophora bakeri</i> , <i>Eucalyptus racemosa</i> , <i>Melaleuca decora</i> and <i>Banksia aemula</i> .   | No                       |
| Coastal Upland Swamps in the Sydney Basin Bioregion                              |             | E       | E        | This ecological community is restricted to the Sydney Basin Bioregion. It occurs on the Hawkesbury sandstone plateaux on acidic soils which are high in organic matter and subject to periodic waterlogging (OEH 2014). The structure of the vegetation may vary from tall open scrubs, tall closed scrubs, closed heaths, open graminoid heaths, sedgeland and fernlands (OEH 2014). This ecological community is associated with shallow groundwater aquifers in the headwaters and impeded drainage lines of streams, and on sandstone benches with abundant seepage moisture (OEH 2014). The floristic assemblage is diverse particularly in the ground layer (OEH 2014). | No                       |
| Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion            |             | E       | CE       | Occurs in western Sydney, with the most extensive stands occurring in the Castlereagh and Holsworthy areas. Smaller remnants occur in the Kemps Creek area and in the eastern section of the Cumberland Plain.  | No                       |



| SCIENTIFIC NAME               | COMMON NAME   | TSC ACT             | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|-------------------------------|---|---------------------|----------|---|--------------------------|
|                               | Shale/Sandstone Transition Forest                         | CE                  | E        | Occurs at the edges of the Cumberland Plain, where clay soils from the shale rock intergrade with earthy and sandy soils from sandstone, or where shale caps overlay sandstone. The boundaries are indistinct, and the species composition varies depending on the soil influences. It typically occurs in moderately wet sites, with an annual rainfall of 800-1100mm per year, and on clay soils derived from Wianamatta shale. The tree canopy is dominated by Turpentine and a variety of eucalypt species. Its distribution is mainly on the Cumberland Plain of the Sydney region. Was not recorded during the field surveys. | Potential                |
|                               | Turpentine-Ironbark Forest in the Sydney Basin Bioregion  | E                   | CE       | Occurs in areas of moderate annual rainfall 800 – 1100 mm on fertile soils of the Wianamatta Shale including altitude margins of the Cumberland Plain, and on the shale ridge caps of sandstone plateaus. It is distributed between areas of Blue Gum High Forest (which occurs on more fertile soils and higher rainfall areas) and Cumberland Plain Woodland (on flat areas, less fertile soils and less rainfall). Remnants mostly occur in the Baulkham Hills, Hornsby, Ku-ring-gai, Parramatta, Ryde, Sutherland and Hurstville local government areas (OEH 2014).   | Known                    |
|                               | Western Sydney Dry Rainforest and Moist Woodland on Shale | E                   | CE       | A closed canopy often associated with humid conditions and supports epiphytes, vines and mesic shrubs although this varies according to topography and landform. It is found on shale soil in the Cumberland Plain Sub-region of the Sydney Basin Bioregion in elevations below 300m with a mean annual rainfall between 700-900mm.   | No                       |
| <b>FISH</b>                   |   |                     |          |   |                          |
| <i>Macquaria australasica</i> | Macquarie Perch   | E<br>(under FM Act) | E        | Habitat for the Macquarie perch is bottom or mid-water in slow-flowing rivers with deep holes, typically in the upper reaches of forested catchments with intact riparian vegetation. Macquarie perch also do well in some upper catchment lakes. In some parts of its range, the species is reduced to taking refuge in small pools which persist in midland–upland areas through the drier summer periods.  | No                       |

| SCIENTIFIC NAME                 | COMMON NAME                | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE                                 |
|---------------------------------|----------------------------|---------|----------|--|--|
| <i>Prototroctes maraena</i>     | Australian Grayling        | -       | V        | Historically, this species occurred in coastal streams from the Grose River southwards through NSW, VIC and TAS. On mainland Australia, this species has been recorded from rivers flowing east and south of the main dividing ranges. This species spends only part of its lifecycle in freshwater, mainly inhabiting clear, gravel-bottomed streams with alternating pools and riffles, and granite outcrops but has also been found in muddy-bottomed, heavily silted habitat. Grayling migrate between freshwater streams and the ocean and as such it is generally accepted to be a diadromous (migratory between fresh and salt waters) species.   | No   |
| <b>FROGS</b>                    |                            |         |          |  |  |
| <i>Heleioporus australiacus</i> | Giant Burrowing Frog       | V       | V        | Forages in woodlands, wet heath, dry and wet sclerophyll forest (Ehmann 1997). Associated with semi-permanent to ephemeral sand or rock based streams (Ehmann 1997), where the soil is soft and sandy so that burrows can be constructed (Environment Australia 2000).   | Unlikely   |
| <i>Litoria aurea</i>            | Green and Golden Bell Frog | E       | V        | This species has been observed utilising a variety of natural and man-made waterbodies (Pyke and White 1996) such as coastal swamps, marshes, dune swales, lagoons, lakes, other estuary wetlands, riverine floodplain wetlands and billabongs, stormwater detention basins, farm dams, bunded areas, drains, ditches and any other structure capable of storing water (OEH 2014). Fast flowing streams are not utilised for breeding purposes by this species. Preferable habitat for this species includes attributes such as shallow, still or slow flowing, permanent and/or widely fluctuating water bodies that are unpolluted and without heavy shading (OEH 2014). Large permanent swamps and ponds exhibiting well-established fringing vegetation (especially bulrushes— <i>Typha</i> sp. and spikerushes— <i>Eleocharis</i> sp.) adjacent to open grassland areas for foraging are preferable (Ehmann 1997). Ponds that are typically inhabited tend to be free from predatory fish such as <i>Gambusia holbrooki</i> (Mosquito Fish) (OEH 2014). | 1 record in 5 km radius<br>Unlikely, no suitable habitat |

| SCIENTIFIC NAME            | COMMON NAME                           | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE |
|----------------------------|---------------------------------------|---------|----------|---|--------------------------|
| <i>Litoria littlejohni</i> | Littlejohn's Tree Frog,<br>Heath Frog | V       | V        | <p>Littlejohn's Tree Frog has a distribution that includes the plateaus and eastern slopes of the Great Dividing Range from Watagan State Forest (90 km north of Sydney) south to Buchan in Victoria (OEH 2014). It occurs along permanent rocky streams with thick fringing vegetation associated with eucalypt woodlands and heaths among sandstone outcrops. It appears to be restricted to sandstone woodland and heath communities at mid to high altitude (OEH 2014). It forages both in the tree canopy and on the ground, and it has been observed sheltering under rocks on high exposed ridges during summer (OEH 2014). It hunts either in shrubs or on the ground. Breeding is triggered by heavy rain and can occur from late winter to autumn, but is most likely to occur in spring when conditions are favourable.</p> <p>Males call from low vegetation close to slow flowing pools. Eggs and tadpoles are mostly found in slow flowing pools that receive extended exposure to sunlight, but will also use temporary isolated pools (OEH 2014).</p> | No                       |
| <i>Mixophyes balbus</i>    | Stuttering Frog                       | E       | V        | <p>A variety of forest habitats from rainforest through wet and moist sclerophyll forest to riparian habitat in dry sclerophyll forest (OEH 2014) that are generally characterised by deep leaf litter or thick cover from understorey vegetation (Ehmann 1997). Breeding habitats are streams and occasionally springs. Not known from streams disturbed by humans (Ehmann 1997) or still water environments (NSW Scientific Committee 2002).</p>  | No                       |



| SCIENTIFIC NAME  | COMMON NAME  | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE               |
|--|--|---------|----------|--|--|
| <i>Pseudophryne australis</i>                                  | Red-crowned Toadlet  | V       | -        | Red-crowned Toadlets are found in steep escarpment areas and plateaus, as well as low undulating ranges with benched outcroppings on Triassic sandstones of the Sydney Basin (OEH 2014). Within these geological formations, this species mainly occupies the upper parts of ridges, usually being restricted to within about 100 metres of the ridgetop. However they may also occur on plateaus or more level rock platforms along the ridgetop (OEH 2014). Associated with open forest to coastal heath (Ehmann 1997). Utilises small ephemeral drainage lines which feed water from the top of the ridge to the perennial creeks below for breeding, and are not usually found in the vicinity of permanent water (Ehmann 1997). Breeding sites are often characterised by clay-derived soils and generally found below the first sandstone escarpment in the talus slope (NPWS 1997). | 20 records in 5 km radius<br>Potential |
| <b>DIURNAL BIRDS</b>   |  |         |          |  |  |
| <i>Anthochaera phrygia</i><br>(aka <i>Xanthomyza phrygia</i> ) | Regent Honeyeater  | E       | E and M  | Associated with temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts, and riparian forests of River Oak ( <i>Casuarina cunninghamiana</i> ) (Garnett 1993). Areas containing Swamp Mahogany ( <i>Eucalyptus robusta</i> ) in coastal areas have been observed to be utilised (NPWS 1997). The Regent Honeyeater primarily feeds on nectar from box and ironbark eucalypts and occasionally from banksias and mistletoes (NPWS 1995). As such it is reliant on locally abundant nectar sources with different flowering times to provide reliable supply of nectar (Environment Australia 2000).   | One recorded in 5km radius<br>Unlikely |
| <i>Botaurus poiciloptilus</i>                                  | Australasian Bittern   | V       | -        | Terrestrial wetlands with tall dense vegetation, occasionally estuarine habitats (Marchant and Higgins 1993). Reedbeds, swamps, streams, estuaries (Simpson and Day 2004).   | No                                     |
| <i>Callocephalon fimbriatum</i>                                | Gang-gang Cockatoo<br>(population in Hornsby and Ku-ring-gai LGAs) | V-E2    | -        | During summer in dense, tall, wet forests of mountains and gullies, alpine woodlands (Morcombe 2004). In winter they occur at lower altitudes in drier more open forests and woodlands, particularly box-ironbark assemblages (Shields and Chrome 1992). They sometimes inhabit woodland, farms and suburbs in autumn/winter (Simpson and Day 2004).   | 6 recorded in 5 km radius<br>Potential |

| SCIENTIFIC NAME                  | COMMON NAME           | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE  |
|----------------------------------|-----------------------|---------|----------|---|---|
| <i>Calyptorhynchus lathamii</i>  | Glossy Black-Cockatoo | V       | -        | Associated with a variety of forest types containing Allocasuarina species, usually reflecting the poor nutrient status of underlying soils (Environment Australia 2000; NPWS 1997; OEH 2014). Intact drier forest types with less rugged landscapes are preferred (OEH 2014). Nests in large trees with large hollows (Environment Australia 2000).  | 15 recorded in 5 km radius<br>Potential                         |
| <i>Daphoenositta chrysoptera</i> | Varied Sittella       | V       | -        | Distribution includes most of mainland Australia except deserts and open grasslands. Prefers eucalypt forests and woodlands with rough-barked species, or mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods from bark, dead branches, or small branches and twigs.  | 5 recorded in 5km radius.<br>Potential                          |
| <i>Dasyornis brachypterus</i>    | Eastern Bristlebird   | E       | E        | Habitat is characterised by dense, low vegetation including heath and open woodland with a heathy understorey; in northern NSW occurs in open forest with tussocky grass understorey; all of these vegetation types are fire prone.<br>Age of habitat since fires (fire-age) is of paramount importance to this species; Illawarra and southern populations reach maximum densities in habitat that has not been burnt for at least 15 years; however, in the northern NSW population a lack of fire in grassy forest may be detrimental as grassy tussock nesting habitat becomes unsuitable after long periods without fire; northern NSW birds are usually found in habitats burnt five to 10 years previously.  | No  |
| <i>Glossopsitta pusilla</i>      | Little Lorikeet       | V       | -        | In New South Wales Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Little Lorikeets mostly occur in dry, open eucalypt forests and woodlands. They have been recorded from both old-growth and logged forests in the eastern part of their range, and in remnant woodland patches and roadside vegetation on the western slopes. They feed primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including melaleucas and mistletoes. On the western slopes and tablelands White Box <i>Eucalyptus albens</i> and Yellow Box <i>E. melliodora</i> are particularly important food sources for pollen and nectar respectively. | 4 recorded in 5 km radius<br>Potential foraging habitat present |

| SCIENTIFIC NAME               | COMMON NAME             | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE  |
|-------------------------------|-------------------------|---------|----------|---|---|
| <i>Haliaeetus leucogaster</i> | White-bellied Sea-Eagle | V       | Ma, Mi   | Forages over large open fresh or saline waterbodies, coastal seas and open terrestrial areas (Marchant & Higgins 1993, Simpson & Day 1999). Breeding habitat consists of tall trees, mangroves, cliffs, rocky outcrops, silts, caves and crevices and is located along the coast or major rivers. Breeding habitat is usually in or close to water, but may occur up to a kilometre away (Marchant & Higgins 1993).   | 3 records in 5 km radius<br>Unlikely, no suitable habitat                             |
| <i>Hieraaetus morphnoides</i> | Little Eagle            | V       | —        | The Little Eagle is widespread in mainland Australia, central and eastern New Guinea. The Little Eagle is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest (OEH 2014). The population of Little Eagle in NSW is considered to be a single population (OEH 2014). This species was recently listed as vulnerable due to a moderate reduction in population size based on geographic distribution and habitat quality (OEH 2014).              | 3 records in 5 km radius<br>Potential, suitable breeding and foraging habitat present |
| <i>Ixobrychus flavicollis</i> | Black Bittern           | V       | —        | Occurs in both terrestrial and estuarine wetlands generally in areas of permanent water and dense vegetation (OEH 2014). In areas with permanent water it may occur in flooded grassland, forest, woodland, rainforest and mangroves (OEH 2014)   | 3 records in 5 km radius<br>Unlikely, no suitable habitat                             |
| <i>Lathamus discolor</i>      | Swift Parrot            | E       | E        | Breeds in Tasmania between September and January. Migrates to mainland in autumn, where it forages on profuse flowering Eucalypts (OEH 2014). Hence, in this region, autumn and winter flowering eucalypts are important for this species. Favoured feed trees include winter flowering species such as Swamp Mahogany ( <i>Eucalyptus robusta</i> ), Spotted Gum ( <i>Corymbia maculata</i> ), Red Bloodwood ( <i>C. gummifera</i> ), Mugga Ironbark ( <i>E. sideroxylon</i> ), and White Box ( <i>E. albens</i> ) (OEH 2014). | 7 records in 5 km radius<br>Unlikely, no breeding habitat                             |
| <i>Lophoictinia isura</i>     | Square-tailed Kite      | V       | —        | In coastal areas associated tropical and temperate forests and woodlands on fertile soils with an abundance of passerine birds (Marchant & Higgins 1993, DECC 2007). May be recorded inland along timbered watercourses (DECC 2007). In NSW it is commonly associated with ridge or gully forests dominated by Woollybutt ( <i>Eucalyptus logiflora</i> ), Spotted Gum ( <i>E. maculata</i> ), or Peppermint Gum ( <i>E. elata</i> , <i>E. smithii</i> ) (OEH 2014).  | 2 records in 5 km radius<br>Potential   |



| SCIENTIFIC NAME                     | COMMON NAME                                   | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE                                 |
|-------------------------------------|---|---------|----------|--|--|
| <i>Melithreptus gularis gularis</i> | Black-chinned Honeyeater (eastern subspecies) | V       | -        | Predominantly associated with box-ironbark association woodlands and River Red Gum (NSW Scientific Committee 2001). Also associated with drier coastal woodlands of the Cumberland Plain and the Hunter, Richmond and Clarence Valleys (NSW Scientific Committee 2001).  | 1 record in 5 km radius<br>Unlikely, no suitable habitat |
| <i>Neophema pulchella</i>           | Turquoise Parrot                              | V       | —        | Steep rocky ridges and gullies, rolling hills, valleys and river flats and the plains of the Great Dividing Range compromise the topography inhabited by this species (Marchant & Higgins 1993). Spends much of the time on the ground foraging on seed and grasses (DECC 2007). It is associated with coastal scrubland, open forest and timbered grassland, especially low shrub ecotones between dry hardwood forests and grasslands with high proportion of native grasses and forbs (Environment Australia 2000).   | 1 record from 1980s<br>Unlikely                          |
| <i>Petroica boodang</i>             | Scarlet Robin                                 | V       | -        | Occurs from the coast to the inland slopes in NSW. After breeding (July-Jan), some disperse to the lower valleys and plains of the tablelands and slopes, and may appear as far west as the eastern edges of the inland plains in autumn and winter. Primarily resides in dry eucalypt forests and woodlands, with usually open and grassy understorey, with scattered shrubs. Abundant logs and fallen timber are important habitat components. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees, and may join mixed flocks of other small insectivorous birds. | 1 record in 5 km radius<br>Unlikely                      |
| <i>Petroica phoenicea</i>           | Flame Robin                                   | V       | —        | Flame Robins are found in a broad coastal band around the south-east corner of the Australian mainland, from southern Queensland to just west of the South Australian border. The species is also found in Tasmania. Flame Robins prefer forests and woodlands up to about 1800 m above sea level.   | 1 record in 5 km radius<br>Unlikely                      |
| <i>Petroica rodinogaster</i>        | Pink Robin                                    | V       | —        | The Pink Robin is found in Tasmania and the uplands of eastern Victoria and far south-eastern NSW, almost as far north as Bombala. On the mainland, the species disperses north and west and into more open habitats in winter, regularly as far north as the ACT area, and sometimes being found as far north as the central coast of NSW. Inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies. Breeds between October and January and can produce two clutches in a season.  | 2 records in 5 km radius<br>Unlikely                     |

| SCIENTIFIC NAME                                      | COMMON NAME                               | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE  |
|--|---|---------|----------|--|---|
| <i>Pomatostomus temporalis temporalis</i>            | Grey-crowned Babbler (eastern subspecies) | V       | —        | Open woodlands dominated by mature eucalypts with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs (NSW Scientific Committee 2001). This species avoids very wet areas (Blakers et al. 1984).  | 1 record in 5 km radius<br>Unlikely                                     |
| <i>Rostratula australis (a.k.a. R. benghalensis)</i> | Painted Snipe (Australian subspecies)     | E       | V        | Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber (OEH 2014). Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds (ibid.). Breeding is often in response to local conditions; generally occurs from September to December (OEH 2014). Roosts during the day in dense vegetation (NSW Scientific Committee 2004). Forages nocturnally on mud-flats and in shallow water (OEH 2014). Feeds on worms, molluscs, insects and some plant-matter (ibid.).  | Unlikely  |
| <i>Stagonopleura guttata</i>                         | Diamond Firetail                          | V       | —        | Typically found in grassy eucalypt woodlands, but also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities (OEH 2014). It is often found in riparian areas and sometimes in lightly wooded farmland (OEH 2014). Appears to be sedentary, though some populations move locally, especially those in the south (OEH 2014).   | 1 record in 5km radius<br>Unlikely                                      |
| <b>NOCTURNAL BIRDS</b>                               |   |         |          |  |   |
| <i>Ninox connivens</i>                               | Barking Owl                               | V       | -        | Associated with a variety of habitats such as savanna woodland, open eucalypt forests, wetland and riverine forest. The habitat is typically dominated by Eucalypts (often Redgum species), however often dominated by Melaleuca species in the tropics (OEH 2014). It usually roosts in dense foliage in large trees such as River She-oak ( <i>Allocasuarina cunninghamiana</i> ), other Casuarina and Allocasuarina, eucalypts, Angophora, Acacia and rainforest species from streamside gallery forests. It usually nests near watercourses or wetlands in large tree hollows with entrances averaging 2-29 metres above ground, depending on the forest or woodland structure and the canopy height (Debus 1997). | 6 records in 5 km radius<br>Unlikely, study area lacks suitable habitat |

| SCIENTIFIC NAME  | COMMON NAME   | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE                                  |
|--|---|---------|----------|---|---|
| <i>Ninox strenua</i>   | Powerful Owl  | V       | -        | Powerful Owls are associated with a wide range of wet and dry forest types with a high density of prey, such as arboreal mammals, large birds and flying foxes (Environment Australia 2000). Large trees with hollows at least 0.5m deep are required for shelter and breeding (Environment Australia 2000).  | 109 records in 5 km radius<br>Potential, suitable habitat |
| <i>Tyto novaehollandiae</i>                                      | Masked Owl  | V       | -        | Associated with forest with sparse, open, understorey, typically dry sclerophyll forest and woodland (OEH 2014) and especially the ecotone between wet and dry forest, and non-forest habitat (Environment Australia 2000). Known to utilise forest margins and isolated stands of trees within agricultural land and heavily disturbed forest where its prey of small and medium sized mammals can be readily obtained.  | 6 records in 5 km radius<br>Unlikely                      |
| <i>Tyto tenebricosa</i>  | Sooty Owl   | V       | -        | Sooty Owls are associated with tall wet old growth forest on fertile soil with a dense understorey and emergent tall Eucalyptus species (Environment Australia 2000). Pairs roost in the daytime amongst dense vegetation, in tree hollows and sometimes in caves. The Sooty Owl is typically associated with an abundant and diverse supply of prey items and a selection of large tree hollows (Garnett 1993).  | 1 record in 5km radius<br>Unlikely, no suitable habitat   |
| <b>MAMMALS (EXCLUDING BATS)</b>                                  |   |         |          |   |   |
| <i>Dasyurus maculatus</i><br><i>Dasyurus maculatus maculatus</i> | Spotted-tailed Quoll<br>Spotted-tailed Quoll (SE Mainland Population) | V<br>-  | -<br>E   | The Spotted-tailed Quoll inhabits a range of forest communities including wet and dry sclerophyll forests, coastal heathlands and rainforests (OEH 2014), more frequently recorded near the ecotones of closed and open forest. This species requires habitat features such as maternal den sites, an abundance of food (birds and small mammals) and large areas of relatively intact vegetation to forage in (OEH 2014). Maternal den sites are logs with cryptic entrances; rock outcrops; windrows; burrows (Environment Australia 2000). | 5 records in 5 km radius<br>Unlikely                      |



| SCIENTIFIC NAME                  | COMMON NAME               | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE                                  |
|----------------------------------|---------------------------|---------|----------|---|---|
| <i>Isoodon obselus obselus</i>   | Southern Brown Bandicoot  | V       | E        | This species is associated with heath, coastal scrub, sedgeland, heathy forests, shrubland and woodland on well drained, infertile soils, within which they are typically found in areas of dense ground cover. Suitable habitat includes patches of native or exotic vegetation which contain understorey vegetation structure with 50–80% average foliage density in the 0.2–1 m height range. This species is thought to display a preference for newly regenerating heathland and other areas prone to fire, but requires a mosaic of burnt and unburnt areas for survival. | Unlikely  |
| <i>Petaurus australis</i>        | Yellow-bellied Glider     | V       | —        | This species is restricted to tall mature forests, preferring productive tall open sclerophyll forests with a mosaic of tree species including some that flower in winter (Environment Australia 2000, Braithwaite 1984, Davey 1984, Kavanagh 1984; DECC 2007). Large hollows within mature trees are required for shelter, nesting and breeding (Henry and Craig 1984; DECC 2007).   | 1 record in 5 km radius<br>Unlikely, not suitable habitat |
| <i>Petrogale penicillata</i>     | Brush-tailed Rock-wallaby | E       | V        | Rocky areas in a variety of habitats, typically north facing sites with numerous ledges, caves and crevices (Strahan 1998).   | No  |
| <i>Phascolarctos cinereus</i>    | Koala                     | V-E2    | -        | Associated with both wet and dry Eucalypt forest and woodland that contains a canopy cover of approximately 10 to 70% (Reed <i>et al.</i> 1990), with acceptable Eucalypt food trees. Some preferred Eucalyptus species are: <i>Eucalyptus tereticornis</i> , <i>E. punctata</i> , <i>E. cypellocarpa</i> , <i>E. viminalis</i>   | Unlikely  |
| <i>Pseudomys novaehollandiae</i> | New Holland Mouse         | -       | V        | A small burrowing native rodent with a fragmented distribution across Tasmania, Victoria, New South Wales and Queensland. Inhabits open heathlands, open woodlands with a heathland understorey and vegetated sand dunes. A social animal, living predominantly in burrows shared with other individuals. The home range of the New Holland Mouse ranges from 0.44 ha to 1.4 ha and the species peaks in abundance during early to mid-stages of vegetation succession typically induced by fire  | No  |

**MAMMALS (BATS)**

| SCIENTIFIC NAME                            | COMMON NAME               | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE  |
|--|---------------------------|---------|----------|--|---|
| <i>Chalinolobus dwyeri</i>                 | Large-eared Pied Bat      | V       | V        | The Large-eared Pied Bat has been recorded in a variety of habitats, including dry sclerophyll forests, woodland, sub-alpine woodland, edges of rainforests and wet sclerophyll forests (Churchill 1998; OEH 2014). This species roosts in caves, rock overhangs and disused mine shafts and as such is usually associated with rock outcrops and cliff faces (Churchill 1998; OEH 2014).  | Unlikely  |
| <i>Falsistrellus tasmaniensis</i>          | Eastern False Pipistrelle | V       | —        | Prefers moist habitats with trees taller than 20m (OEH 2014). Roosts in tree hollows but has also been found roosting in buildings or under loose bark (OEH 2014).   | 10 recorded in 5 km radius<br>Potential, suitable foraging and breeding habitat present |
| <i>Miniopterus australis</i>               | Little Bent-wing Bat      | V       | -        | Prefers well-timbered areas including rainforest, wet and dry sclerophyll forests, Melaleuca swamps and coastal forests (Churchill 1998). This species shelter in a range of structures including culverts, drains, mines and caves (Environment Australia 2000). Relatively large areas of dense vegetation of either wet sclerophyll forest, rainforest or dense coastal banksia scrub are usually found adjacent to caves in which this species is found (OEH 2014). Breeding occurs in caves, usually in association with <i>M. schreibersii</i> (Environment Australia 2000, OEH 2014). | 12 records in 5 km radius<br>Potential foraging and sheltering habitat                  |
| <i>Miniopterus schreibersii oceanensis</i> | Eastern Bent-wing Bat     | V       | -        | Associated with a range of habitats such as rainforest, wet and dry sclerophyll forest, monsoon forest, open woodland, paperbark forests and open grassland (Churchill 1998). It forages above and below the tree canopy on small insects (Dwyer 1995). Will utilise caves, old mines, and stormwater channels, under bridges and occasionally buildings for shelter (Environment Australia 2000, Dwyer 1995).   | 39 records in 5 km radius<br>Potential foraging and sheltering habitat                  |
| <i>Mormopterus norfolkensis</i>            | East Coast Freetail Bat   | V       | -        | Most records of this species are from dry eucalypt forest and woodland east of the Great Dividing Range (Churchill 1998). Individuals have, however, been recorded flying low over a rocky river in rainforest and wet sclerophyll forest and foraging in clearings at forest edges (Environment Australia 2000; Allison and Hoye 1998). Primarily roosts in hollows or behind loose bark in mature eucalypts, but have been observed roosting in the roof of a hut (Environment Australia 2000; Allison and Hoye 1998).   | 15 records in 5km radius<br>Potential foraging and breeding habitat                     |

| SCIENTIFIC NAME                 | COMMON NAME                    | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE   |
|---------------------------------|--------------------------------|---------|----------|---|--|
| <i>Myotis macropus</i>          | Southern Myotis                | V       | -        | The Large-footed Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Will occupy most habitat types such as mangroves, paperbark swamps, riverine monsoon forest, rainforest, wet and dry sclerophyll forest, open woodland and River Red Gum woodland, as long as they are close to water (Churchill 1998). While roosting (in groups of 10-15) is most commonly associated with caves, this species has been observed to roost in tree hollows, amongst vegetation, in clumps of Pandanus, under bridges, in mines, tunnels and stormwater drains (Churchill 1998). However the species apparently has specific roost requirements, and only a small percentage of available caves, mines, tunnels and culverts are used (Richards 1998). Forages over streams and pools catching insects and small fish by raking their feet across the water surface. In NSW females have one young each year usually in November or December (OEH 2014) | 7 records in 5 km radius<br>Potential foraging and marginal breeding habitat |
| <i>Pteropus poliocephalus</i>   | Grey-headed Flying-Fox         | V       | V        | Inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas (Churchill 1998). Camps are often located in gullies, typically close to water, in vegetation with a dense canopy (Churchill 1998).  | 54 records in 5 km radius<br>Potential foraging habitat                      |
| <i>Saccolaimus flaviventris</i> | Yellow-bellied Sheath-tail-bat | V       | -        | Found in almost all habitats, from wet and dry sclerophyll forest, open woodland (Churchill 1998), open country, mallee, rainforests, heathland and waterbodies. Roosts in tree hollows; may also use caves; has also been recorded in a tree hollow in a paddock (Environment Australia 2000) and in abandoned sugar glider nests (Churchill 1998). The Yellow-bellied Sheath-tail-bat is dependent on suitable hollow-bearing trees to provide roost sites, which may be a limiting factor on populations in cleared or fragmented habitats (Environment Australia 2000).   | 8 records in 5 km radius<br>Potential breeding and foraging habitat          |



| SCIENTIFIC NAME  | COMMON NAME                 | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE                                  |
|--|-----------------------------|---------|----------|---|---|
| <i>Scoteanax rueppellii</i>                                | Greater Broad-nosed Bat     | V       | -        | Associated with moist gullies in mature coastal forest, or rainforest, east of the Great Dividing Range (Churchill 1998), tending to be more frequently located in more productive forests (Hoye and Richards 1998). Within denser vegetation types, use is made of natural and man-made openings such as roads, creeks and small rivers, where it hawks backwards and forwards for prey (Hoye and Richards 1998).  | 8 records in 5 km radius<br>Unlikely                      |
| <b>INVERTEBRATE</b>  |                             |         |          |   |   |
| <i>Meridolum corneovirens</i>                              | Cumberland Plain Land Snail | V       | -        | Associated with open eucalypt forests, particularly Cumberland Plain Woodland. Found under fallen logs, debris and in bark and leaf litter around the trunk of gum trees or burrowing in loose soil around clumps of grass, or rubbish (NPWS 1997).   | 1 record in 5 km radius<br>Unlikely, outside distribution |
| <i>Pommerhelix duralensis</i>                              | Dural Woodland Snail        | -       | E        | This species is endemic to NSW. It has a narrow distribution and its habitat is specifically shale-influenced which occur along the transition of shale-sandstone landscape (TSCC 2014). Its known distribution ranges from St Albans. Moving southwest from St Albans, East Kurrajong and along the footslopes of the Blue Mountains as far south as Mulgoa (TSCC 2014).   | 16 records in 5 km radius<br>Potential                    |
| <b>REPTILE</b>   |                             |         |          |   |   |
| <i>Hoplocephalus bungaroides</i>                           | Broad-headed Snake          | E       | V        | Typical sites consist of exposed sandstone outcrops and benching where the vegetation is predominantly woodland, open woodland and/or heath on Triassic sandstone of the Sydney Basin (OEH 2014). They utilise rock crevices and exfoliating sheets of weathered sandstone during the cooler months and tree hollows during summer (Webb and Shine 1998). Some of the canopy tree species found to regularly co-occur at known sites include <i>Corymbia eximia</i> , <i>C. gummifera</i> , <i>Eucalyptus sieberi</i> , <i>E. punctata</i> and <i>E. piperita</i> (OEH 2014). | No  |
| <i>Varanus rosenbergi</i>                                  | Heath Monitor               | V       | -        | Associated with Sydney sandstone woodland and heath land. Rocks, hollow logs and burrows are utilised for shelter (Environment Australia 2000). Terrestrial termitaria are required for reproduction (King and Green 1999).   | 1 record in 5 km radius<br>Unlikely                       |
| <b>MIGRATORY TERRESTRIAL SPECIES LISTED UNDER EPBC ACT</b> |                             |         |          |   |   |

| SCIENTIFIC NAME  | COMMON NAME               | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE               |
|--|---------------------------|---------|----------|---|--|
| <i>Apus pacificus</i>                                  | Fork-tailed Swift         | -       | M        | Sometimes travels with Needletails. Varied habitat with a possible tendency to more arid areas but also over coasts and urban areas (Simpson and Day 1999).   | 10 recorded in 5 km radius<br>Unlikely |
| <i>Hirundapus caudacutus</i>                           | White-throated Needletail | -       | M        | Forages aerially over a variety of habitats usually over coastal and mountain areas, most likely with a preference for wooded areas (Marchant and Higgins 1993; Simpson and Day 1999). Has been observed roosting in dense foliage of canopy trees, and may seek refuge in tree hollows in inclement weather (Marchant and Higgins 1993).   | Potential                              |
| <i>Merops ornatus</i>                                  | Rainbow Bee-eater         | -       | M        | Resident in coastal and subcoastal northern Australia; regular breeding migrant in southern Australia, arriving September to October, departing February to March, some occasionally present April to May. Occurs in open country, chiefly at suitable breeding places in areas of sandy or loamy soil: sand-ridges, riverbanks, road-cuttings, sand-pits, occasionally coastal cliffs (ibid). Nest is a chamber at the end of a burrow, up to 1.6 m long, tunneled in flat or sloping ground, sandy bank or cutting. | Unlikely                               |
| <i>Monarcha melanopsis</i>                             | Black-faced Monarch       | -       | M        | Rainforest and eucalypt forests, feeding in tangled understorey.  | Unlikely                               |
| <i>Monarcha trivirgatus</i>                            | Spectacled Monarch        | —       | M        | Wet forests, mangroves (Simpson and Day 1999).  | Unlikely                               |
| <i>Myiagra cyanoleuca</i>                              | Satin Flycatcher          | -       | M        | Wetter, denser forest, often at high elevations (Simpson and Day 2004).   | Unlikely                               |
| <i>Rhipidura rufifrons</i>                             | Rufous Fantail            | -       | M        | The Rufous Fantail is a summer breeding migrant to southeastern Australia (Morcombe 2004). The Rufous Fantail is found in rainforest, dense wet eucalypt and monsoon forests, paperbark and mangrove swamps and riverside vegetation (Morcombe 2004). Open country may be used by the Rufous Fantail during migration (Morcombe 2004).  | Unlikely                               |
| <i>Xanthomyza phrygia</i>                              | Regent Honeyeater         | E       | E, M     | SEE DIURNAL BIRDS ABOVE   | See diurnal birds above                |
| <b>MIGRATORY WETLAND SPECIES LISTED UNDER EPBC ACT</b> |                           |         |          |   |  |

| SCIENTIFIC NAME   | COMMON NAME    | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE               |
|---|----------------|---------|----------|---|--|
| <i>Gallinago hardwickii</i>                                     | Latham's Snipe | -       | M        | A variety of permanent and ephemeral wetlands, preferring open fresh water wetlands with nearby cover (Marchant and Higgins 1993). Occupies a variety of vegetation around wetlands (Marchant and Higgins 1993) including wetland grasses and open wooded swamps (Simpson and Day 1999). Latham's Snipe sometimes occur in habitats that have saline or brackish water, such as saltmarsh, mangrove creeks, around bays and beaches, and at tidal rivers. These habitats are most commonly used when the birds are on migration. They are regularly recorded in or around modified or artificial habitats including pasture, ploughed paddocks, irrigation channels and drainage ditches, ricefields, orchards, saltworks, and sewage and dairy farms. They can also occur in various sites close to humans or human activity (e.g. near roads, railways, airfields, commercial or industrial complexes). | 1 recorded in 5 km radius<br>No        |
| <i>Pandion cristatus</i><br>( <i>Pandion haliaetus</i> )        | Eastern Osprey | V       | Ma, M    | Associated with waterbodies including coastal waters, inlets, lakes, estuaries, beaches, offshore islands and sometimes along inland rivers (Schodde and Tidemann 1986). Osprey may nest on the ground, on sea cliffs or in trees. Osprey generally prefer emergent trees, often dead or partly dead with a broken off crown.   | Unlikely                               |
| <i>Rostratula benghalensis</i><br>(a.k.a. <i>R. australis</i> ) | Painted Snipe  | -       | M        | See: <i>Rostratula australis</i>  | No                                     |
| <b>FLORA SPECIES</b>  |                |         |          |   |  |
| <i>Acacia bynoeana</i>  | Bynoe's Wattle | E       | V        | <i>Acacia bynoeana</i> is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains, and has recently been found in the Colymea and Parma Creek areas west of Nowra. It is found in heath and dry sclerophyll forest, typically on a sand or sandy clay substrate, often with ironstone gravels (OEH 2014).  | 15 records in 5 km radius<br>Potential |
| <i>Acacia gordonii</i>  | -              | E       | E        | <i>Acacia gordonii</i> is restricted to the north-west of Sydney, occurring in the lower Blue Mountains in the west, and in the Maroota/Glenorie area in the east, within the Hawkesbury, Blue Mountains and Baulkham Hills local government areas. Grows in dry sclerophyll forest and heathlands amongst or within rock platforms on sandstone outcrops (OEH 2014).   | 1 record in 5km radius<br>Potential    |



| SCIENTIFIC NAME                 | COMMON NAME                  | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE                              |
|---------------------------------|------------------------------|---------|----------|--|---|
| <i>Acacia pubescens</i>         | Downy Wattle                 | V       | V        | <i>Acacia pubescens</i> occurs on the NSW Central Coast in Western Sydney, mainly in the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. It is associated with Cumberland Plains Woodlands, Shale / Gravel Forest and Shale / Sandstone Transition Forest growing on clay soils, often with ironstone gravel (NPWS 1997; Benson and McDougall 1994).   | 12 records in 5 km radius<br>Potential habitat        |
| <i>Allocasuarina glareicola</i> | -                            | E       | E        | <i>Allocasuarina glareicola</i> is primarily restricted to the Richmond district on the north-west Cumberland Plain, with an outlier population found at Voyager Point. It grows in Castlereagh woodland on lateritic soil (OEH 2014).   | Predicted by EPBC search tool<br>Unlikely, no records |
| <i>Asterolasia elegans</i>      | <i>Asterolasia elegans</i>   | E       | E        | <i>Asterolasia elegans</i> is restricted to a few localities on the NSW Central Coast north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby LGAs. It is found in sheltered forests on mid- to lower slopes and valleys, in or adjacent to gullies (OEH 2014).   | Predicted by EPBC search tool<br>Unlikely, no records |
| <i>Cryptostylis hunteriana</i>  | Leafless Tongue Orchid       | V       | V        | <i>Cryptostylis hunteriana</i> is known from a range of vegetation communities including swamp-heath and woodland (OEH 2014). The larger populations typically occur in woodland dominated by Scribbly Gum ( <i>Eucalyptus sclerophylla</i> ), Silvertop Ash ( <i>E. sieberi</i> ), Red Bloodwood ( <i>Corymbia gummifera</i> ) and Black Sheoak ( <i>Allocasuarina littoralis</i> ); where it appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid ( <i>C. subulata</i> ) and the Tartan Tongue Orchid ( <i>C. erecta</i> ) (OEH 2014). | Predicted by EPBC search tool<br>Unlikely, no records |
| <i>Darwinia biflora</i>         | <i>Darwinia biflora</i>      | V       | V        | <i>Darwinia biflora</i> is an erect or spreading shrub to 80 cm high associated with habitats where weathered shale capped ridges intergrade with Hawkesbury Sandstone, where soils have a high clay content (NPWS 1997).  | 401 records in 5 km radius<br>Potential               |
| <i>Darwinia peduncularis</i>    | <i>Darwinia peduncularis</i> | V       |          | <i>Darwinia peduncularis</i> occurs as local disjunct populations in coastal NSW in the Blue Mountains, Brooklyn, Berowra, Galston Gorge, Hornsby, Bargo River, Glen Davis, Mount Boonbourwa and Kings Tableland, and usually grows on or near rocky outcrops on sandy, well drained, low nutrient soil over sandstone (OEH 2014).   | 13 records in 5 km radius<br>Unlikely                 |

| SCIENTIFIC NAME   | COMMON NAME   | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE                |
|---|---|---------|----------|---|---|
| <i>Epacris purpurascens</i><br>var. <i>purpurascens</i> | <i>Epacris purpurascens</i><br>var. <i>purpurascens</i> | V       | -        | <i>Epacris purpurascens</i> var. <i>purpurascens</i> has been recorded between Gosford in the north to Avon Dam in the south, in a range of habitats, but most have a strong shale soil influence (OEH 2014).   | 184 records in 5 km radius<br>Potential |
| <i>Eucalyptus camfieldii</i>                            | Camfield's Stringybark                                  | V       | V        | <i>Eucalyptus camfieldii</i> is associated with shallow sandy soils bordering coastal heath with other stunted or mallee eucalypts, often in areas with restricted drainage and in areas with laterite influenced soils, thought to be associated with proximity to shale (OEH 2014).   | 9 records in 5 km radius<br>Unlikely    |
| <i>Eucalyptus nicholii</i>                              | Narrow-leaved Peppermint                                | V       | V        | <i>Eucalyptus nicholii</i> naturally occurs in the New England Tablelands of NSW, where it occurs from Nundle to north of Tenterfield. Grows in dry grassy woodland, on shallow and infertile soils, mainly on granite (OEH 2014). This species is widely planted as an urban street tree and in gardens but is quite rare in the wild (OEH 2014). Plantings undertaken for horticultural and aesthetic purposes are not considered threatened species under the TSC Act. | 5 records in 5 km radius<br>No          |
| <i>Eucalyptus scoparia</i>                              | Wallangarra White Gum                                   | E       | V        | Known in NSW only from the Tenterfield district where it is very uncommon. Grows on rocky hillsides in shrubby woodland close to granite outcrops.  | 9 radius in 5km radius<br>No            |
| <i>Eucalyptus</i> sp. <i>Cattai</i>                     | <i>Eucalyptus</i> sp. <i>Cattai</i>                     | E       | -        | <i>Eucalyptus</i> sp. <i>Cattai</i> occurs in the area between Colo Heights and Castle Hill, north western Sydney. It occurs as a rare emergent in scrub, heath and low woodland on sandy soils, usually as isolated individuals or occasionally in small groups. The sites at which it occurs are generally flat and on ridge tops and associated soils are laterised clays overlying sandstone (OEH 2014).  | 16 records in 5km radius<br>No          |

| SCIENTIFIC NAME              | COMMON NAME                 | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE                |
|------------------------------|-----------------------------|---------|----------|--|---|
| <i>Galium australe</i>       | Tangled Bedstraw            | E       |          | <i>Galium australe</i> is known from the Towamba Valley near Bega, Lake Yarrunga near Kangaroo Valley, Cullendulla Creek Nature Reserve near Batemans Bay, Conjola National Park, Swan Lake near Swanhaven, and the Big Hole in Deua National Park. Tangled Bedstraw was recorded historically from the Clyde River near Batemans Bay and the Mongarlowe area near Braidwood (OEH 2014). The species also occurs beside Lake Windemere in Jervis Bay, is widespread in Victoria and is also found in South Australia and Tasmania (OEH 2014). In NSW <i>Galium australe</i> has been found in moist gullies of tall forest, <i>Eucalyptus tereticornis</i> forest, coastal Banksia shrubland, and <i>Allocasuarina nana</i> heathland, while in other states the species is found in a range of near-coastal habitats, including sand dunes, sand spits, shrubland and woodland. | 3 records in 5 km radius<br>Unlikely    |
| <i>Genoplesium baueri</i>    | Bauer's Midge Orchid        | V       |          | Known from coastal areas from northern Sydney south to the Nowra district. Previous records from the Hunter Valley and Nelson Bay are now thought to be erroneous. Grows in shrubby woodland in open forest on shallow sandy soils.  | 1 record in 5km radius<br>Unlikely      |
| <i>Grammitis stenophylla</i> | Narrow-leaf Finger Fern     | E       |          | In NSW, <i>Grammitis stenophylla</i> has been found on the south, central and north coasts, and as far west as Mount Kaputar National Park near Narrabri, in moist places, usually near streams, on rocks or in trees, in rainforest and moist eucalypt forest (OEH 2014).   | 2 records in 5 km radius<br>Unlikely    |
| <i>Hibbertia superans</i>    | -                           | E       | -        | <i>Hibbertia superans</i> mainly occurs in the north west Sydney region between Baulkham Hills and Wisemans Ferry, with a disjunct occurrence near Mt Boss (inland from Kempsey) on the Mid North Coast of NSW. In the Sydney region it occurs in dry sclerophyll forest on sandstone ridgetops while the northern occurrence is on granite (OEH 2014).  | 111 records in 5 km radius<br>Potential |
| <i>Kunzea rupestris</i>      | <i>Kunzea rupestris</i>     | V       | V        | <i>Kunzea rupestris</i> is endemic to the Hornsby Plateau, where it grows in heath on exposed sandstone rock platforms (NPWS 1997).  | 1 record in 5km radius<br>Unlikely      |
| <i>Lasiopetalum joyceae</i>  | <i>Lasiopetalum joyceae</i> | V       | V        | <i>Lasiopetalum joyceae</i> grows in ridgetop woodland, heath, woodland or open scrub, often with a clay influence (NPWS 1997).  | 9 records in 5km radius<br>Unlikely     |



| SCIENTIFIC NAME                                     | COMMON NAME   | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE              |
|---|---|---------|----------|---|---------------------------------------|
| <i>Leptospermum deanei</i>                          | Deane's Tea-tree                                    | V       | V        | <i>Leptospermum deanei</i> has been recorded in Hornsby, Warringah, Kuring-gai and Ryde LGAs, in woodland on lower hill slopes or near creeks, at sites with sandy alluvial soil or sand over sandstone (OEH 2014). It has also been recorded in riparian scrub dominated by <i>Tristaniopsis laurina</i> and <i>Baeckea myrtifolia</i> ; woodland dominated by <i>Eucalyptus haemastoma</i> ; and open forest dominated by <i>Angophora costata</i> , <i>Leptospermum trinervium</i> and <i>Banksia ericifolia</i> (OEH 2014). | 1 record in 5 km radius<br>Unlikely   |
| <i>Leucopogon fletcheri</i> subsp. <i>fletcheri</i> | <i>Leucopogon fletcheri</i> subsp. <i>fletcheri</i> | E       | -        | <i>Leucopogon fletcheri</i> subsp. <i>fletcheri</i> is restricted to north-western Sydney between St Albans in the north and Annangrove in the south, within the local government areas of Hawkesbury, Baulkham Hills and Blue Mountains. It occurs in dry eucalypt woodland or in shrubland on clayey lateritic soils, generally on flat to gently sloping terrain along ridges and spurs (OEH 2014).  | 25 records in 5km radius<br>Potential |
| <i>Macadamia integrifolia</i>                       | Macadamia Nut                                       | -       | V        | This species is not known to occur naturally in NSW.  | 12 records in 5km radius<br>Unlikely  |
| <i>Macadamia tetraphylla</i>                        | Rough-shelled Bush Nut                              | V       | V        | Confined chiefly to the Richmond and Tweed Rivers in north-east NSW, extending just across the border into QLD (DEC 2005). Found in subtropical rainforest, usually near the coast (DEC 2005).  | 4 records in 5km radius<br>Unlikely   |
| <i>Melaleuca biconvexa</i>                          | Biconvex Paperbark                                  | V       | V        | <i>Melaleuca biconvexa</i> occurs in coastal districts and adjacent tablelands from Jervis Bay north to the Port Macquarie district. It grows in damp places often near streams.  | No records<br>No                      |
| <i>Melaleuca deanei</i>                             | Deane's Paperbark                                   | V       | V        | Found in heath on sandstone (OEH 2014), and also associated with woodland on broad ridge tops and slopes on sandy loam and lateritic soils (Benson and McDougall 1998).   | 34 records in 5km radius<br>Potential |
| <i>Pelargonium</i> sp. <i>Striatellum</i>           | Omeo Stork's-bill                                   | E       | E        | In NSW, <i>Pelargonium</i> sp. (G.W. Carr 10345) is known from the Southern Tablelands. Otherwise, only known from the shores of Lake Omeo near Benambra in Victoria where it grows in cracking clay soil that is probably occasionally flooded.  | No records<br>No                      |
| <i>Persoonia hirsuta</i>                            | Hairy Geebung                                       | E       | E        | <i>Persoonia hirsuta</i> occurs from Singleton in the north, south to Bargo and the Blue Mountains to the west (OEH 2014). It grows in dry sclerophyll eucalypt woodland and forest on sandstone  | 15 records in 5 km radius<br>Unlikely |

| SCIENTIFIC NAME                                  | COMMON NAME                                      | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS   | LIKELIHOOD OF OCCURRENCE              |
|--|--|---------|----------|--|---------------------------------------|
| <i>Persoonia mollis</i> subsp. <i>maxima</i>     | <i>Persoonia mollis</i> subsp. <i>maxima</i>     | E       | E        | Deep gullies or on the steep upper hillsides of narrow gullies incised from Hawkesbury Sandstone, characterised by steep sideslopes, rocky benches and broken scarps, with creeks fed by small streams and intermittent drainage depressions. Occurrences of this plant have been recorded on the dry upper-hillsides of gullies and in more exposed aspects (Scribbly Gum <i>E. haemastoma</i> , Grey Gum ( <i>E. punctata</i> ). | 76 records in 5km radius<br>Potential |
| <i>Pimelea curviflora</i> var. <i>curviflora</i> | <i>Pimelea curviflora</i> var. <i>curviflora</i> | V       | V        | <i>Pimelea curviflora</i> var. <i>curviflora</i> is confined to the coastal area of Sydney between northern Sydney in the south and Maroota in the north-west. It grows on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands (OEH 2014). Associated with the Duffys Forest Community, shale lenses on ridges in Hawkesbury sandstone geology.             | 46 records in 5km radius<br>Unlikely  |
| <i>Pimelea spicata</i>                           | Spiked Rice-flower                               | E       | E        | In western Sydney, <i>Pimelea spicata</i> occurs on an undulating topography of well-structured clay soils, derived from Wianamatta shale (OEH 2014). It is associated with Cumberland Plains Woodland (CPW), in open woodland and grassland often in moist depressions or near creek lines (Ibid.). Has been located in disturbed areas that would have previously supported CPW (Ibid.).   | No records<br>Unlikely                |
| <i>Pomaderris brunnea</i>                        | Rufous Pomaderris                                | V       | V        | <i>Pomaderris brunnea</i> occurs in a limited area around the Colo, Nepean and Hawkesbury Rivers as well as near Walcha on the Northern Tablelands. It grows in moist woodland or forest on clay or alluvial soils of floodplains and creek lines (DEC 2005).  | 1 record in 5 km radius<br>Unlikely   |
| <i>Pterostylis saxicola</i>                      | Sydney Plains Greenhood                          | E       | E        | Terrestrial orchid predominantly found in Hawkesbury Sandstone Gully Forest growing in small pockets of soil that have formed in depressions in sandstone rock shelves (NPWS 1997). Known from Georges River National Park, Ingleburn, Holsworthy, Peter Meadows Creek, St Marys Tower (NSW Scientific Committee 2011).  | No records<br>Unlikely                |

| SCIENTIFIC NAME              | COMMON NAME                  | TSC ACT | EPBC ACT | HABITAT ASSOCIATIONS  | LIKELIHOOD OF OCCURRENCE               |
|------------------------------|------------------------------|---------|----------|---|--|
| <i>Syzygium paniculatum</i>  | Magenta Lilly Pilly          | V       | V        | This species occupies a narrow coastal area between Bulahdelah and Conjola State Forests in NSW. On the Central Coast, it occurs on Quaternary gravels, sands, silts and clays, in riparian gallery rainforests and remnant littoral rainforest communities. In the Ourimbah Creek valley, <i>S. paniculatum</i> occurs within gallery rainforest with <i>Alphitonia excelsa</i> , <i>Acmena smithii</i> , <i>Cryptocarya glaucescens</i> , <i>Toona ciliata</i> , <i>Syzygium oleosum</i> with emergent <i>Eucalyptus saligna</i> . At Wyrribalong NP, <i>S. paniculatum</i> occurs in littoral rainforest as a co-dominant with <i>Ficus fraseri</i> , <i>Syzygium oleosum</i> , <i>Acmena smithii</i> , <i>Cassine australe</i> , and <i>Endiandra sieberi</i> . It is also report that this species appears absent from Terrigal formation shales, on which the gully rainforests occur. <i>S. paniculatum</i> is summer flowering (November-February), with the fruits maturing in May (OEH 2014). | 6 records in 5km radius<br>Unlikely    |
| <i>Tetratheca glandulosa</i> | <i>Tetratheca glandulosa</i> | V       | V        | Associated with ridgetop woodland habits on yellow earths, also in sandy or rocky heath and scrub (NPWS 1997). Often associated with sandstone / shale interface where soils have a stronger clay influence (NPWS 1997). Flowers July to November.  | 59 records in 5 km radius<br>Potential |
| <i>Thesium austral</i>       | Austral Toadflax             | V       | V        | Widespread throughout the eastern third of NSW but most common on the North Western Slopes, Northern Tablelands and North Coast. Occurs in grassland or grassy woodland. Often found in damp sites in association with Kangaroo Grass ( <i>Themeda australis</i> ) (OEH 2014). The preferred soil type is a fertile loam derived from basalt although it occasionally occurs on metasediments and granite.  | No records<br>Unlikely                 |

Disclaimer: Data extracted from the Atlas of NSW Wildlife and EPBC Protected Matters Report are only indicative and cannot be considered a comprehensive inventory. 'Migratory marine species' and 'listed marine species' listed on the EPBC Act (and listed on the protected matters report) have not been included in this table, since they are considered unlikely to occur within the study area due to the absence of marine habitat.

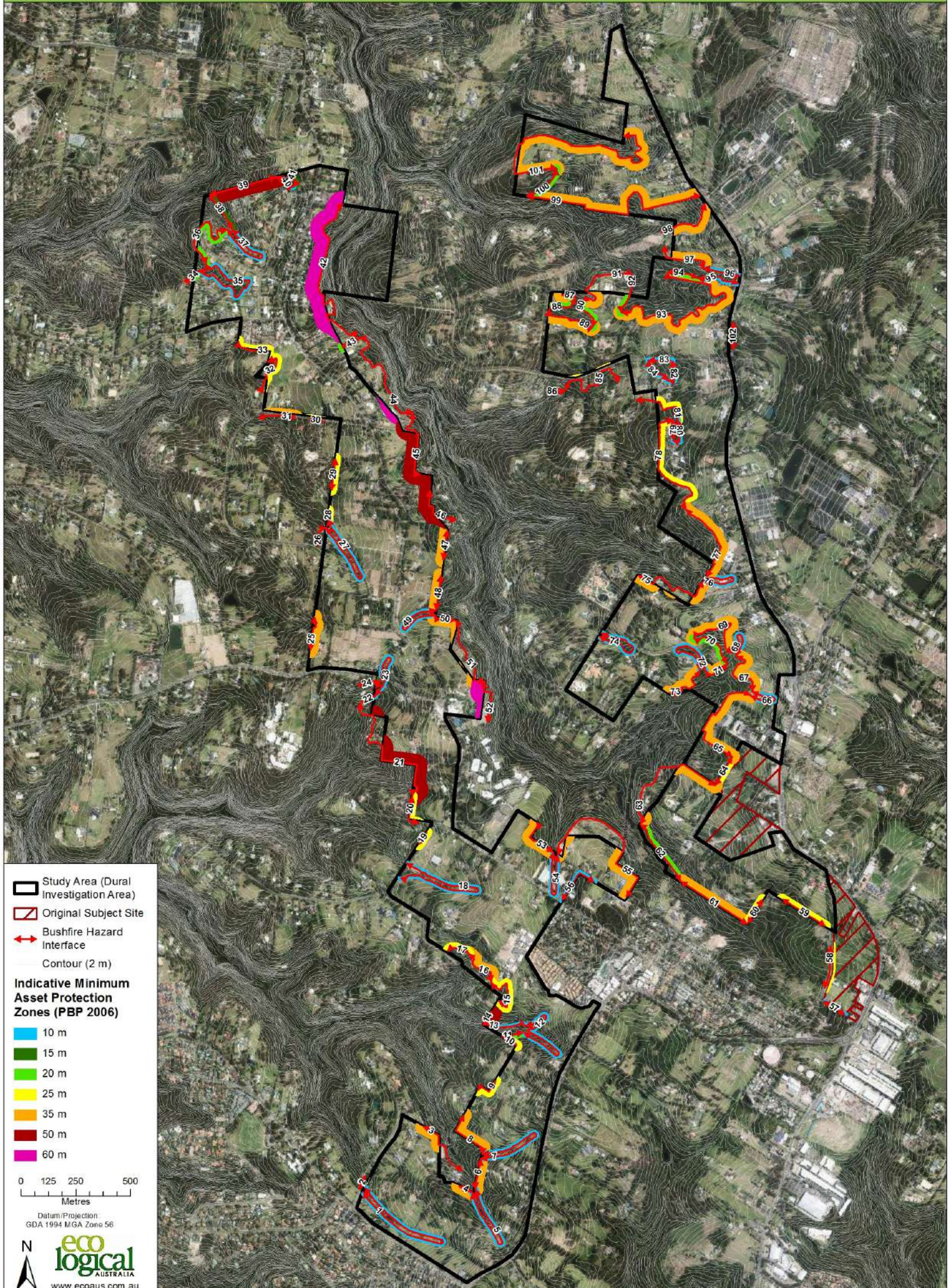
V = Vulnerable, E = Endangered, CE = Critically Endangered, Mi = migratory, Ma = Marine







# Indicative Minimum Asset Protection Zones



**Legend**

- Study Area (Dural Investigation Area)
- Original Subject Site
- Bushfire Hazard Interface
- Contour (2 m)

**Indicative Minimum Asset Protection Zones (PBP 2006)**

- 10 m
- 15 m
- 20 m
- 25 m
- 35 m
- 50 m
- 60 m

0 125 250 500  
Metres

Datum/Projection:  
GDA 1994 MGA Zone 56

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## Bushfire Protection Assessment

Proposed Rezoning – Dural

Prepared for  
**Urbis Pty Ltd**

29 September 2017



**DOCUMENT TRACKING**

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# 1 Introduction

## 1.1 Description of proposal

Urbis commissioned Eco Logical Australia Pty Ltd (ELA) to prepare a bushfire protection assessment (BPA) for a proposed rezoning of a number of large allotments in Dural.

The lots are currently zoned as rural land being RU6-Transition with one lot being effected by a split zoning of RU6 and SP2-Infrastructure. Under the proposed rezoning, *The Hills Shire Local Environmental Plan 2012* (LEP) will be amended to allow for R2 Low Density Residential zone with areas of private/public open space (RE1 or RE2). There is also potential for special uses including medical, commercial and ancillary development. A separate ecological (flora and fauna) assessment has been undertaken by ELA.

This report relates to 9 lots within the proposed rezoning however it also considers the wider area of Dural, north of the Dural town centre.

## 1.2 Study area

The study area is located approximately 1 to 1.5 km from Dural town centre, within the The Hills Shire Council. There are currently existing dwellings or structures located within some lots within the subject area as shown in **Figure 1**.

The existing lots captured by the proposal are:

- Lot 100 and 102 DP13628
- Lot 1 DP656036
- Lot X DP501233
- Lot 2 DP567995
- Lot 9 DP237576
- Lot 2 DP541329
- Lots 101 and 103 DP713628

The study area is separated into two precincts or clusters, separated by existing large lot residential land with dwellings and associated ancillary buildings. The main access to the lots is off Old Northern Road for the eastern precinct and Derriwong Road for the western precinct of lots. The majority of the vegetation within the lots has been cleared except where scattered trees remain.

### 1.2.1 Aim and structure of report

ELA has been engaged to investigate the current bushfire risk of the study area and the appropriate combination of bushfire protection measures to mitigate this risk in support of the rezoning. Specifically, this analysis responds to the requirements of *Planning for Bush Fire Protection 2006* (PBP), *Australian Standard AS 3959 Construction of buildings in bushfire-prone areas* (AS3959) and the requirements of The Hills LEP. This report details the outcomes of these investigations in the context of the proposed land use.

The overarching objective of this report is to identify all potential bushfire constraints to the future urban development of the study area. The results of this assessment will directly support the preparation of necessary planning documentation. As such the objectives of this report are to:

- Ensure the statutory requirements for bushfire protection are identified and can be adequately met; and

- Implement suitable management frameworks for bushfire protection, whilst having consideration of the vegetation and ecological issues for the study area, enabling long term conservation and management of these environmental values while facilitating safe urban development outcomes.
- Consider the likely rehabilitation of ecological issues and the recommendations of the flora and fauna study to preserve and enhance ecological communities on the subject land.

This report assesses the potential bushfire hazard across the study area, in the context of existing vegetation (refer to **Figure 2** for vegetation coverage). It then identifies planning requirements as per PBP. Management of future asset protection zones (APZ) and environmental areas are also considered.

Future subdivision of land and the construction of buildings will require an assessment against PBP. As such the provisions of this report are to be considered in the planning and design of any development following the rezoning process.

### 1.3 Legislative requirements

#### 1.3.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal planning legislation for NSW, providing a framework for the overall environmental planning and assessment of development proposals. A variety of other legislation and environmental planning instruments, such as the *Threatened Species Conservation Act 1995* (TSC Act), *Water Management Act 2000* and *Rural Fires Act 1997* (RF Act), are integrated with the EP&A Act.

#### 1.3.2 Threatened Species Conservation Act 1995

The TSC Act aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. The TSC Act is integrated with the EP&A Act and requires consideration of whether a development (assessed under Part 4 of the EP&A Act) is likely to significantly affect threatened species, populations and ecological communities or their habitat.

#### 1.3.3 Rural Fires Act 1997

Bushfire suppression and management is regulated by the RF Act. Both the EP&A Act and the RF Act were modified by the *Rural Fires and Environmental Assessment Legislation Amendment Act 2002* to enhance bushfire protection through the development assessment process. Key requirements of the RF Act include:

- The need for a bushfire safety authority to be issued by the RFS under section 100B of the RF Act for any development applications for subdivision (therefore considered integrated development);
- All landowners to exercise a duty of care to prevent bushfire from spreading on or from their land under section 63 of the RF Act. This relates to the appropriate provision and maintenance of APZs, landscaping and any retained vegetation when developing land.

#### 1.3.4 Direction 4.4 Planning for Bush Fire Protection

Direction 4.4 Planning for Bushfire Protection identifies matters for consideration for planning proposals that will affect, or are in proximity to land mapped as bush fire prone. In particular a planning proposal where development is proposed must:

- have regard to *Planning for Bush Fire Protection 2006* (PBP),
- provide an Asset Protection Zone (APZ) incorporating at a minimum:



- an Inner Protection Area (IPA) bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and
- an Outer Protection Area (OPA) managed for hazard reduction and located on the bushland side of the perimeter road,
- for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service (RFS). If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the RF Act), the APZ provisions must be complied with,
- contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,
- contain provisions for adequate water supply for fire fighting purposes,
- minimise the perimeter of the area of land interfacing the hazard which may be developed,
- introduce controls on the placement of combustible materials in the Inner Protection Area.

Consideration must also be given to NSW RFS *Practice Note 2/12 Planning Instruments and Policies*. It is expected that the RFS, in its assessment of the proposal will consider the requirements of this Practice Note.

### 1.3.5 Planning for Bush Fire Protection 2006

Rezoning proposals require consultation with the NSW RFS as the lead agency for managing bushfire. As such the requirements of *Planning for Bush Fire Protection* (NSW RFS, 2006) are to be addressed. This includes having regard to the following planning principles of PBP:

- Provision of a perimeter road with adequate two way access which delineates the extent of the intended development;
- Provision, at the urban bushland interface, for the establishment of adequate asset protection zones for future housing;
- Specifying minimum residential lot depths to accommodate asset protection zones for lots on perimeter roads;
- Minimising the perimeter of the area of land, interfacing the hazard, which may be developed;
- Introduction of controls which avoid placing inappropriate developments in hazardous areas; and
- Introduction of controls on the placement of combustible materials in asset protection zones.

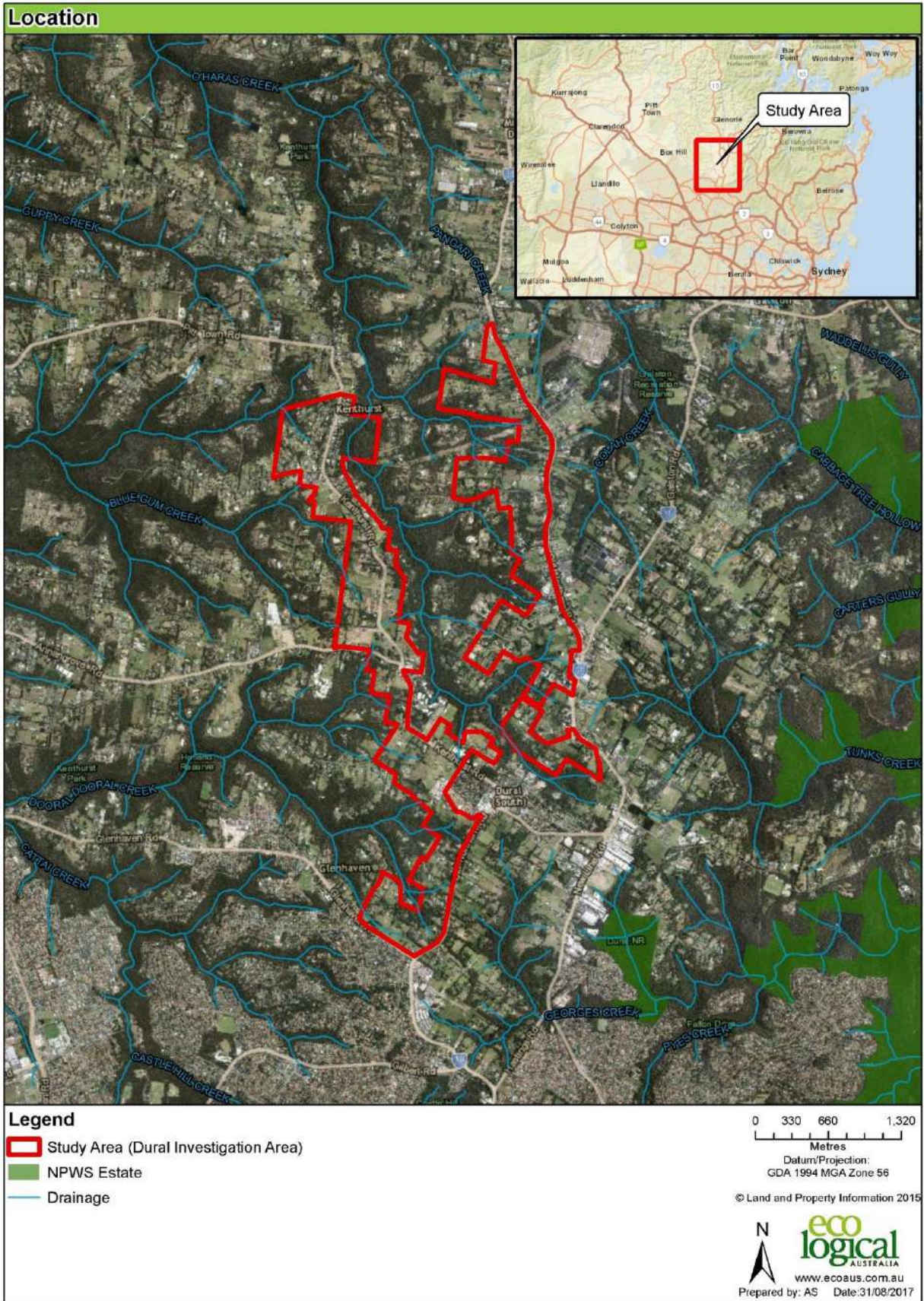


Figure 1: Study area



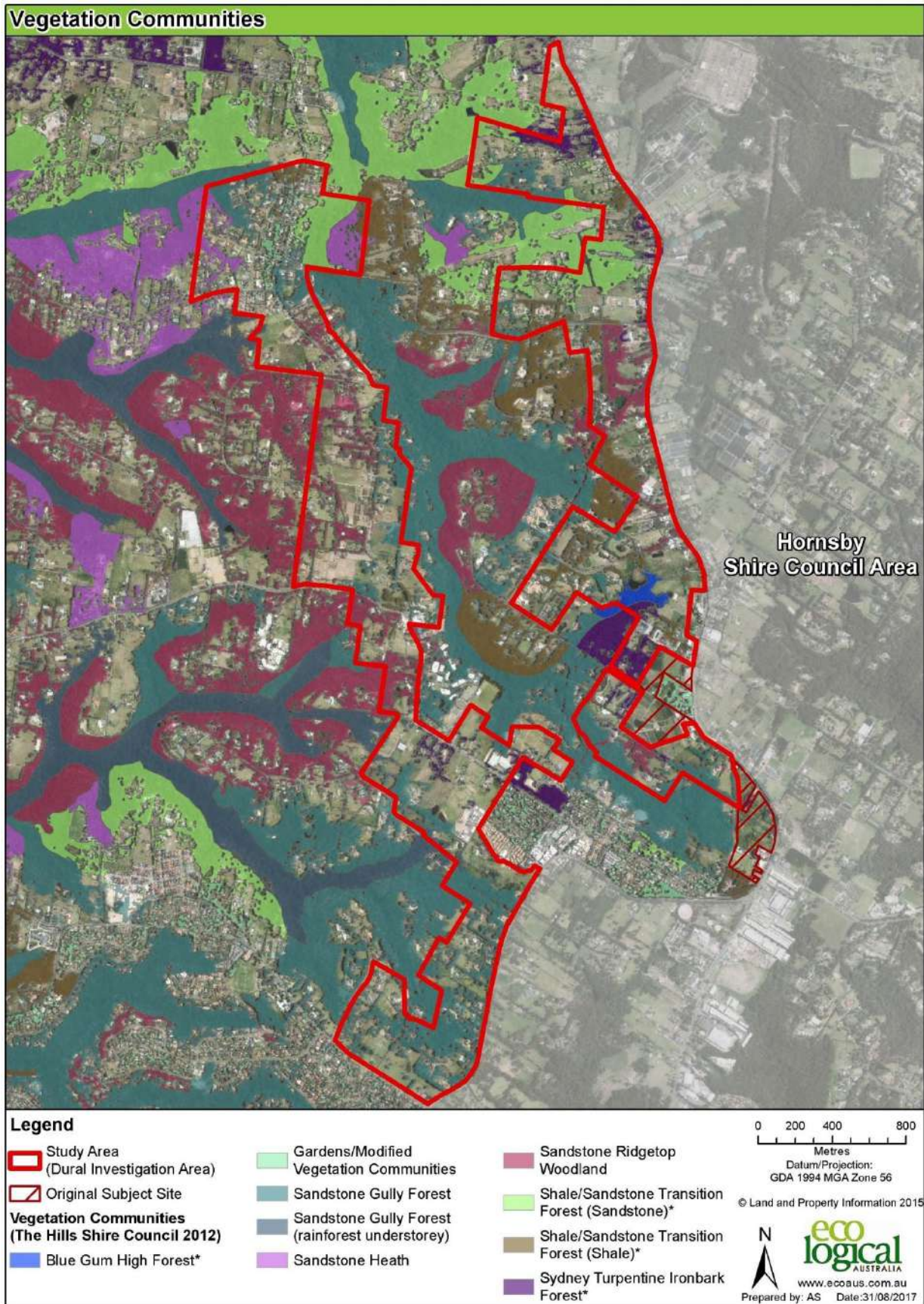


Figure 2: Vegetation Communities



## 2 Bushfire threat assessment

An assessment of the bushfire hazard is necessary to determine the application of bushfire protection measures such as asset protection zone location and dimension. This section provides a detailed account of the vegetation communities (bushfire fuels) and the topography (effective slope) that combine to create the bushfire hazard that may affect bushfire behaviour at the study area.

The concept of bushfire risk as influenced by fire history and current and past bushfire issues has little bearing on the determination of bushfire protection strategies for rezoning and future development within the study area. This is due to the fact that PBP assesses bushfire protection based purely on vegetation and slope (i.e. hazard and not risk), making the assumption that a fire may occur in any patch of bushland at a worst-case scenario (based on a set design fire).

Notwithstanding this, the *The Hills Bush Fire Risk Management Plan* (BFRMP) was reviewed to gain a greater understanding of the bushfire environment, hazard and risk issues that affect the study area.

The development of the study area is situated to the north east of the Dural town centre. The proposed development will provide further asset protection for existing development surrounding the study area by creating increased separation from bushfire hazards. The BFRMP does not affect the bushfire protection measures required for future development within the study area, but should be updated following development of the study area (**Figure 3**).

### 2.1 Bushfire protection measures

PBP requires the assessment of a suite of bushfire protection measures that in total afford an adequate level of protection. The measures required to be assessed for rezoning are listed in **Table 1** and are discussed in detail in this section. This section demonstrates that the study area can accommodate the required bushfire protection measures and achieve the Direction 4.4 objectives and RFS requirements.

**Table 1: PBP bushfire protection measures**

| Bushfire Protection Measure      | Considerations  |
|----------------------------------|---|
| Asset Protection Zones (APZ)     | Location and dimension of APZ setbacks from vegetation including prescriptions of vegetation management within the APZ.   |
| Access                           | Assessment to include access and egress in and out of a developable area such as alternate access, operational response and evacuation options. APZ perimeter access to be considered as is design standards of public roads and any fire trails. |
| Water supply and other utilities | List requirements for reticulated water supply and hydrant provisions, and any static water supplies for fire fighting.   |
| Building construction standards  | Provide a guide on the application of construction standards for future buildings.  |

### 2.2 Vegetation types

In accord with PBP, the predominant vegetation class has been assessed within the proposed lots and calculated for a distance of at least 140 m out from the proposed development. The predominant vegetation and effective slope assessments are shown **Table 3**.

Vegetation mapping shows Western Sandstone Gully Forest to the west of the western precinct/cluster of lots with smaller pockets of Blue Gum High Forest, Turpentine-Ironbark Margin Forest, and Sydney

Turpentine-Ironbark Forest to the west and south. These vegetation formations also occur around the eastern precinct/cluster of lots. In accordance with PBP the predominant vegetation is 'forest'.

Vegetation throughout the majority of the subject site (western and eastern precincts) is highly fragmented as a result of past agricultural land practices and rural-residential recent uses. Areas affected by these past or current uses are generally cleared or managed.

### 2.3 Effective slope

In accord with PBP, the slope that would most significantly influence fire behaviour was determined over a distance of 100 m from the boundary of the subject land where the vegetation was found (measuring the worst-case scenario). This assessment was made with 10 m contours and slope classes are listed in **Table 2**.

The land slopes down to the water course to the west. Slopes vary across the site and within the bushfire hazard and range from >0-15 degrees downslope and are shown in **Figure 3**.

**Table 2: PBP slope classes**

| Upslope or Downslope | PBP Slope Class  |
|----------------------|--|
| Upslope / Flat Land  | Flat land and all upslope land leading away from the development |
| Downslope            | >0-5 degrees downslope leading away from the development         |
|                      | >5-10 degrees downslope leading away from the development        |
|                      | >10-15 degrees downslope leading away from the development       |
|                      | >15-18 degrees downslope leading away from the development       |

### 3 Asset protection zones

Table A2.4 of PBP has been used to indicate the required APZ dimensions for future residential development within the subject land using the vegetation and slope data identified in **Section 2**. The APZ calculation is tabulated below and shown in **Figure 3**.

It is best practice to provide an APZ dimension that achieves a building construction standard under *AS 3959-2009 Construction of buildings in bushfire-prone areas* (Standards Australia 2009) of Bushfire Attack Level (BAL)-29 for residential development to ensure future home owners are not impacted by the additional costs associated with construction of a dwelling at BAL-40. **Table 3** lists the current minimum APZ and best practice APZ related to BAL-29 (refer to **Section 4** for more information on AS 3959-2009). Special Fire Protection Purpose (SFPP) developments will require an increase in APZ to provide a higher level of bushfire protection.

It is important to note that the APZ calculations quoted in this assessment are indicative only and have been determined at a landscape scale. This level of detail is suitable for a rezoning assessment where the aim is to demonstrate whether a parcel of land can accommodate the bushfire hazard, the expected APZ and future development. The final APZ dimensions for any future subdivision or development depends on the accuracy of a slope assessment undertaken at a site-specific level. The APZ dimensions quoted in this assessment should not be relied on to approve a future subdivision; they may be used as a guide only.

#### 3.1 APZ maintenance plan

The following fuel management specifications will need to be considered in the provision of APZ fo future development:

- No tree or tree canopy is to occur within 2 m of the dwelling roofline.
- The presence of a few shrubs or trees in the APZ is acceptable provided that they:
  - are well spread out and do not form a continuous canopy
  - are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period
  - are located far enough away from the building so that they will not ignite the building by direct flame contact or radiant heat emission.
- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species.

#### 3.2 Staging of development for APZ

Staging of future development should give consideration to the provision of an APZ to manage any potential bushfire hazard within adjoining future development areas to ensure that future dwellings are not impacted by unnecessary construction standards. This could occur through the provision of temporary APZ for earlier stages which will be automatically extinguished once the land where the APZ operates is developed and the hazard is permanently removed.

#### 3.3 Perimeter access within APZ

An APZ may require a perimeter road depending on the significance of the bushfire threat. The assessment of perimeter access is provided in the following **Section 5.3**.



Table 3: Threat assessment, APZ and category of bushfire attack

| Direction from envelope                          | Slope <sup>1</sup>           | Vegetation <sup>2</sup> | PBP required APZ <sup>3</sup> | BAL-29 APZ AS3959 | Comments  |
|--|------------------------------|-------------------------|-------------------------------|-------------------|---|
| <b>Western &amp; Eastern Precincts (cluster)</b> |                              |                         |                               |                   |   |
| Various  | Upslope / Level              | Forest                  | 20 m<br>60 m (SFPP)           | 25 m              | Refer to APZ interface plan – <b>Figure 3</b><br><br>APZs provided within property boundaries and existing infrastructure such as Derriwong Road and Old Northern Road. |
|  | 0-5 <sup>0</sup> downslope   |                         | 25 m<br>70 m (SFPP)           | 32 m              |   |
|  | 5-10 <sup>0</sup> downslope  |                         | 35 m<br>85 m (SFPP)           | 39 m              |   |
|  | 10-15 <sup>0</sup> downslope |                         | 50 m<br>100 m (SFPP)          | 49 m              |   |
|  | 15-18 <sup>0</sup> downslope |                         | 60 m<br>100 m (SFPP)          | 61 m              |   |
| Various  | Upslope / Level              | Low-hazard (Rainforest) | 10 m<br>30 m (SFPP)           | 11 m              |   |
|  | 0-5 <sup>0</sup> downslope   |                         | 10 m<br>40 m (SFPP)           | 14 m              |   |
|  | 5-10 <sup>0</sup> downslope  |                         | 15 m<br>50 m (SFPP)           | 18 m              |   |
|  | 10-15 <sup>0</sup> downslope |                         | 20 m<br>60 m (SFPP)           | 23 m              |   |
|  | 15-18 <sup>0</sup> downslope |                         | 25 m<br>65 m (SFPP)           | 29 m              |   |
| Various  | Upslope / Level              | Tall Heath              | 15 m<br>45 m (SFPP)           | 13 m              |   |
|  | 0-5 <sup>0</sup> downslope   |                         | 15 m<br>50 m (SFPP)           | 15 m              |   |
|  | 5-10 <sup>0</sup> downslope  |                         | 20 m<br>55 m (SFPP)           | 17 m              |   |
|  | 10-15 <sup>0</sup> downslope |                         | 20 m<br>60 m (SFPP)           | 19 m              |   |
|  | 15-18 <sup>0</sup> downslope |                         | 20 m<br>65 m (SFPP)           | 21 m              |   |
| Various  | Upslope / Level              | Grassland               | 10 m                          | 9 m               |   |
|  | 0-5 <sup>0</sup> downslope   |                         | 10 m                          | 10 m              |   |

| Direction from envelope | Slope <sup>1</sup>                     | Vegetation <sup>2</sup> | PBP required APZ <sup>3</sup> | BAL-29 APZ AS3959 | Comments |
|-------------------------|--|-------------------------|-------------------------------|-------------------|----------|
|                         | 5-10 <sup>0</sup> downslope            |                         | 10 m                          | 11 m              |          |
|                         | 10-15 <sup>0</sup> downslope           |                         | 10 m                          | 13 m              |          |
|                         | 15-18 <sup>0</sup> downslope           |                         | 10 m                          | 15 m              |          |
| All other directions    | Managed/Cleared land – No requirements |                         |                               |                   |          |

<sup>1</sup> Slope most significantly influencing the fire behaviour of the site having regard to vegetation found. Slope classes are according to PBP.

<sup>2</sup> Predominant vegetation is identified, according to PBP and “Where a mix of vegetation types exist the type providing the greater hazard is said to be predominate”.

<sup>3</sup> Assessment according to Table A2.4 of PBP



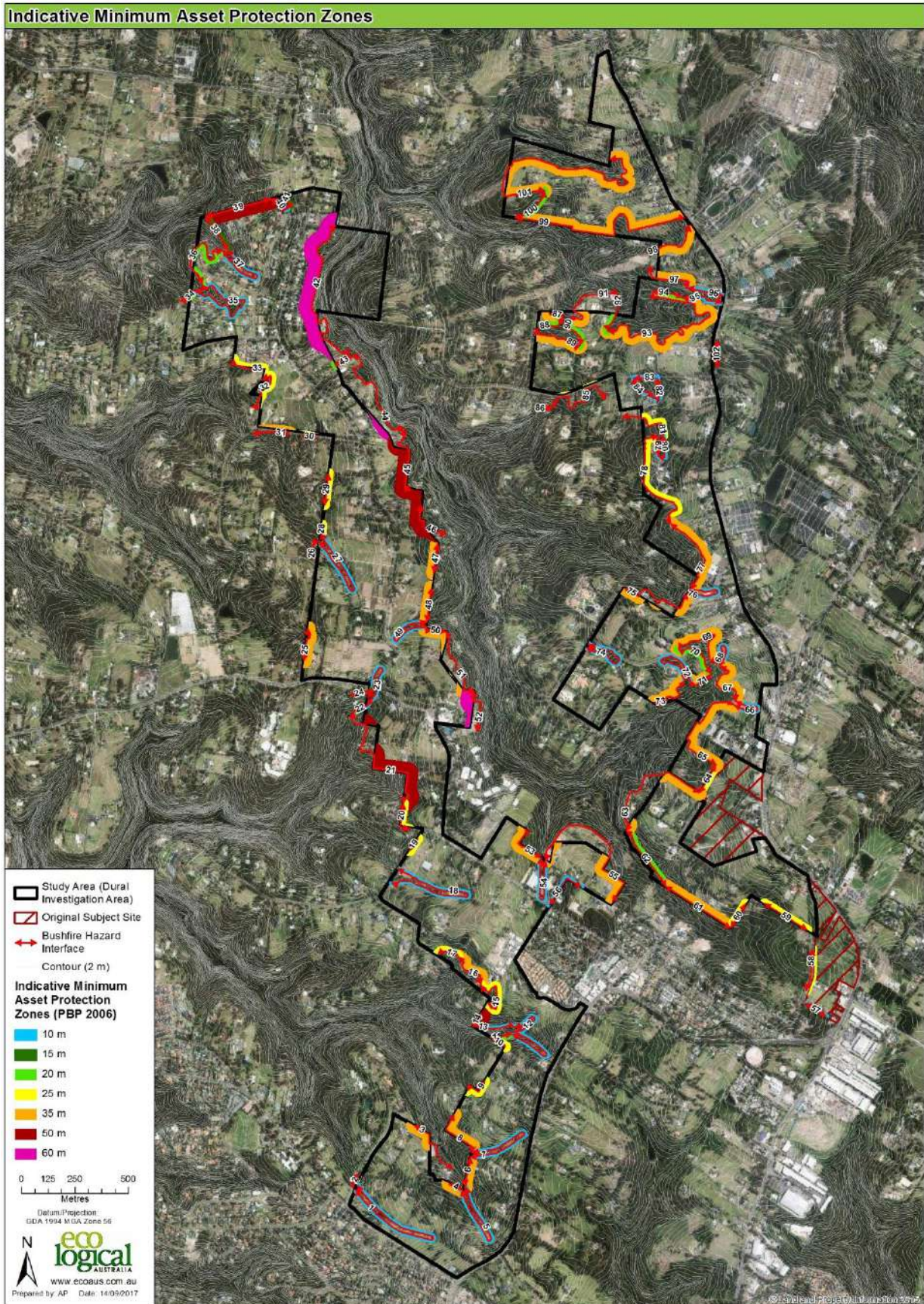


Figure 3: Asset protection zones



## 4 Construction standard

The application of building construction standards for bushfire protection under *AS 3959-2009 Construction of buildings in bushfire-prone areas* (Standards Australia 2009) is to be considered at the development application stage for individual dwellings and buildings. An assessment under AS 3959-2009 is not required at the rezoning or subdivision stages. The following is a brief introduction on AS 3959-2009.

AS 3959-2009 contains six Bushfire Attack Levels (BAL), each with a prescribed suite of design and construction specifications aimed at preventing ignition during the passing of a bushfire front. The BALs are outlined below:

- BAL-Low: The threat does not warrant application of construction standards. Developments with BAL-Low are generally not within bushfire prone land (greater than 100 m from bushland)
- BAL-12.5: Addresses background radiant heat at lower levels and ember attack
- BAL-19: Addresses mid-range radiant heat and ember attack
- BAL-29: Addresses high range radiant heat and ember attack
- BAL-40: Addresses extreme range of radiant heat and potential flame contact and ember attack
- BAL-FZ: Addresses construction within the flame zone. New subdivided lots are not permitted within the flame zone in NSW.

NSW has a minor variation to AS 3959-2009 which requires consideration in future development applications. The variation is contained within the document '*PBP Appendix 3 Addendum*' (RFS 2010).

## 5 Utilities and access

### 5.1 Water supply

Future lots will likely be serviced by reticulated water infrastructure suitable for fire fighting purposes. With the exception of rural residential subdivision, the furthest point from any future dwellings to a hydrant is to be less than 90 m (with a tanker parked in-line) in accordance with *Australian Standard 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning* (Standards Australia 2005). The reticulated water supply is to comply with the following acceptable solutions within Section 4.1.3 of PBP:

- Reticulated water supply to use a ring main system for areas with perimeter roads;
- Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005;
- Hydrants are not located within any road carriageway;
- All above ground water and gas service pipes external to the building are metal, including and up to any taps; and
- The PBP provisions of parking on public roads are met.

## 5.2 Gas and electrical supplies

In accordance with PBP, electricity should be underground wherever practicable. Where overhead electrical transmission lines are installed:

- Lines are to be installed with short pole spacing, unless crossing gullies
- No part of a tree should be closer to a powerline than the distance specified in the *ISSC 3 Guideline for Managing Vegetation Near Power Lines* (Industry Safety Steering Committee, 2015).

Any gas services are to be installed and maintained in accordance with *Australian Standard AS/NZS 1596 'The storage and handling of LP Gas'* (Standards Australia 2008).

## 5.3 Access

All bushfire prone areas should have an alternate access or egress option. This is usually achieved by providing more than one public road into and out of a precinct. The need for an alternative road and its location depends on the bushfire risk, the density of the development, and the chances of the road being cut by fire. All precincts within the study area should allow for an alternative public access road.

The proposed access arrangements within the study area are in accordance with the intent and principles of PBP regarding the provision of safe access and egress for both residents and fire fighters.

### 5.3.1 Safe access and egress

All bushfire prone areas should have an alternate access or egress option. An internal road system supporting future development is to comply with Section 4.2.7 of PBP.

### 5.3.2 Road design and construction

Depending on the bushfire risk, all bushland interface areas containing an APZ for a significant bushfire hazard should feature a perimeter public road within the APZ. It is acceptable for some areas not to have a perimeter road or have a perimeter trail instead. These include areas of lower bushfire risk (such as grassland or low hazard remnants or areas where it may not be feasible to provide a continuous road due to the shape of the interface or the terrain. These areas should have some other access strategy such as regular access points and good access to a hydrant network.

Provision of a simple layout with perimeter roads and frequent direct access to the internal road system will provide sufficient access/egress in the case of an emergency. Public roads should provide safe operational access to structures and water supply. Perimeter roads will be required at APZ bushland interface locations where a significant bushfire hazard exists. However, minor drainage corridors and the setbacks provided within larger 'lifestyle lots' present a lower risk scenario and, therefore, may not require implementation of perimeter roads. Property access roads will also need to provide safe access for emergency services and provide protection to properties and occupants during a bushfire

The design details (PBP acceptable solutions) of public roads are shown in **Table 4**.

Table 4: Performance criteria for proposed public roads

| Intent may be achieved where:   | Acceptable solutions  |
|---|---|
| <ul style="list-style-type: none"> <li>firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)</li> </ul> | <ul style="list-style-type: none"> <li>public roads are two-wheel drive, all weather roads</li> </ul>   |
| <ul style="list-style-type: none"> <li>public road widths and design that allows safe access for firefighters while residents are evacuating an area</li> </ul>                     | <ul style="list-style-type: none"> <li>urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle)</li> <li>the perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas</li> <li>traffic management devices are constructed to facilitate access by emergency services vehicles</li> <li>public roads have a cross fall not exceeding 3 degrees</li> <li>public roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard</li> <li>curves of roads (other than perimeter roads) are a minimum inner radius of six metres</li> <li>maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient</li> <li>there is a minimum vertical clearance to a height of four metres above the road at all times</li> <li>the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicated load rating</li> </ul> |
| <ul style="list-style-type: none"> <li>the capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles</li> </ul>                               | <ul style="list-style-type: none"> <li>public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression</li> </ul>  |
| <ul style="list-style-type: none"> <li>roads that are clearly sign posted (with easy distinguishable names) and buildings / properties that are clearly numbered</li> </ul>         | <ul style="list-style-type: none"> <li>public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression</li> <li>public roads up to 6.5 metres wide provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression</li> </ul>   |
| <ul style="list-style-type: none"> <li>there is clear access to reticulated water supply</li> </ul>   | <ul style="list-style-type: none"> <li>one way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and located services outside of the parking bays to ensure accessibility to reticulated water for fire suppression</li> <li>parking bays are a minimum of 2.6 metres wide from kerb to kerb edge to road pavement . No services or hydrants are located within the parking bays</li> </ul>   |
| <ul style="list-style-type: none"> <li>parking does not obstruct the minimum paved width</li> </ul>   | <ul style="list-style-type: none"> <li>public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road</li> </ul>   |



## 6 Recommendations and conclusion

Bushfire hazard has been assessed across the subject study area and found to be acceptable based on the ability to provide compliant APZ within the subject site. On the basis of this assessment, indicative asset protection zone requirements have been mapped across the proposed rezoning area.

A number of strategies have been provided in the form of planning controls such that the risk from bushfire can be minimised and future rezoning or development approval processes can be streamlined. Further, it has been found that development of the anticipated land uses within the subject study area, from a bushfire planning perspective, are considered suitable.

A number of strategies have been provided in this report such that the risk from bushfire can be mitigated. The main strategies suggested include:

- Ensure adequate setback from bushfire prone vegetation (APZs)
- Integrate non-combustible infrastructure within APZs such as roads, easements and parking areas. The majority of APZs should be contained within perimeter roads and front yard setbacks
- Ensure adequate access and egress from the study area through a well-designed road system
- Consider the adequacy of water supply and the delivery of other services (gas and electricity)
- Provide temporary APZs during any staged development
- Provide for effective and ongoing management of APZs; and
- Consider construction standards (AS3959) implications for future developments depending on development type (25 and 70 metre APZs).

The rezoning has been prepared based on the advice and constraints contained within this report. In relation to the furthering of the planning processes as they relate to the future uses of the study area, it is considered appropriate that more detailed assessment and consideration of the relevant bushfire protection strategies should be undertaken at the development application stage. This further assessment should include a more comprehensive review of the road and lot layout and subsequent planning controls, to ensure they are well designed in terms of bushfire protection outcomes.

The wider area of consideration has similar characteristics as the subject site and as such should have similar capacity to provide the required suite of bushfire protection measures for future rezoning investigations at the wider scale.

## 6.1 Statement of capability

This bushfire assessment demonstrates that the subject land is capable of accommodating future development and associated land use with the appropriate bushfire protection measures and bushfire planning requirements prescribed by s.117 (2) Direction 4.4 – ‘*Planning for Bush Fire Protection*’ and PBP.

If further information is required, please contact Daniel Copland on 4302 1224.



Daniel Copland

**Senior Bushfire Consultant**

**FPAA BPAD Certified Practitioner No. BPAD28853-L3**



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17 January 2018

Ms Janelle Atkins  
Principal Forward Planner  
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Dear Janelle,

## **DERRIWONG ROAD-OLD NORTHERN ROAD PLANNING PROPOSAL ADDENDA**

### **1. OVERVIEW**

This letter is submitted as an addendum to and to be read as part of the ongoing consideration of the Derriwong Road - Old Northern Road Planning Proposal (**the Planning Proposal**). The Planning Proposal was subject of a pre-Gateway Review in 2017 (2017SWC031 – The Hills Shire – PGR\_2017\_THILL\_001\_00) and remains an active planning proposal under consideration by The Hills Shire Council (**the Council**). The Planning Proposal relates to multiple land parcels that are broadly divided into the Northern and Southern Sites along Old Northern Road and Derriwong Road, Dural. The location of these sites is illustrated in **Figure 1**.

At the pre-gateway meeting held on 20 April 2017 the Sydney West Central Planning Panel (**the Panel**) determined that the Planning Proposal would not be submitted for a Gateway Determination. At this meeting the Panel stated that the Planning Proposal should not proceed prior to the completion of a strategic study programmed by the Council for the Dural area. The Council and the proponent were advised that the Panel would consider this Planning Proposal again if this strategic study was not completed by the end of 2017.

Since this time, the proponent has provided the Council with two addenda to the Planning Proposal, dated 27 September 2017 and 29 September 2017 respectively. These addenda provide additional strategic context for the proposed works and further environmental constraints analysis resulting in a recommended wider 'Investigation Area' for the Dural Area. This work was completed in addition to any separate work by the Council in completing the strategic study.

The wider 'Investigation Area' is subsequently divided into recommended precincts that prioritises short-medium term growth immediately surrounding existing local centres such as Round Corner Village. The sites the subject of the Planning Proposal are located within recommended Precinct 1 as illustrated within **Figure 2**.

Following this analysis, further studies have been undertaken on the stormwater management strategy, and sewerage and water supply strategy for the entire recommended for Precinct 1. These studies are attached to this correspondence at **Attachment 1** and **Attachment 2** respectively and form part of this addendum to the Planning Proposal. While these studies reference a subdivision plan or 'master plan' it is noted that this forms only one option for the future subdivision of the land following the finalisation and gazettal of the Planning Proposal.



Since the completion of the pre-Gateway Review in 2017, the Greater Sydney Commission has released for comment the Draft Greater Sydney Regional Plan and the Draft Central City District Plan that apply to the site the subject of the Planning Proposal. As such, this addendum also provides to Council an assessment of the Planning Proposal against the relevant outcomes and actions of these new strategic plans.

Figure 1 – Aerial View of the Southern and Northern Sites and Surrounding Context (Source: Urbis, 2016)

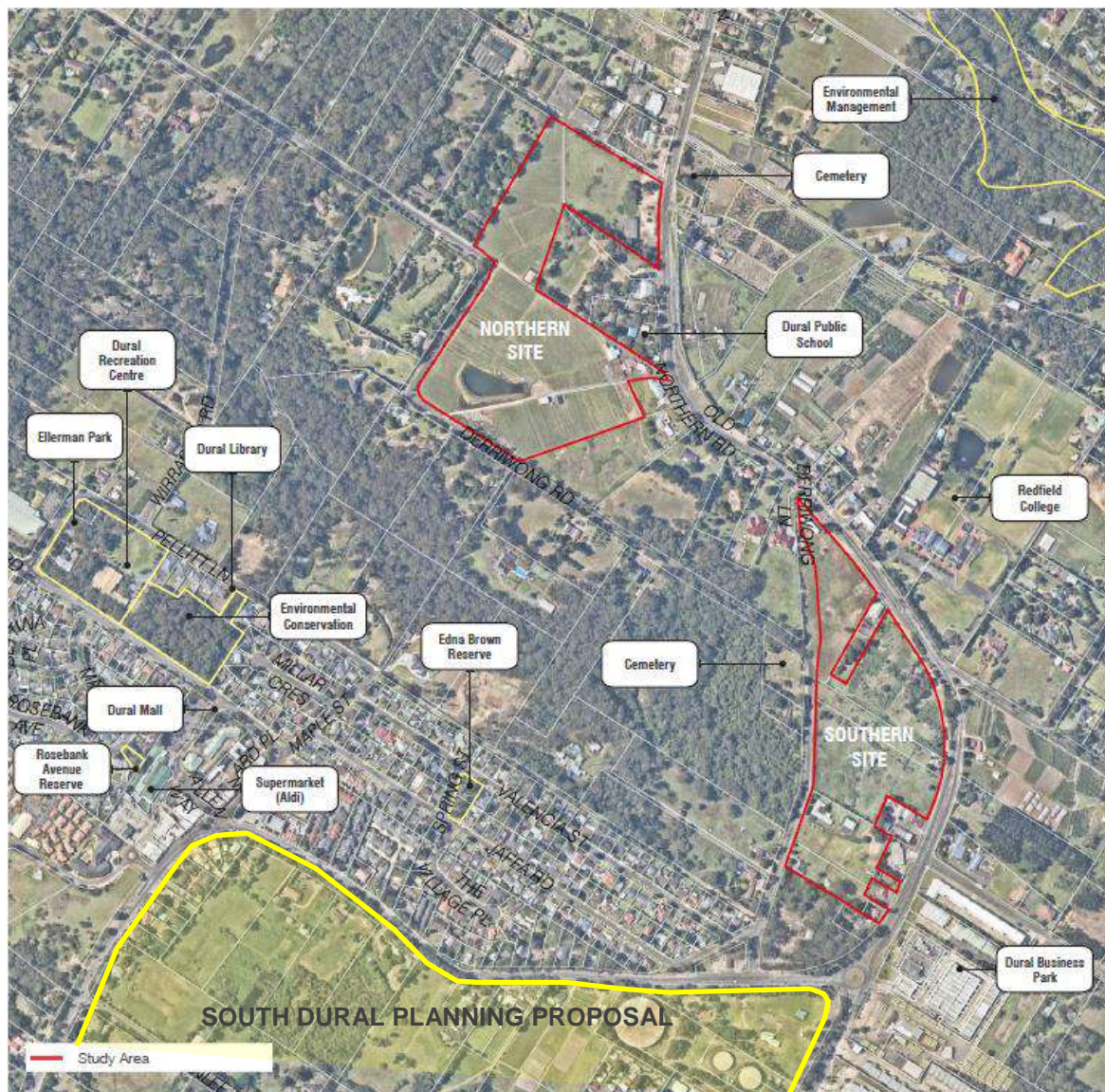
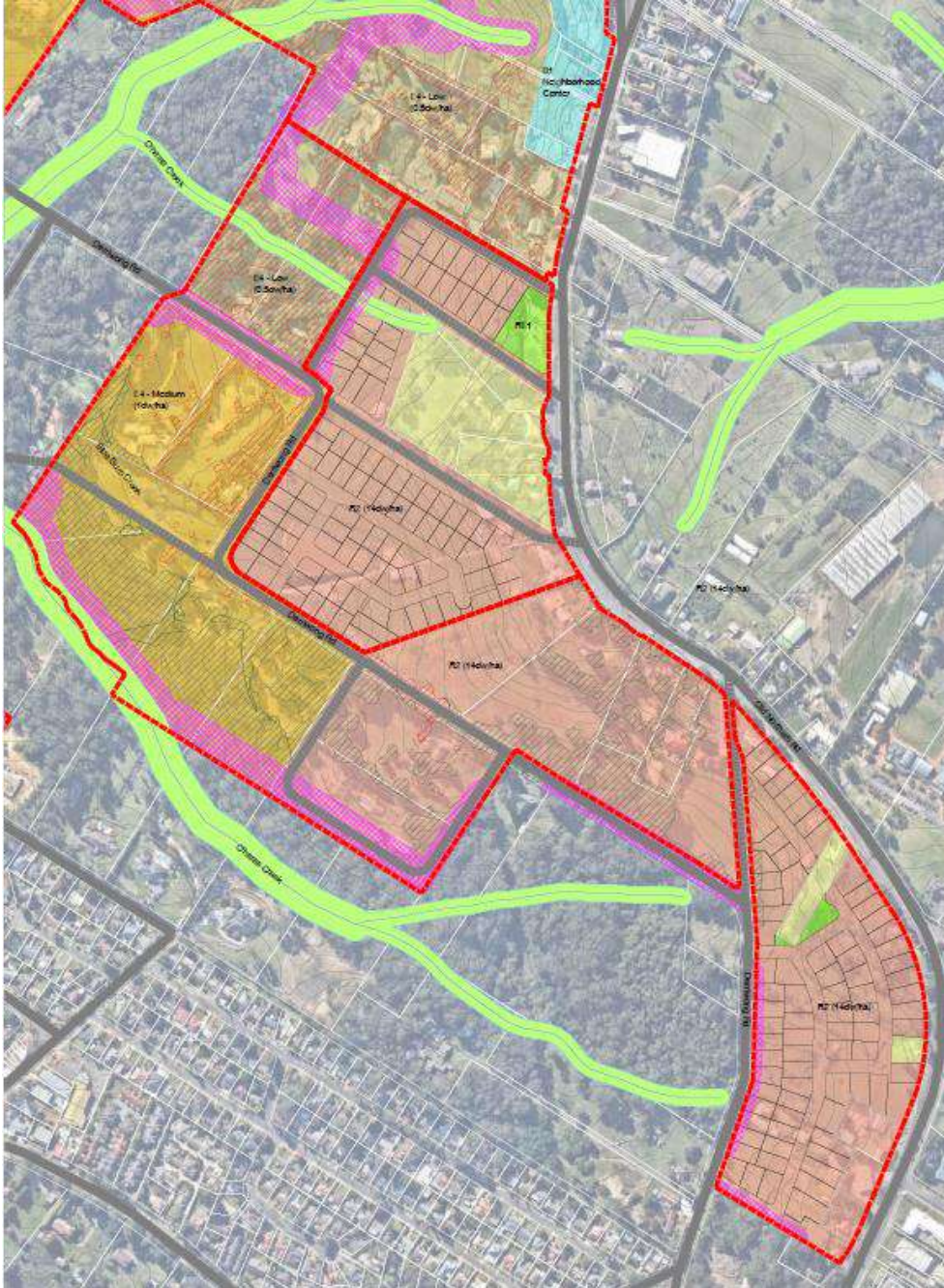




Figure 2 – Recommended 'Precinct 1' of the Wider Dural Investigation Area



Source: Urbis, Provided within Addendum 1 to the Planning Proposal

## 2. DRAFT GREATER SYDNEY REGIONAL PLAN AND DRAFT CENTRAL CITY DISTRICT PLAN

The Draft Greater Sydney Regional Plan (**Draft Regional Plan**) was released in October 2017 and guides the growth for the Greater Sydney region over the next 20 years. The site the subject of the Planning Proposal is located within the Central River City and is subject to the objectives of the Draft Central City District Plan (**Draft District Plan**), also released in October 2017.

The site and its surrounds are identified in each of the plans as being within the 'Metropolitan Rural Area' (**MRA**) of Greater Sydney, which is consistent with the previous "Plan for Growing Sydney". Urbis Pty Ltd (**Urbis**) made a submission, on behalf of the proponent, dated 15 December 2017 to the Greater Sydney Commission requesting clarification and amendment to the draft plans regarding planning for the area around the Round Corner Village. The key themes of the submission are summarised as follows:

- The locality around the Round Corner Village in Dural should not be identified as being within the MRA as there is an existing cluster of urban land uses in and adjacent to this local centre.
- The Draft Region Plan should not preclude the potential for urban development where it is shown to be consistent with the values of the MRA provided that the urban development:
  - Will result in no adverse impact on high value agricultural land or productive industrial lands;
  - Will retain or preserve the scenic quality and ecological value of the locality;
  - Enables a logical expansion to existing local centres and facilitates improvements to local accessibility and walkability of these centres; and
  - Provides for/or maintains a buffer between urban development and genuine agricultural land.
- The Draft Region Plan and Draft District Plans should recognise the importance of planned growth or increased density around all local centres where there is a logical sequence of land release for urban purposes or up zoning, including the three local centres located within the nominated MRA outside of the Western City District.
- Ensure east-west connections between the West, Central, and Eastern Cities are recognised within the Draft District Plans, including upgrades to local transport corridors from Strategic Centres such as Rouse Hill and Hornsby.

Notwithstanding the above, the ongoing consideration of the Planning Proposal should not be suspended on the basis of the release of the Draft Regional Plan nor the Draft District Plan as the proposed rezoning of the site is consistent with these strategies in the context of a wider Dural Investigation Area as summarised in **Table 1**.



Table 1 – Consideration of the Planning Proposal against the relevant directions and actions of the Draft Regional Plan and Draft District Plan

| Planning Priority   | Comment / Consistency   |
|---|---|
| <b>Greater Sydney Region Plan</b>                               |   |
| <i>A city for people</i>  |   |
| 6. Services and infrastructure meet communities' changing needs | The Planning Proposal seeks to rezone the land for residential purposes in a location proximate to a number of existing and planned health and education facilities. These facilities are located within Dural Neighbourhood Centre and Round Corner Local Centre.  |
| 7. Communities are healthy, resilient and socially connected    | The Planning Proposal will facilitate the improvement of walkability in the locality by improving interfaces at the nearby primary school, providing open space, and delivering additional housing in close proximity of the local centre.  |
| <i>Housing the city</i>   |   |
| 10. Greater housing supply                                      | <p>The area around the site and the Round Corner Village has evolved from historic agricultural uses to a local precinct, and the majority of the area is no longer suitable or available for agricultural purposes. While the character of this part of Dural has changed as evident by the current land uses in the area, the provision of more diverse housing has not followed. The area immediately surrounding the site is still characterised by predominantly large lot residential homes. New planning proposals in proximity of the site have also proposed medium density residential development.</p> <p>The zoning and lot standards proposed within the Planning Proposal are designed to provide a more affordable housing option for existing and future residents of the locality, compared to the dominant large lot homes.</p> |
| 11. Housing is more diverse and affordable                      |   |
| 13. Environmental heritage is conserved and enhanced            |   |

| Planning Priority  | Comment / Consistency   |
|--|---|
| <b>Greater Sydney Region Plan</b>  |   |
| <i>A well-connected city</i>   |   |
| 14. A metropolis of three cities - integrated land use and transport creates walkable and 30-minute cities | The Planning Proposal envisages the future extension of Annangrove Road through the site to Old Northern Road, which will have broader subregional benefits to the road and transport network. This will also remove the traffic congestion within Round Corner and improve the amenity and accessibility within the local centre.  |
| <i>Jobs and skills for the city</i>  |   |
| 23. Industrial and urban services land is planned, protected and managed                                   | The Planning Proposal supports the logical expansion of local centre and it has been demonstrated that it will not result in an adverse impact on productive industrial land. As outlined throughout the Planning Proposal the Northern and Southern Sites and immediately surrounding lands are not used for agricultural or industrial purposes. Furthermore, the proximity of the Northern and Southern Sites to urban land uses including the Dural Public Schools makes them unsuitable for any such uses due to potential land use conflicts. The changing residential and commercial character of surrounding land to the north and south further supports the proposed rezoning of the sites. |
| <i>A city in its landscape</i>   |   |
| 27. Biodiversity is protected, urban bushland and remnant vegetation is enhanced                           | <p>The sites have been substantially cleared of vegetation. An extensive vegetation corridor (located outside the site boundaries) is located to the south/southwest and follows the O'Hara Creek Line.</p> <p>An ecological assessment of the two sites and the and surrounds has been undertaken and this identified the presence of endangered and threatened flora communities within the sites.</p> <p>The current concept plan for development of the Southern Site may require the removal of an identified flora community being <i>Eucalyptus saligna</i> (Sydney Blue Gum). An assessment of their condition by ELA included within the Planning Proposal has</p>                           |

| Planning Priority  | Comment / Consistency   |
|--|---|
| <b>Greater Sydney Region Plan</b>  |   |
|  | <p>concluded that the surveyed species are in a poor condition and highly fragmented.</p> <p>Notwithstanding this, the species may be present throughout the extensive vegetation corridor located to the south/southwest that will not be affected by the proposal. Detailed consideration of the potential for environmental impact is considered in Part 3, Section C of the Planning Proposal. Despite the condition and fragmentation of the identified species on the site, the Planning Proposal concludes that if the preferred design layout cannot be implemented, design alternatives may be explored as well as opportunities to transplant trees or collect, seeds to support revegetation elsewhere within the immediate area. The potential impact has feasible alternatives that may be explored at DA stage.</p> |
| <p>28. Scenic and cultural landscapes are protected</p>  | <p>An extensive vegetation corridor (located outside the site boundaries) is located to the south/southwest and follows the O'Hara Creek Line. The Planning Proposal is not inconsistent with this objective as the two sites do not contribute to significant cultural landscapes being in proximity to an existing urban area. It is considered that the Planning Proposal will deliver outcomes consistent with Council's policy direction for the delivery and preservation of open space.</p> <p>The Planning Proposal has given consideration to the visibility of the site along Old Northern Road, and in particular for the Southern Site, the indicative layout has been established to ensure a setback can be achieved to the Old Northern Road accommodating significant landscaping.</p>                            |
| <p>29. Environmental, social and economic values in rural areas are maintained and protected</p> | <p>It is acknowledged that the Planning Proposal is not entirely consistent with this objective, as it proposes urban development outside of the 'urban area', as defined by the Draft Region Plan. However, the Round Corner Village area has an existing cluster of urban land uses in and adjacent to this local centre.</p>   |





| Planning Priority   | Comment / Consistency  |
|---|--|
| <b>Central City District Plan</b>   |  |
| <i>Liveability:</i>   |  |
| 3. Providing services and social infrastructure to meet people's changing needs                 | <p>The Planning Proposal would facilitate the delivery of low density residential accommodation located in close proximity to an existing primary school and local centre.</p> <p>The provision of low density residential accommodation within the locality will provide housing diversity within the area and provide an affordable choice for families of the locality, consistent with Planning Priority C3 and C5 of the Draft District Plan. The provision of low density detached housing is also consistent with the predicted population change from 2016-2036 within the Hills Shire local government area with a predicted approximate 60% increase in children aged four years or younger, and 76% increase in young people aged 20-24 years (Draft District Plan, page 25).</p> |
| 5. Providing housing supply, choice and affordability with access to jobs and services          | <p>As stated within the Planning Proposal the social demographic of Dural is families and over 55's. Housing and economic investigation demonstrates a demand for smaller housing lots driven by relative affordability for young families as well as demand generated by "empty nesters" and retirees looking to remain in the "village" like area but wanting to down size from 2 hectare properties.</p> <p>The proposal is consistent with current demand for an alternate housing product within a rather homogenous supply environment combined with planning for long term growth up to 20 years.</p>   |
| 6. Creating and renewing great places and local centres, and respecting the District's heritage | <p>The indicative master plan accompanying the Planning Proposal envisages an extension of the local centre that includes new open space co-located with the primary school, improvements to pedestrian and vehicle access to the primary school, and increased residential development within a walkable distance of the Round Corner Village.</p>  |
| <i>Productivity:</i>  |  |

| Planning Priority   | Comment / Consistency   |
|---|---|
| <b>Central City District Plan</b>   |   |
| 9. Delivering integrated land use and transport planning and a 30-minute city     | The Planning Proposal envisages the future extension of Annangrove Road through the site to Old Northern Road, which will have broader subregional benefits to the road and transport network. This will also remove the traffic congestion within Round Corner and improve the amenity and accessibility within the local centre.  |
| <b>Sustainability:</b>  |   |
| 13. Protecting and improving the health and enjoyment of the District's waterways | As outlined in the Stormwater Quality Assessment included at <b>Attachment A</b> of this addendum the subdivision of the site can be arranged to ensure appropriate treatment of all stormwater resulting from the increased residential development on the sites.  |
| 15. Protecting and enhancing bushland and biodiversity                            | <p>As stated above the two sites have been substantially cleared of vegetation. An extensive vegetation corridor (located outside the site boundaries) is located to the south/southwest and follows the O'Hara Creek Line.</p> <p>Detailed consideration of the potential for environmental impact is considered in Part 3, Section C of the Planning Proposal. Despite the condition and fragmentation of the identified species on the site, the Planning Proposal concludes that if the preferred design layout cannot be implemented, design alternatives may be explored as well as opportunities to transplant trees or collect, seeds to support revegetation elsewhere within the immediate area. The potential impact has feasible alternatives that may be explored at DA stage.</p> |
| 17. Delivering high quality open space  | The indicative subdivision plan allows for future open space to be co-located with compatible land uses including the existing school and public hall to support a range of future community and recreational opportunities for a broad cross section of the community (existing and future).   |
| 16. Better managing rural areas   | The Planning Proposal is not considered to result in a loss of commercially viable or productive agricultural land. Surrounding land uses are predominantly urban in nature including local centres   |



| Planning Priority   | Comment / Consistency  |
|---|--|
| <b>Central City District Plan</b>   |  |
|   | to north and south providing services such as educational establishments and retail and commercial operations. The nature of the surrounding uses compromise its ability to be utilised for agricultural purposes. This is demonstrated within the Planning Proposal and supporting documentation including the Urbis Assessment of New Agricultural Enterprise Viability in Dural dated 2 November 2016.  |
| 18. Adapting to the impacts of urban and natural hazards and climate change | The Planning Proposal has been informed by mapping of local constraints and opportunities including ecological characteristics, flooding and fire hazard. The Addenda to the Planning Proposal submitted in September 2017 provides additional analysis into the ecological characteristics and fire hazard potential of the site and surrounding lands to get an even better understanding of the impacts of these potential hazards around the site. |

### 3. DEMAND FOR AGRICULTURAL LAND

Planning Priority C12 of the Draft District Plan reinforces the need to protect and support agricultural production and mineral resources. The Draft District Plan notes that agricultural processing and export is a key economic sector of the MRA. However, the land to be protected must first be recognised as viable agricultural land so as to not diminish the importance of this objective.

With respect of Dural and more specifically the land immediately surrounding the Round Corner Village area, including the Northern and Southern sites, the existing land uses within RU6 Transition-zoned land are predominantly rural-residential, with the nearest intensive agricultural uses located further to the north in Middle Dural, approximately 30 kilometres away. The Draft District Plan notes that the District has two agricultural clusters, namely Maroota and Middle Dural/Galston/Arcadia.

The Draft District Plan notes that the agricultural cluster at Middle Dural is to be protected, and seeks to ensure the operation of rural industries is protected from encroachment from incompatible land uses (including residential). Middle Dural however is located some 30 kilometres away from Round Corner urban area and the land the subject of the Planning Proposal.

The site, and the broader ‘Precinct 1’ of the recommended Dural Investigation Area, could only be suitable for low yield agricultural purposes due to the landform impediments and close proximity to established urban land uses that would contribute to amenity impacts. These uses are unlikely to generate sufficient income or have the critical mass to support viable commercial operations.

Allowing moderate growth of low density residential surrounding an existing local centre, where it can be demonstrated that the development will have no adverse impact to high value agricultural land, is



consistent with the objective to support agricultural production at land elsewhere including Maroota and Middle Dural/Galston/Arcadia without undermining the importance of this objective.

## **4. STORMWATER AND SERVICING THE SITE**

Concurrent with the Council undertaking the Dural Strategic Landuse Study the proponent has further considered how the Planning Proposal sits amongst a wider Dural Investigation Area. As discussed with the Council and the Greater Sydney Commission previously, the proponent has completed additional studies to further investigate and inform the servicing strategy and stormwater management strategy for the two sites. This information forms part of this addenda and should be read in conjunction with the Planning Proposal.

Whilst it is recognised the Council and their consultants will ultimately assess the future strategic direction for the Dural area, additional constraints analysis that has been undertaken by the proponent to assist the Council in identifying the relevant catchment and boundary for the wider Dural Investigation Area and provide confidence that planning for 'Precinct 1' and specifically the Planning Proposal site can progress.

The Stormwater Quality Assessment (Attachment 1) and Sewerage and Water Supply Strategy (Attachment 2) prepared by ARUP are discussed in further detail in the following sections. It is noted that that the master plan layout provided with the Planning Proposal is one of many potential options and that land area is capable of accommodating other layouts and can address its servicing and infrastructure needs as demonstrated in attached reports. In summary, these reports found the following.

### **4.1. STORMWATER QUALITY TREATMENT**

A precinct-wide stormwater concept plan has been developed which includes a number of dual-function water quality and detention basins. Swales and rain gardens are also proposed within the streetscape where road grades permit. The stormwater management strategy plan provides advice on the indicative size of these features and basins in terms of area and volume. On this basis, the report concludes that further planning can proceed by setting aside these approximate designated areas for site stormwater management.

However, the Stormwater Quality Assessment recommends minor changes to the current indicative subdivision plan to create 8 sub-catchments. The arrangement for Catchment 1 includes a widened central road reserve, and provides space for a water quality basin/swale to run along the central median. The arrangement for Catchment 4 removes one north-south road and provides an additional three lots. The water quality and OSD storage will be provided in the four south western lots, where the natural landform is flat. This potential change to a master plan layout may result in the net loss of one lot, but will not have a material impact on the overall feasibility of the concept subdivision layout.

### **4.2. POTABLE WATER**

The existing water supply to the area is supplied from the SWC Dural South Reservoir site on the corner of the Old Northern Road and New Line Road to the south of Precinct 1. Sydney Water advised that the trunk water supply in the area has adequate capacity to service the whole proposed Precinct 1 area.



### **4.3. SEWAGE**

The Sewerage and Water Supply Strategy demonstrates that 'Precinct 1' can be sewered by a combination of a gravity sewerage (central and southern portion of Precinct 1) and a pressure sewerage system (northern and western portion of Precinct 1). The existing Sewage Pumping Station and pressure main will be at full capacity when all of the Northern Site of the Planning Proposal and *part* of the Southern site are complete.

The remaining areas of 'Precinct 1' would require the upgrade of the pumping station and the pressure main. It is noted the existing Dural Public School will also benefit from any new sewerage installation built for the Northern Site.

It is understood that the Council and Sydney Water are already investigating multiple options to address the requirements to upgrade the pumping station and pressure main.

## **5. CONCLUSION**

This addendum has been prepared and is submitted in support of the Planning Proposal and is presented for Council's consideration. Consistent with other material submitted in support of the Planning Proposal, the proponent raises no objection to the Council releasing this material to its consultants undertaking the broader Dural Land use study.

We consider that this addendum demonstrates strategic merit of the Planning Proposal in the context of the future likely growth in the area.

Should you have any questions or comments to progress the status of the Wider Dural Investigation Area, please do not hesitate to contact the undersigned or Clare Brown, Director Planning, at (02) 8233 9900.

Yours sincerely,

A handwritten signature in black ink that reads "Clare Brown".

Clare Brown  
Director

Attachment A – Stormwater Quality Assessment (ARUP)

Attachment B – Sewerage and Water Supply Strategy (ARUP)





Dural Development Management  
Services Pty Ltd

**Old Northern Road, Dural -  
Precinct 1**

**Stormwater Management Strategy**

First Issue | 22 December 2017

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 258715-00

Arup  
Arup Pty Ltd ABN 18 000 966 165



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**ARUP**

# Document Verification

# ARUP

|  |             |                                       |   |                       |                  |           |                                     |
|--|-------------|---------------------------------------|---|-----------------------|------------------|-----------|-------------------------------------|
| <b>Job title</b>                                 |             | Old Northern Road, Dural - Precinct 1 |   | <b>Job number</b>     |                  | 258715-00 |                                     |
| <b>Document title</b>                            |             | Stormwater Management Strategy        |   | <b>File reference</b> |                  |           |                                     |
| <b>Document ref</b>                              |             |                                       |   |                       |                  |           |                                     |
| <b>Revision</b>                                  | <b>Date</b> | <b>Filename</b>                       | Report Stormwater Quality Assessment - Rev 1.docx |                       |                  |           |                                     |
| First Issue                                      | 22 Dec 2017 | <b>Description</b>                    | First issue to client                             |                       |                  |           |                                     |
|  |             |                                       | Prepared by                                       | Checked by            | Approved by      |           |                                     |
|  |             | Name                                  | E Dean  | A Crouch              | M Knight         |           |                                     |
|  |             | Signature                             |   |                       | <i>MB Knight</i> |           |                                     |
|  |             | <b>Filename</b>                       |   |                       |                  |           |                                     |
|  |             | <b>Description</b>                    |   |                       |                  |           |                                     |
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|  |             | Signature                             |   |                       |                  |           |                                     |
| <b>Issue Document Verification with Document</b> |             |                                       |   |                       |                  |           | <input checked="" type="checkbox"/> |

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## Appendices

### Appendix A

Urbis - Development Investigation - PLN01 – Dural Planning Proposal

### Appendix B

Urbis - Precinct 1 - PLN04 – Dural Planning Proposal

### Appendix C

Arup - Precinct 1 - Servicing Plan - Stormwater Quality

## Executive Summary

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Dural Development Management Services Pty Ltd (DDMS) are looking at the re-zoning, amalgamation and possible development of land in the suburb of Dural in the Hills Shire Local Government Area northwest of the Sydney Central Business District. Arup has been engaged by DDMS to investigate the stormwater management strategy for the area referred to as Precinct 1.

This report has assessed Council requirements for stormwater quality treatment and on site detention that would apply to the proposed development of the site. Based on these requirements a precinct-wide stormwater concept plan has been developed which includes a number of dual-function water quality and detention basins. Swales and rain gardens are also proposed within the street-scape where road grades permit.

The stormwater management strategy plan provides advice on the indicative size of these features and basins in terms of area and volume. On this basis, development planning can proceed by setting aside these designated areas for site stormwater management.

The strategy stormwater management strategy presented in this report has demonstrated that the development area can be developed in adherence to Council stormwater management requirements.



# 1 Introduction

Dural Development Management Services Pty Ltd (DDMS) are investigating the re-zoning, amalgamation and possible development of land in the suburb of Round Corner in the Hills Shire Local Government Area northwest of the Sydney Central Business District. The area concerned is shown as Precinct 1 in the Urbis – Development Investigation Plan – Dural Planning Proposal in Appendix A and is referred to as the Old Northern Road and Derriwong Road, Dural area.

The Precinct 1 area under review is bound by the Old Northern Road to the east, O’Haras Creek and the existing Round Corner residential land to the south, and a second tributary of O’Haras Creek to the north and west. The location of Precinct 1 is shown in Figure 1.

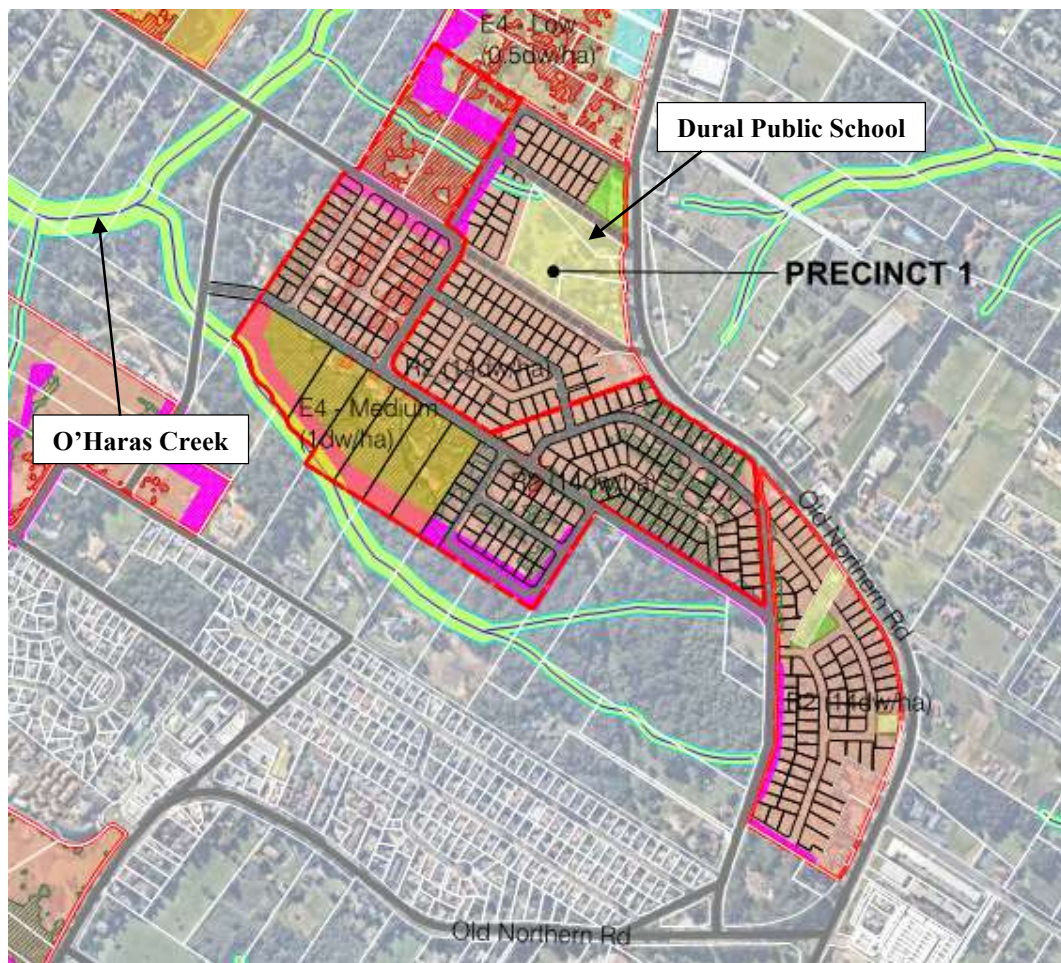


Figure 1 Location of of Precinct 1 area at the Old Northern Road, Dural

The land is currently zoned *RU6 Transition* and is proposed to be rezoned to *R2 Low Density Residential* and/or *E4 Environmental Living*. A more detailed plan of the site is shown for Precinct 1 in the Urbis – Precinct 1 – Dural Planning Proposal plan in Appendix B.

A meeting was held between the Hills Shire Council, the Greater Sydney Commission and DDMS in May 2017 regarding the potential rezoning of the subject land. At this meeting, DDMS were requested to investigate the servicing

and stormwater management strategy for the site. Subsequently, DDMS have engaged Arup to investigate the stormwater management strategy for the area referred to as Precinct 1. This assessment investigated the potential development staging, with a priority for servicing the northern portion of the site, followed by the southern portion of the site.

DDMS have been looking at the amalgamation of lots in the area of Precinct 1 for a period of time and have previously investigated the potential rezoning of two sites within this area. These sites were referred to as the northern lots and the southern lots. Refer Appendix C for the location of these areas within Precinct 1.

To enable re-zoning of this land, the Hills Shire Council has requested the drainage be addressed and all land in the area be considered and thus the Precinct 1 area is being reviewed in this report.

## 2 Site Description

---

The study area is approximately 45 ha in size. The area is located on the northern side of O’Haras Creek across from the existing Round Corner residential area. The land in the study area comprises large undulating allotments which are predominantly used for agriculture and includes several farm dams. Some existing buildings are present and these are typically located near Old Northern Road. The area also includes Dural Public School at 622 Old Northern Road to the north of the site. The study area includes Derriwong Road which is a typical narrow rural road. These features are shown in the locality plan in Figure 2. Within the study area the Northern Lots and Southern Lots Area are identified

Figure 2 also shows the development site broken down into four stages. The preferred staging of the development is as lots as follows:

- Stage 1 – Northern Lots.
- Stage 2 – Southern Lots.
- Stage 3 – Central Lots connecting Stage 1 and 2.
- Stage 4 – Western Lots

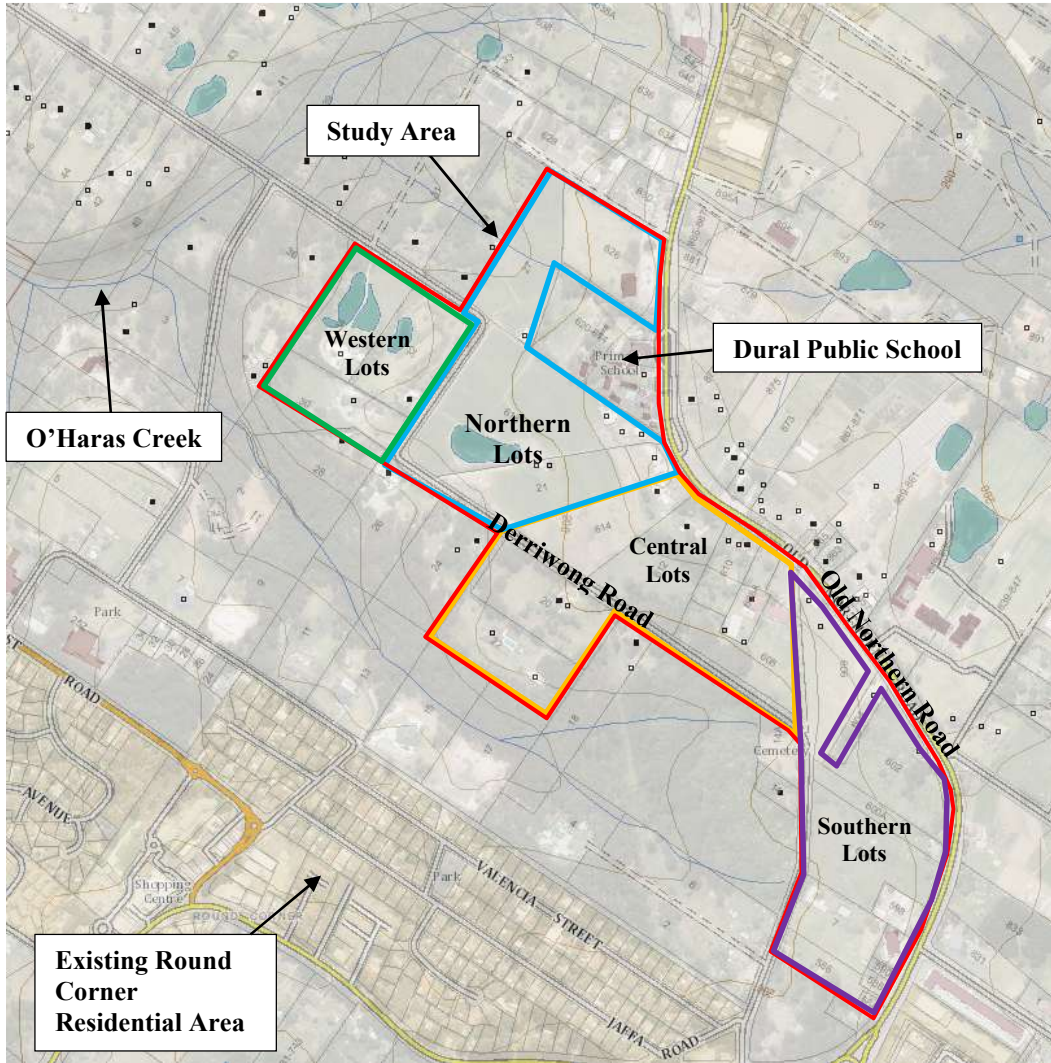


Figure 2 Site locality plan



## 3 Stormwater Management

### 3.1 Existing Stormwater Catchment

The area can be separated into five existing stormwater subcatchments based on a review of LiDAR topographical data sourced from GeoScience Australia. Each of the five subcatchments fall to the southwest from the ridge line which follows the Old Northern Road, towards tributaries of O’Haras Creek, as shown in Figure 3. The site is relatively steep, with major flow paths falling at gradients of between 5% and 12%.

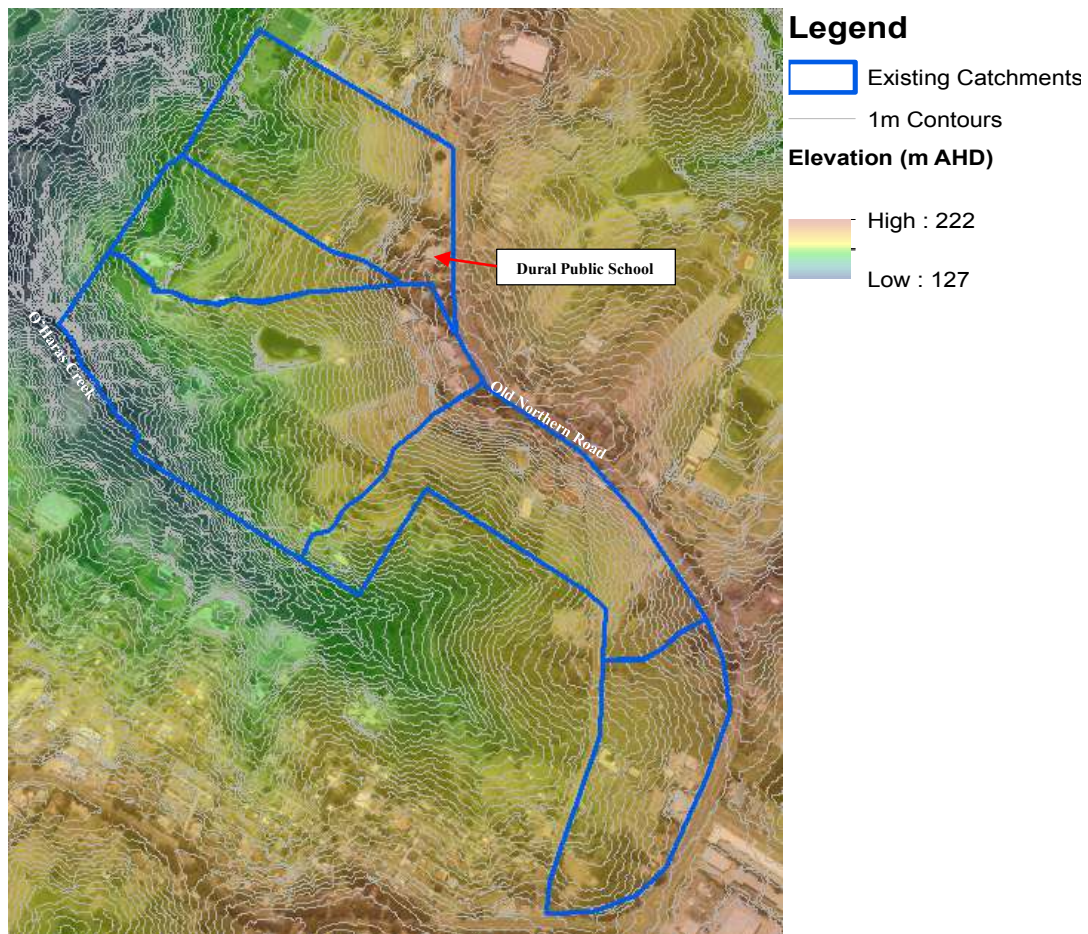


Figure 3 Existing subcatchment areas at the proposed development site

As discussed in Section 2, these subcatchment areas are currently predominantly occupied by rural properties. Based on an inspection of aerial photography of the area it is estimated to consist of 95% pervious surfaces and 5% impervious surfaces. Impervious surfaces in the area include light residential or community buildings typically on the high side of the catchment near the Old Northern Road. Areas lower in the catchment typically consist of open pasture areas, farm dams or crops. Dural Public School is located within the top of the northern most subcatchment. Further downstream towards the creek, the open pasture becomes thicker bushland within the O’Haras Creek riparian zone.

There is limited existing stormwater infrastructure around the site. The majority of Derriwong Road drains into roadside table drains. At sag points in the road, runoff is collected in pits which discharge to upper tributaries of O'Haras Creek.

## 3.2 Proposed Stormwater Management Strategy

The proposed development is estimated to increase the impervious fraction of the catchment area to approximately 60% subject to final allotment sizes and roof areas.

Based on the lot layout plan in Appendix C, the proposed development can be separated into eight subcatchments. Lots within the proposed subdivision will be drained via inter-allotment drainage or the road kerb and gutter drainage. It is proposed that roads will be drained by kerb inlet pits or roadside water quality swales. The drainage system will discharge at the low points towards O'Haras Creek, as per the existing flow regime.

A concept drainage diagram has been developed and is shown in Appendix C, Precinct 1 – Servicing Plan Stormwater Quality. The concept is subject to change as a result of final lot layouts and road grading in conjunction with site earthworks. It should be noted that Dural Public School and other existing properties which are impacted by the proposed works have not been included in water quality and on-site detention calculations.

### 3.2.1 Water Quality

Appendix B of The Hills Shire Council Development Control Plan (DCP) 2012, Part B2 for residential developments requires that new developments include two of the following Water Sensitive Urban Design (WSUD) measures:

- Low impact building design;
- Low impact landscape design;
- Porous paving;
- Rainwater utilisation – toilet, hot water;
- On-site infiltration system;
- Stormwater treatment system;
- Infiltration or retention basin; and
- Stormwater utilisation – irrigation.

This analysis has assumed that the proposed development will include stormwater treatment and infiltration/retention basins to meet the WSUD criteria. The Hills Shire Council DCP does not define specific annual average load reduction targets for pollutants.

Due to the high-level nature of the current analysis, as a basis for further planning it has been assumed that the total area of filtration media required at the site is equal to 2% of the total site area in order to meet anticipated best practice water

quality requirements. This filtration area would include a combination of biofiltration basins, swales and rain gardens.

On this basis, a total filter area of approximately 2,000 m<sup>2</sup> is anticipated to be necessary to satisfy the water quality requirements for the Northern Lots, and 1,800 m<sup>2</sup> for the Southern Lots. A total filter area of 8,000 m<sup>2</sup> is anticipated to be required for the ultimate development. This will be provided using rain gardens and vegetated swales where the site topography and lot layout allows, and water quality basins or constructed wetlands where additional treatment area is required. Based on the lot plan provided, the required water quality basins will take up approximately 3 lots in the Northern Lots, 3.5 lots in the Southern Lots, and 13 lots in the ultimate development case. This takes into account an additional 30% of the total basin area to allow for basin earthworks batter slopes and maintenance access areas. These basins will also act as above-ground on site detention (OSD) storage where required.

These treatment areas are summarised in Table 1.

Table 1 Required water quality treatment areas

| Catchment    | Catchment Area within Precinct 1 (m <sup>2</sup> ) | WQ Treatment Area Required (m <sup>2</sup> )* | Swales/Rain Gardens (m <sup>2</sup> ) | Basin (m <sup>2</sup> ) | No. Lots Sacrificed |
|--------------|--|---|---------------------------------------|-------------------------|---------------------|
| 1 (Northern) | 40,853   | 1,062   | 0                                     | 1,127                   | 2                   |
| 2 (Western)  | 68,885   | 1,791   | 0                                     | 3,473 <sup>^</sup>      | 6                   |
| 3 (Western)  | 19,515   | 507   | 682                                   | 0                       | 0                   |
| 4 (Northern) | 57,821   | 1,503   | 576                                   | 965                     | 1                   |
| 5 (Central)  | 21,692   | 564   | 0                                     | 625                     | 0.5                 |
| 6 (Central)  | 19,411   | 505   | 0                                     | 511                     | 0                   |
| 7 (Central)  | 82,742   | 2,151   | 2,648                                 | 0                       | 0                   |
| 8 (Southern) | 86,256   | 2,243   | 0                                     | 2,251                   | 3.5                 |

<sup>^</sup> Existing farm dam to be repurposed for water quality and attenuation.

\* These areas have been inflated by 30% to space proof for basin earthworks batter slopes and maintenance access areas.

Note: Basin areas greater than the required area for water quality treatment will be used to provide on-site detention (see section 3.2.2).

Rain gardens and vegetated swales have been recommended where possible, as they reduce the required water quality basin areas. They also serve as landscaping features. Where lots must be sacrificed to provide water quality treatment area, the basin areas are maximised as these basins can also provide OSD storage.

An existing farm dam in the Catchment 2 area is proposed to be repurposed as a water quality and OSD attenuation basin for the development. Table 1 shows that the area of this existing dam is more than sufficient to provide the required water quality treatment and OSD storage for the catchment.

An alternative lot layout for Catchments 1 and 4 have been proposed, shown in Appendix C. The arrangement for Catchment 1 includes a widened central road reserve, and provides space for a water quality basin/swale to run along the central median. Due to the steep gradient of the site, this median may need to be terraced to create vegetated areas flat enough to provide water quality benefits. This median has sufficient area to provide the water quality and OSD storage required for Catchment 1 without sacrificing any lots. The arrangement for Catchment 4 removes one north-south road and provides an additional three lots. The water quality and OSD storage will be provided in the four south western lots, where the natural landform is very flat. This results in the net loss of only one lot.

MUSIC water quality treatment modelling would be required at a later stage to quantify the achieved annual average load reduction of pollutants and confirm adherence with Council requirements.

### 3.2.2 On Site Detention (OSD)

Clause 2.12 e) of The Hills Shire Council Development Control Plan (DCP) 2012, Part B2 for residential developments requires that new developments comply with the Upper Parramatta River Catchment Trust (UPRCT) Handbook for on site detention. Appendix Q of the handbook specifies that the site storage requirement (SSR) for the Hawkesbury River catchment is dependent on the slope of the site. Based on the site topography and flow paths, the SSRs for the proposed catchments are between 336 m<sup>3</sup>/ha and 396 m<sup>3</sup>/ha.

The Northern Lots would require approximately 4,700 m<sup>3</sup> of OSD storage without rainwater capture offsets, and the Southern Lots would require approximately 3,500 m<sup>3</sup>. The ultimate development would require approximately 14,000 m<sup>3</sup> of OSD storage excluding rainwater capture offsets.

The UPRCT Handbook specifies a maximum ponding depth of 600mm for unfenced OSD basins, unless all safety concerns are addressed and a dispensation is granted by Council. However, it has been assumed that these safety concerns can be addressed for the proposed basins through fencing or other means and dispensation can be granted. Therefore, for the proposed development we have assumed that all OSD basins have an average depth of 1m.

Based on the proposed lot layout plan and the proposed water quality basin locations, an additional basin area of 2,000 m<sup>2</sup> will be required to provide compliant OSD storage in the Northern Lots, 1,500 m<sup>2</sup> of basin area will in the Southern Lots, and a total of 8,500 m<sup>2</sup> of additional basin area will be required for the ultimate development. These additional OSD basins will take up 3 additional lots in the Northern Lots, 2 additional lots in the Southern Lots, and 8 additional lots in the ultimate development case. This takes into account an additional 30% of the total basin area to allow for basin earthworks batter slopes and maintenance access areas. The required OSD volumes and areas are summarised in Table 2.



Table 2 Required OSD basin dimensions

| Catchment    | Catchment Area (m <sup>2</sup> ) | Required OSD Volume (m <sup>3</sup> ) | WQ Basin Area (m <sup>2</sup> ) | Additional OSD Basin Area (m <sup>2</sup> )* | Total Basin Storage Area (m <sup>2</sup> )* | Additional No. Lots Sacrificed |
|--------------|----------------------------------|---------------------------------------|---------------------------------|--|---|--------------------------------|
| 1 (Northern) | 40,853                           | 1,479                                 | 1,127                           | 503  | 1,630                                       | 1                              |
| 2 (Western)  | 68,885                           | 2,494                                 | 3,473                           | 0  | 3,473                                       | 0                              |
| 3 (Western)  | 19,515                           | 706                                   | 0                               | 920  | 920   | 1.5                            |
| 4 (Northern) | 57,821                           | 2,093                                 | 965                             | 1,467  | 2,432                                       | 2                              |
| 5 (Central)  | 21,692                           | 785                                   | 625                             | 222  | 847   | 0                              |
| 6 (Central)  | 19,411                           | 703                                   | 511                             | 260  | 771   | 0                              |
| 7 (Central)  | 82,742                           | 2,780                                 | 0                               | 3,626  | 3,626                                       | 1.5                            |
| 8 (Southern) | 86,256                           | 3,416                                 | 2,251                           | 1,518  | 3,769                                       | 2                              |

<sup>^</sup> OSD for catchment 7 will be provided by the excess OSD storage areas in catchments 5 and 6

\* These areas include an additional 30% to allow for basin earthworks batter slopes and maintenance access areas.

The Hills Shire Council allows rainwater tank capture to provide some OSD in accordance with the UPRCT Handbook. A rainwater capture 'credit' can be claimed to reduce the total volume of OSD storage required for the site. Assuming a roof area of 280 m<sup>2</sup> per lot (40% of total lot size based on nearby developments of a similar scale), 80% roof area draining to a rainwater tank, and one 5,000 L rainwater tank per lot, based on the UPRCT spreadsheet this would correspond with a rainwater capture credit of approximately 380 m<sup>3</sup> for the ultimate development. This credit can be further increased by reducing roof area, reducing the proportion of roof area draining to the rainwater tank, increasing tank volumes, or providing dedicated storage area in rainwater tanks. Dedicated storage area is tank space that is guaranteed to be available for storage during large storm events. These offsets have not been deducted from the basin sizes presented in this report.

At later design stages it will be necessary to model the geometric arrangement of basins as well as undertake hydrologic and hydraulic modelling of the existing and proposed scenarios to verify that the proposed OSD configuration complies with Council requirements.

## 4 Conclusion

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This report has assessed the servicing and stormwater management requirements for the proposed development of land at the Old Northern Road, Dural. It is proposed to develop the land across 4 stages, however, this report has focused on the ultimate development scenario.

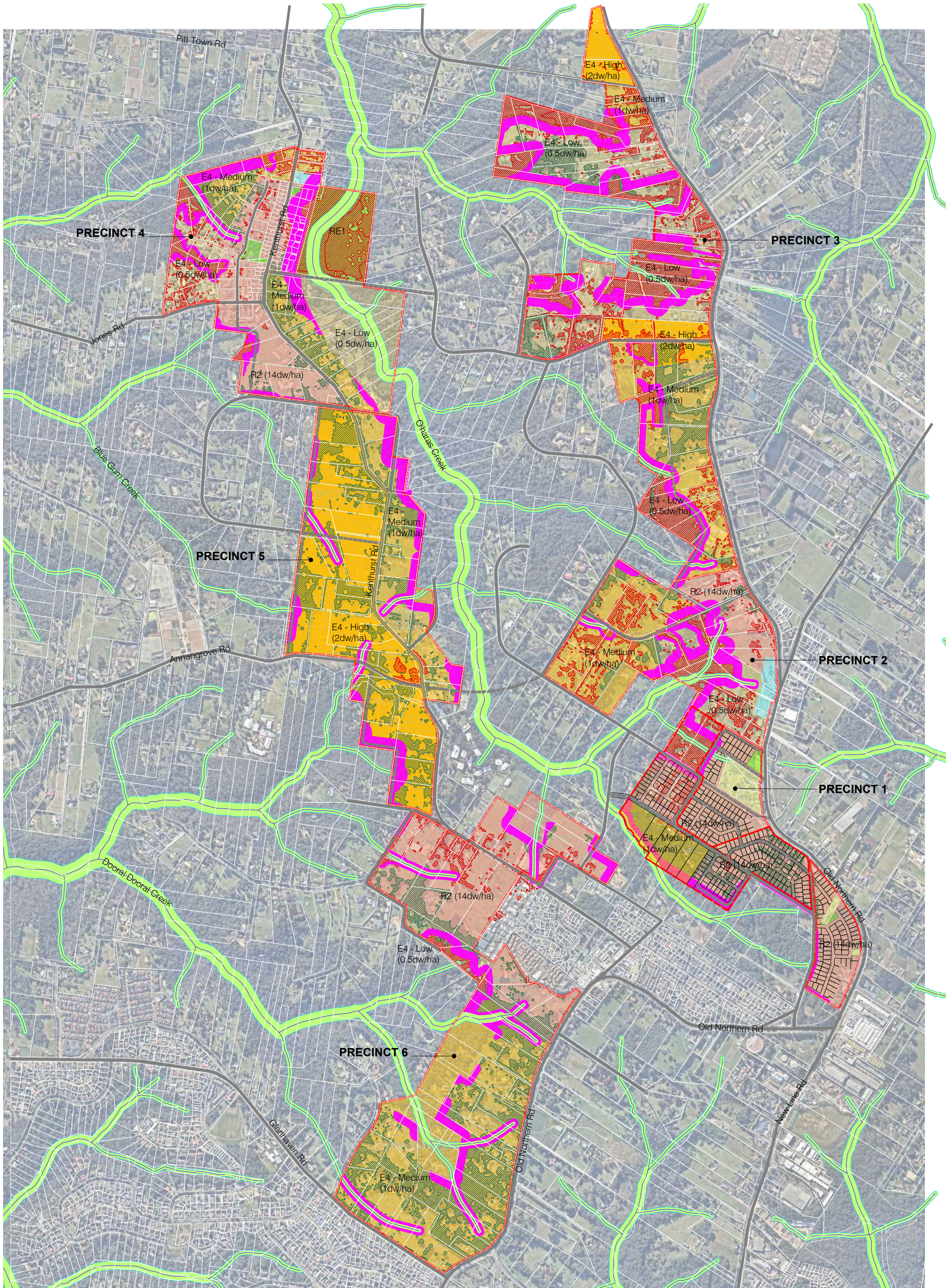
A stormwater management concept plan has been developed for the site. In this plan locations and areas have been identified for the construction of water quality elements and OSD basins. During later design stages further geometric, hydrologic, hydraulic and water quality modelling will be required to develop the concept and demonstrate compliance with Council requirements.

The strategy stormwater management strategy presented in this report has demonstrated that the development area can be developed in adherence to Council stormwater management requirements.

## Appendix A

Urbis - Development  
Investigation - PLN01 –  
Dural Planning Proposal



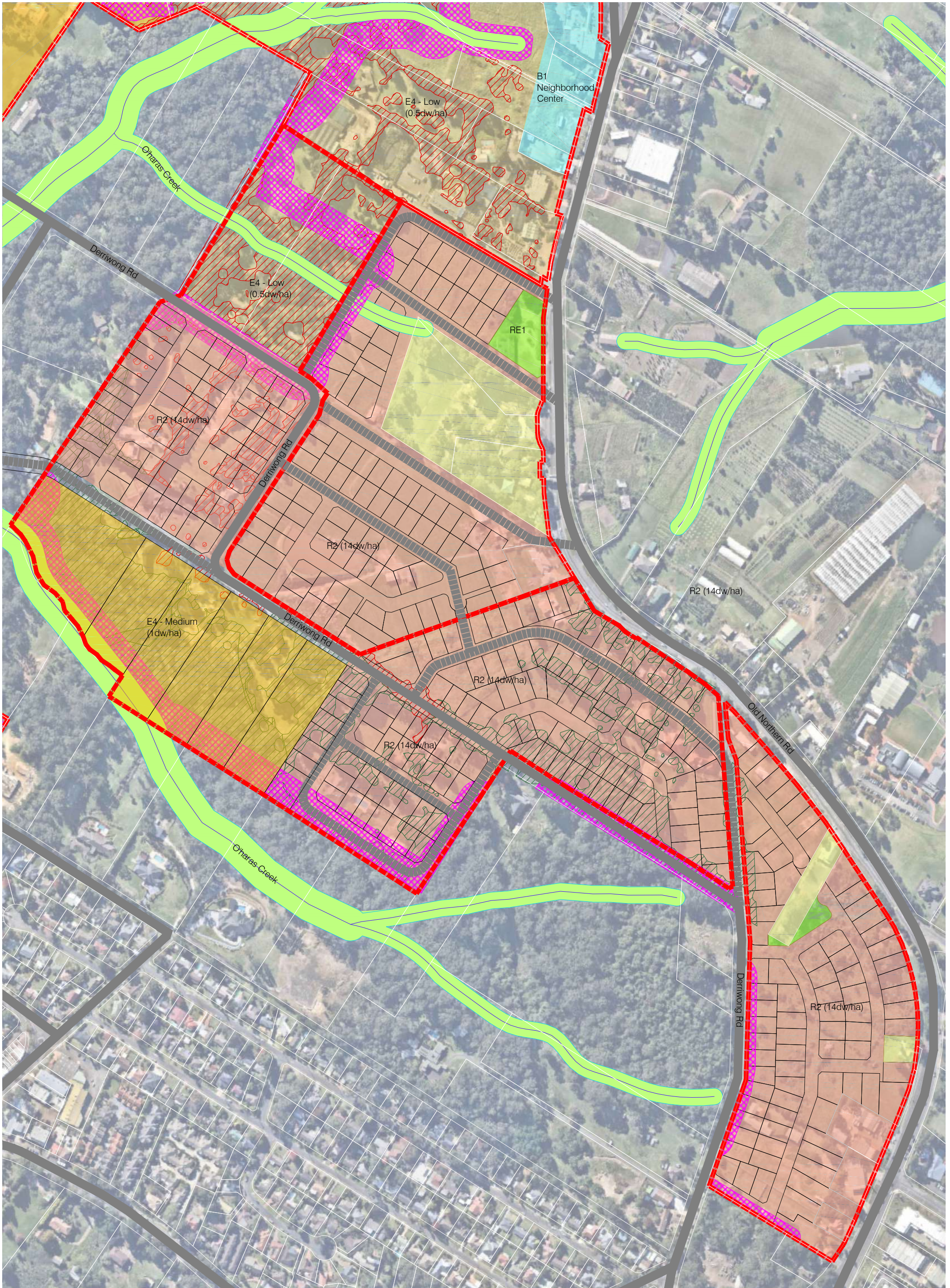




## **Appendix B**

Urbis - Precinct 1 - PLN04 –  
Dural Planning Proposal



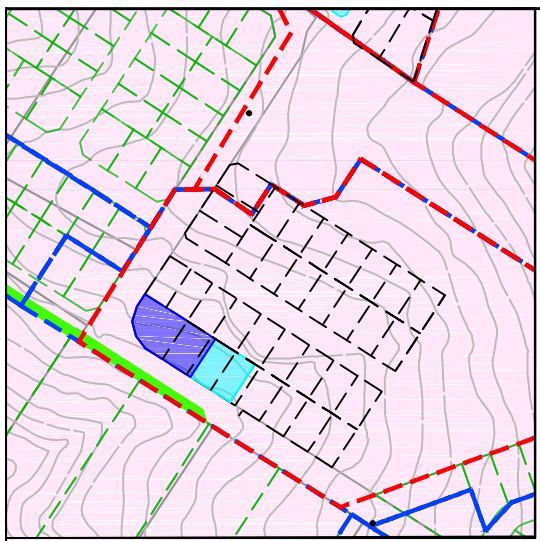




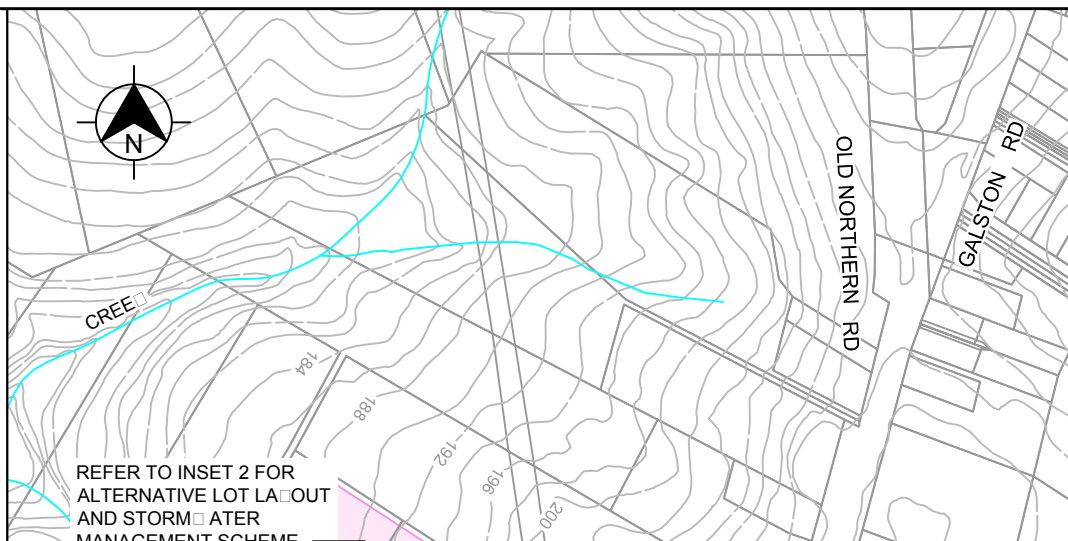
## Appendix C

Arup - Precinct 1 - Servicing  
Plan - Stormwater Quality

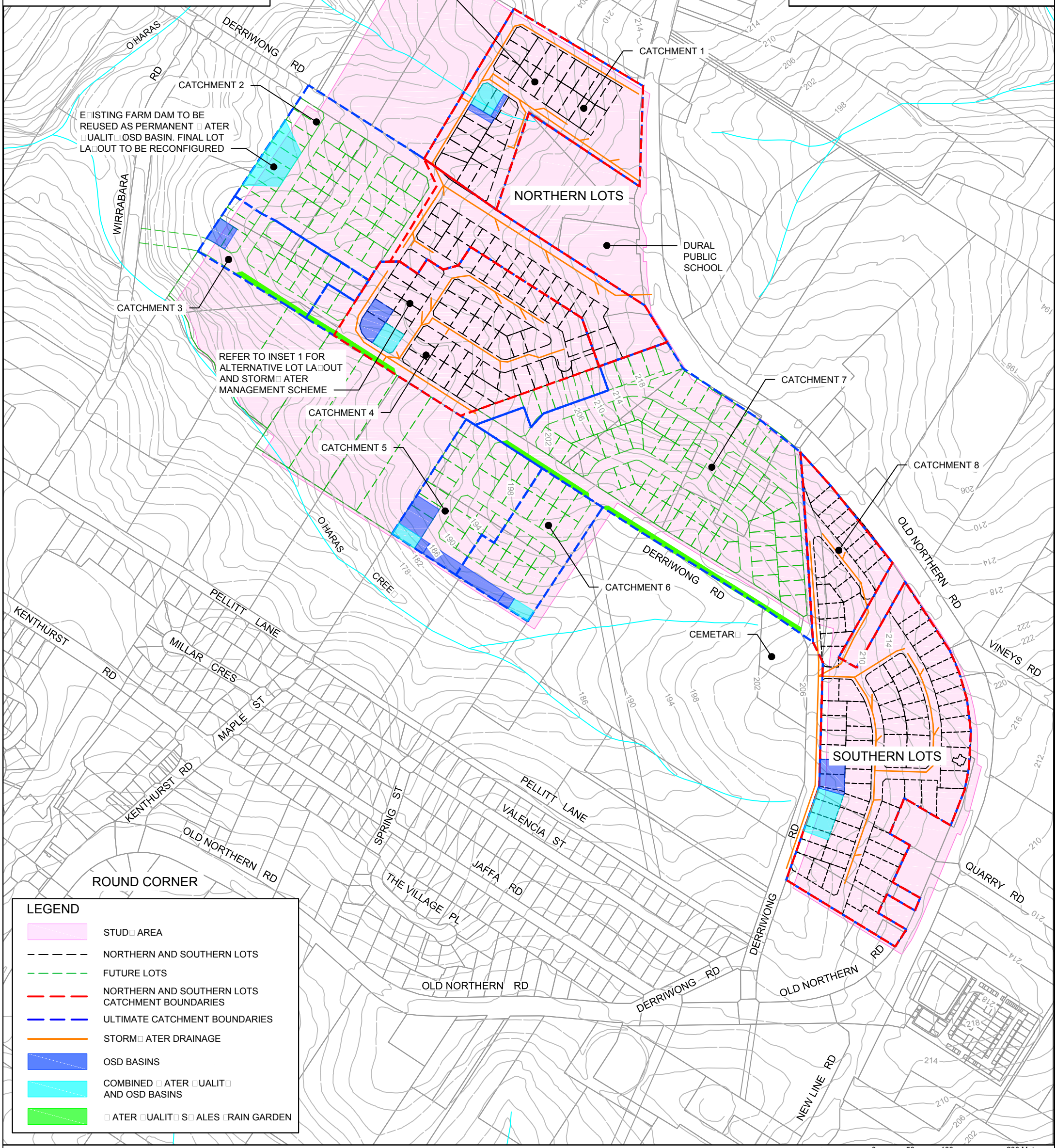




INSET 1 - ALTERNATIVE LOT LAYOUT



INSET 2 - ALTERNATIVE LOT LAYOUT

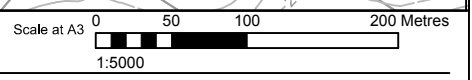


EXISTING FARM DAM TO BE REUSED AS PERMANENT WATER QUALITY OSD BASIN. FINAL LOT LAYOUT TO BE RECONFIGURED

REFER TO INSET 1 FOR ALTERNATIVE LOT LAYOUT AND STORMWATER MANAGEMENT SCHEME

REFER TO INSET 2 FOR ALTERNATIVE LOT LAYOUT AND STORMWATER MANAGEMENT SCHEME

| LEGEND |   |
|--------|---|
|        | STUDY AREA                                      |
|        | NORTHERN AND SOUTHERN LOTS                      |
|        | FUTURE LOTS                                     |
|        | NORTHERN AND SOUTHERN LOTS CATCHMENT BOUNDARIES |
|        | ULTIMATE CATCHMENT BOUNDARIES                   |
|        | STORMWATER DRAINAGE                             |
|        | OSD BASINS                                      |
|        | COMBINED WATER QUALITY AND OSD BASINS           |
|        | WATER QUALITY SLOPES RAIN GARDEN                |



Description  
 WATER QUALITY PLAN

**ARUP**



Dural Development Management  
Services Pty Ltd

**Old Northern Road, Dural -  
Precinct 1**

Sewerage and Water Supply Strategy

Rev 2 | 21 December 2017

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 258715-00

Arup  
Arup Pty Ltd ABN 18 000 966 165



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**ARUP**



# Document Verification

|  |             |                                       |  |                       |                  |
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| <b>Job title</b>   |             | Old Northern Road, Dural - Precinct 1 |  | <b>Job number</b>     |                  |
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|  |             |                                       | Prepared by  | Checked by            | Approved by      |
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|  |             | Signature                             |  |                       | <i>MB Knight</i> |
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|  |             |                                       | Prepared by  | Checked by            | Approved by      |
|  |             | Name                                  | M Knight   | A Crouch              | M Knight         |
|  |             | Signature                             |  |                       | <i>MB Knight</i> |
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|  |             | <b>Description</b>                    |  |                       |                  |
|  |             |                                       | Prepared by  | Checked by            | Approved by      |
|  |             | Name                                  |  |                       |                  |
|  |             | Signature                             |  |                       |                  |
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|  |             | <b>Description</b>                    |  |                       |                  |
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|  |             | Name                                  |  |                       |                  |
|  |             | Signature                             |  |                       |                  |
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## Appendices

### Appendix A

Urbis - Development Investigation - PLN01 – Dural Planning Proposal

### Appendix B

Urbis - Precinct 1 - PLN04 – Dural Planning Proposal

### Appendix C

Arup - Precinct 1 - Servicing Plan - Sewerage

### Appendix D

Arup - Precinct 1 - Servicing Plan - Water supply

### Appendix E

Sydney Water Corporation - Existing Sewerage & Water supply Plan

### Appendix F

Sydney Water Corporation - Previous Feasibility Letter July 2016

### Appendix G

Proposed Sewer Lead-in Line No. 1 Longitudinal Section

### Appendix H

Proposed Sewer Lead-in Line No. 2 Longitudinal Section





## Executive Summary

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Dural Development Management Services Pty Ltd (DDMS) are looking at the re-zoning, amalgamation and possible development of land in the suburb of Dural in the Hills Shire Local Government Area northwest of the Sydney Central Business District. Arup has been engaged by DDMS to investigate the sewerage and potable water servicing strategy for the area referred to as Precinct 1.

Following the review of infrastructure in the Old Northern Road, Dural – Precinct 1 area it appears that the proposed expansion of the residential area is a natural extension of the existing Round Corner residential area to the south. The site is at the top of the natural drainage catchment of O’Haras Creek. The Old Northern Road in this area runs along the ridge line and acts as the catchment boundary for the local sewerage subcatchments.

Arup’s review of existing infrastructure has identified that there is existing Sydney Water Corporation (SWC) sewerage and potable water supply trunk infrastructure in the Round Corner area that can be extended to service the proposed Precinct 1 residential area.

For sewerage the entire Precinct 1 catchment could be serviced with a combined system of gravity and pressure sewerage systems. The majority of the proposed residential area will drain by gravity sewer across the upper reaches of O’Haras Creek via a pipe aqueduct to the SWC existing DN300 sewer inlet provided for future extension of the existing sewer system. This sewer then leads downstream to Sewage Pumping Station No. 1111 (SPS 1111) off Wirrabara Road in the west.

SPS 1111 pumps to Castle Hill Sewage treatment works for the treatment of all effluent via a 4,000m DN250 PVC and DICL pressure main along the Old Northern Road and Ferncliffe Road Glenhaven to the south. The existing SPS 1111 and pressure main will be at full capacity when the proposed Stage 1 (Northern Lots) and part of Stage 2 (Southern Lots) are complete. The remaining Stage 3 (Central Lots) and Stage 4 (Western Lots) would require the upgrade of SPS 1111 and the pressure main. The assumptions are based on the existing SWC sewer layout and the proposed preliminary layouts and calculations.

The existing Dural Public School will also benefit from any new sewerage installation built in Stage 1.

Due to the elevated location of the existing SPS 1111 to the south of O’Haras Creek it is not possible to gravitate the Western Lots of Precinct 1 across the creek. Areas that are below the natural gravity catchment of sewer Lead-in No 1 in the western and northern portion of the Northern Lots of Precinct 1 can be serviced by a pressure sewer system which can discharge to the gravity system above. It is noted that SWC have a similar pressure sewer system in place for the Galston and Glenorie Wastewater Scheme to the north.

Existing water supply to the area is supplied from the SWC Dural South Reservoir site on the corner of the Old Northern Road and New line Road to the south of Precinct 1. There are existing DN100 and DN150 water mains in Derriwong

Road through the Precinct 1 area and a DN200 water main along The Old Northern Road for distribution of water to the precinct. SWC advised that the trunk water supply in the area has adequate capacity to service the development area.

From the review of the existing sewerage and water supply in the area of Precinct 1 there is sufficient capacity in the existing sewerage infrastructure to sewer Precinct 1 and sufficient capacity in SPS 1111 to service Stage 1 and part of Stage 2 only before an upgrade is required. For water supply there is sufficient capacity to service the whole proposed Precinct 1 area.

It is recommended that further consultation be made with SWC on the proposed strategy.

Following concurrence of the proposed strategy from SWC where sewer lead-in infrastructure is proposed through private adjoining lands consultation with the landowners affected is recommended to confirm access and the viability of the proposed system.

The sewerage strategy in this report for the assessment of the sewerage system adopts the original catchments for SPS 1111 and SPS 583 and the proposed Precinct 1 re-zoning area only which results in the existing sewerage system reaching its capacity at the completion of the Stage 1 and part of Stage 2 areas. It is not known if any other private sewerage systems currently pump to the SPS 1111 catchment or any other developments are proposed to pump to SPS 1111 as SWC do not show this on their GIS data base. If other developments are proposed the timing and costs for upgrades will need to be addressed.

The current SWC Growth Servicing Plans July 2014 to June 2019 on the SWC website show no servicing strategy for the Old Northern Road area currently.

# 1 Introduction

Dural Development Management Services Pty Ltd (DDMS) are looking at the rezoning, amalgamation and possible development of land in the suburb of Round Corner in the Hills Shire Local Government Area northwest of the Sydney Central Business District. The area concerned is shown as Precinct 1 in the Urbis – Development Investigation Plan – Dural Planning Proposal in Appendix A and is referred to as the Old Northern Road and Derriwong Road, Dural area.

The Precinct 1 area under review is bound by the Old Northern Road to the east, O’Haras Creek and the existing Round Corner residential land to the south, and a second tributary of O’Haras Creek to the north and west.

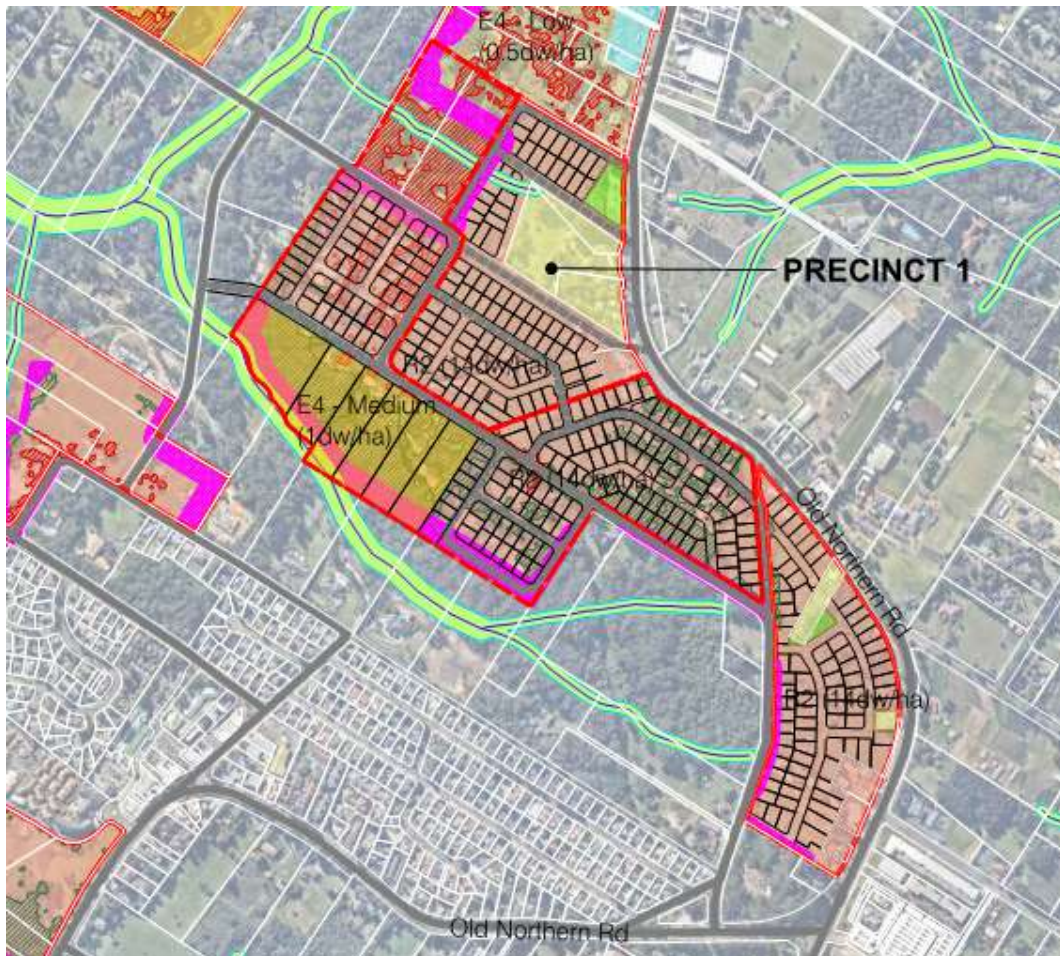


Figure 1 Location of Precinct 1 area at the Old Northern Road, Dural

The land is currently zoned *RU6 Transition* and is proposed to be rezoned to *R2 Low Density Residential* and/or *E4 Environmental Living*. A more detailed plan of the site is shown for Precinct 1 in the Urbis – Precinct 1 – Dural Planning Proposal plan in Appendix B.

A meeting was held between the Hills Shire Council, the Greater Sydney Commission and DDMS in May 2017 regarding the potential rezoning of the subject land. At this meeting, DDMS were requested to investigate the servicing for the site. Subsequently, DDMS have engaged Arup to investigate the sewerage



and potable water supply servicing strategy for the area referred to as Precinct 1. This assessment investigated the potential development and staging, with a preference for staging the lots as follows:

- Stage 1 - The Northern Lots.
- Stage 2 - The Southern Lots.
- Stage 3 – The Central Lots connecting Stage 1 and 2.
- Stage 4 – The Western Lots.

Refer Appendix C for the proposed staging and sewerage system concept plan.

## 2 Background

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DDMS have been looking at the amalgamation of lots in the area of Precinct 1 for a period of time and have previously investigated the potential rezoning of two sites within this area. These sites are referred to as the Northern Lots and the Southern Lots and are proposed to be developed as stages 1 and 2 respectively.

To enable re-zoning of this land, the Hills Shire Council has requested the sewerage and water supply servicing be considered on a precinct-wide basis. Therefore, sewerage and water supply servicing for the entire Precinct 1 area has been reviewed in this report. Precinct 1 is considered to be the logical extent of development in the local area.

A previous investigation into utility servicing for the Northern Lots and Southern Lots was prepared in May 2016 by AT&L Pty Ltd. This report identified that the sites could be serviced but would require a new sewage pumping station to service the Northern Lots.

In July 2016 Sydney Water Corporation (SWC) supplied a Feasibility Letter, Case Number 154616 which is included in Appendix F. This letter identified the following:

### **Sewerage**

- 1. The development site is currently not serviced by a SWC wastewater system. The nearest wastewater reticulation main is located in Pellitt Lane. It is recommended that the flow is transferred by gravity to the existing sewer main in Pellitt Lane.*
- 2. Build a new sewer main along the Pellitt Lane and connect it to the DN225 sewer constructed under WO48473.*
- 3. Connect to the existing reticulation sewer main across the Derriwong Road at the southern end of the development site. If this option is utilised, upsizing of the system may be required. Sizing of the mains must be in accordance with the Sewerage Code of Australia.*
- 4. The consultant will need to assess the options and come up with a suitable servicing strategy that meets all of Sydney Water requirements and submit it to Sydney Water for its review, at or prior to Section 73 Application.*

### **Water supply**

- 1. Strategic investigation showed that the trunk water has adequate capacity to service this development area.*
- 2. The preferred connection for each portion of the development is the DN200 main in the Old northern Road. Refer Appendix E - Sydney Water Corporation - Existing Sewerage & Water supply Plan*

Subsequently, in March 2017 Arup undertook a detailed cost estimate for the servicing of the Northern Lots which was summarised in a report dated 7 March 2017. This report identified that the site could be drained to the existing SWC DN300 sewer maintenance hole with a DN300 inlet for future extension at the

rear of the 15 Pellitt Lane property. This would eliminate the need for a new SWC sewage pumping station on the north side of O'Haras Creek.



## 3 Sewerage

---

### 3.1 Existing Sewerage System

The developed area of Round Corner south of O'Haras Creek is currently serviced by a gravity sewerage system owned by SWC. There are currently no gravity sewers servicing the proposed Precinct 1 area.

The existing sewerage system in the area is shown in Appendix E – Sydney Water Corporation – Existing Sewerage & Water supply Plan. The existing sewerage system services the Round Corner commercial area and residential areas east and west of the commercial area. The sewerage system gravitates to the existing Sewage Pumping Station (SPS) 1111 off Wirrabara Road. The area further to the west of the Round Corner commercial area drains to SPS 583 which subsequently pumps into the SPS 1111 catchment area.

A DN300 sewer inlet has been provided in the existing sewer lead-in to SPS 1111 (Section 2) to service future development to the east. The ultimate planned limits of the catchment for the DN300 inlet are unknown. The inlet is to be used to service the proposed Precinct 1 area as referred to in the SWC Feasibility letter.

Previous reports and the SWC Feasibility letter dated July 2016, included in Appendix F, identify SPS 1111 as a point of disposal for sewage.

The information below was taken from the SWC documents for the design and construction of SPS 1111 in 2000.

*“Transfer of Round Corner Sewerage. Feasibility Report – August 1998”.*

*“The report noted Sydney Water estimates at the time for population currently connected to Round Corner sewage treatment works (now SPS 1111) is around 1,500 EP and an additional 500 EP will be connected within the next 2-3 years, including the Mountain View retreat Retirement Village and likely increase in the size of some of the schools in the area.”* It should be noted that Arup contacted the retirement village on 23 November 2017 and was informed that the village is still on a sewage pump out system and therefore, has been excluded from any flows in this report. It is recommended that this is confirmed through SWC.

*“It is proposed to adopt a design population based on the current population (2,000 EP) with an allowance for growth of 5%. Based on current data, it is expected that the growth allowance will be sufficient for the next 25 years, or until major re-zoning occurs in the catchment. The transfer system will therefore be designed for 2,100 EP, and have capacity for wet weather flow of 68 L/S.”*

Arup designed SPS 1111 in the year 2000 for SWC as part of the removal of the Round Corner Sewage Treatment Plant. From records of the design of the pump station we have been able to identify the parameters that were used in the design of SPS 1111. The following data was taken from the SWC documents for the design and construction of SPS 1111 in 2000:

*“Design and Construction for the transfer of Round Corner Sewerage. Volume 2 Technical Specification. Contract No 17734 – August 1999”.*

*Design flows for SPS 1111 were as follows:*

| <i>Parameter</i>                       | <i>Design Loadings</i> |
|--|------------------------|
| <i>Average Dry weather Flow (ADWF)</i> | <i>6.6 L/s</i>         |
| <i>Peak Dry weather flow (PDWF)</i>    | <i>16.9 L/s</i>        |
| <i>Design Wet Weather Flow (DWWF)</i>  | <i>67.7 L/s</i>        |

The pumping station has an offline storage structure capable of storing four (4) hours PDWF.

The transfer system (pressure main) was designed for a DWWF flow of 68 L/s.

The above flows equate to a total of 2100 Equivalent Population (EP) at 3.5 EP per lot at the time. This further equates to a DWWF of 67.7 L/s.

The limiting sewer downstream of Precinct 1 is the lead-in DN400 VC sewer pipe WO 48473 (Section No.1) to SPS 1111 which is laid at 0.30% grade, giving it a capacity of 114.2 L/s or 4,015 Equivalent People (EP). This exceeds the capacity of SPS 1111.

### **3.2 Proposed Sewerage System**

A concept sewerage servicing diagram has been developed for Precinct 1 and is shown in Appendix C, Arup - Precinct 1 - Servicing Plan – Sewerage. The concept is subject to change as a result of final lot layouts and road grading in conjunction with site earthworks.

The concept shows that the whole area in Precinct 1 that is proposed to be re-zoned can be sewered by a combination of a gravity sewerage and a pressure sewerage system.

The land to the north of O’Haras Creek referred to as the Northern Lots, Central Lots and Western Lots can be serviced by a new gravity sewerage system which connects to the existing DN300 inlet provided in the maintenance hole on the existing DN300 VC gravity sewer WO 48473 at the rear of Lot 15 Pellitt Lane. An aqueduct would be required to cross O’Haras Creek to connect to the existing inlet provided.

An indicative longitudinal section labelled Lead-in Line No 1 has been provided in Appendix G to further demonstrate the grading of the trunk sewer. This longitudinal section also shows the location of the proposed aqueduct crossing of O’Haras Creek.

It is recommended that a detailed survey of the area is undertaken to confirm all levels and the final position of the proposed sewer creek crossing. It is further recommended that the sewer be bored to the creek edges to minimise the disturbance of the vegetation in the riparian zone either side of the creek.

The existing surface levels of the proposed residential land to the west and north of Derriwong Road is below what can be serviced by gravity and would need to be serviced using a pressure sewer system. This system would pump to the adjacent gravity system which would be at a higher elevation. This proposal would provide sewerage services to the 92 lots not serviced by gravity. 62 of these lots are in the current planning and are referred to as the Western Lots. This proposal removes the need for a new SWC sewage pumping station should the area be developed in part or in full.

The existing Dural Public School, which has 435 students and 25 staff, would also benefit from the new gravity sewerage installation.

Due to the elevated location of the existing SPS 1111 which is above the creek invert and is located to the south of O’Haras Creek, it is not possible to gravitate the Western Lots of Precinct 1 across the creek directly to SPS 1111 which has necessitated the pressure sewerage system option proposed above.

We note the pressure sewer system proposed is similar to the SWC system that is in place for the Galston and Glenorie Wastewater Scheme to the north of the site. As part of this scheme, a pressure main runs along the Old Northern Road to the east and is noted on the existing sewer utility plans, “*no connections allowed*”, as can be seen in the figure in Appendix E.

The residential land to the east, referred to as the Southern Lots, can be gravitated to the existing DN300 inlet provided in the maintenance hole on the existing DN300 VC gravity sewer WO 48473 at the rear of Lot 15 Pellitt Lane.

A longitudinal section labelled Lead-in Line No 2 has been provided in Appendix H to further demonstrate the grading of this trunk sewer from the Southern Lots. It is recommended to bore sections of the sewer to retain the vegetation along the alignment and to enable connection to the existing inlet provided.

A review of the existing sewer EP loadings and capacity downstream of the existing DN300 inlet connection point was undertaken. The sewer is broken into Section 1 and Section 2 on the figure in Appendix C. This existing sewer leads to SPS 1111. The catchments considered in the calculations include SPS 1111, SPS 583 and the proposed development of the entire Precinct 1 area. The sewer lead-in equivalent population (EP) loadings are shown in Table 1.

Table 1 Sewer Lead-in to SPS 111 loadings

| Location             | Sewer Capacity in EPs | Loading Existing + Proposed EPs | Comments            |
|----------------------|-----------------------|---------------------------------|---------------------|
| Section 1 – DN400    | 4015                  | 3073                            | Sufficient capacity |
| Section 2 – DN300    | 2387                  | 2187                            | Sufficient capacity |
| Existing DN300 inlet | 2132                  | 1575                            | Sufficient capacity |

The loadings shown above that were determined in the preliminary investigation show that the existing sewerage reticulation system has capacity to accommodate the proposed Precinct 1 development within the existing reticulation system.



The preliminary investigation shown in Table 2 below shows that SPS 1111 has capacity to accommodate the proposed Stage 1 development and part of the Stage 2. After this point, upgrades would be required to fully develop Stage 2 and to accommodate development of Stage 3 and Stage 4.

Table 2 SPS 1111 capacity compared to existing and proposed loads

| Location                       | SPS 1111 Capacity in EP's | Loading Existing + Proposed EP's | Comments                               |
|--------------------------------|---------------------------|----------------------------------|--|
| SPS 1111 (Existing)            | 2100                      | 1498                             | Sufficient capacity                    |
| Existing + Stage 1             | 2100                      | 1999                             | Sufficient capacity                    |
| Existing + Stage 1 and 2       | 2100                      | 2461                             | Has partial capacity, Requires upgrade |
| Existing + Stage 1, 2 and 3    | 2100                      | 2856                             | Requires upgrade                       |
| Existing + Stage 1, 2, 3 and 4 | 2100                      | 3073                             | Requires upgrade                       |

The above calculations have been based on the Sewerage Code of Australia, Sydney Water Edition – Version 4 – 2017. The following loadings in Table 3 have been adopted for different land use types within the catchments according to Table A1 for Equivalent Populations for Synchronous Discharges.

Table 3 Synchronous discharges

| Classification                               | Unit          | EP per unit | Remarks  |
|--|---------------|-------------|--|
| <b>Residential</b>                           |               |             |  |
| Single Occupancy Lot                         | Lot           | 3.5         | To be used for single occupancy lots down to 300m <sup>2</sup> |
| Single occupancy high density dwelling units | Dwelling Unit | 2.5         |  |
| <b>Commercial</b>                            |               |             |  |
| Local commercial                             | Gross hectare | 75          |  |
| Education institutions                       | Student       | 0.2         | Includes teachers and staff                                    |

As a result of the proposed Precinct 1 development, the potential for other developments in the area and existing developments that are not serviced by sewer, there may be a need to upgrade SPS 1111 and its associated pressure main in the near future. The timing of this would be subject to monitoring of current flows in conjunction with modelling projected future flows at SPS 1111. Any ultimate upgrade of SPS 1111 would need to be considered and assessed by SWC.

From the review of the topography in the area and the existing sewer loadings plus the proposed Precinct 1 loadings it can be seen that the proposed development for Stage 1 and part of Stage 2 could be adequately serviced with sewerage by the existing SPS 1111 Round Corner sewerage system but will

require upgrading of the SPS 1111 and its pressure main to accommodate full development of Stage 2 and any development of Stage 3 and Stage 4.

It is recommended that further consultation be made with SWC and The Hills Shire Council to identify any other proposed land re-zonings and developments in the area that may affect the conclusions made in this report. Other precincts that may be considered for rezoning in the vicinity of the development are shown in the plan in Appendix A. The rezoning of these areas would need to be considered further by The Hills Shire Council and SWC to establish any upgrading programme requirements, costs and timing of upgrades to SPS 1111 and its associated pressure main.

The current SWC Growth Servicing Plans July 2014 to June 2019 show no servicing strategy for the Round Corner, Old Northern Road area.

## 4 Water supply

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### 4.1 Existing Water supply System

The area of Round Corner and Dural is currently serviced by a group of reservoirs on the corner of the Old Northern Road and New Line Road to the south of Precinct 1. These are referred to as the Dural South Reservoirs by SWC.

The existing water supply system in the area is shown in Appendix E – Sydney Water Corporation – Existing Sewerage and Water supply Plan.

The following water mains are located in the vicinity of Precinct 1:

- A DN200 cast iron cement lined reticulation main WO82600 built in 1939 in the Old Northern Road to the east.
- A DN600 cast iron cement lined trunk main WO 71019 built in 1972 in the Old Northern Road to the east.
- A DN500 cast iron cement lined trunk main WO 64966 built in 1960 in the Old Northern Road to the east.
- A DN250 cast iron cement lined trunk main WO 83773 built in 1946 in the Old Northern Road to the east.
- A DN150 cast iron cement lined reticulation main WO 72145 built in 1978 services the Derriwong Road eastern area of Precinct 1.
- A DN100 cast iron cement lined reticulation main WO 84624 built in 1973 services the Derriwong Road western area of Precinct 1.
- A DN100 cast iron cement lined reticulation main WO 82187 built in 1969 services the Derriwong Road western area of Precinct 1.

### 4.2 Proposed Water supply System

A concept water supply servicing diagram has been developed and is shown in Appendix D, Arup – Precinct 1 – Servicing Plan Water supply. The concept is subject to change as a result of final lot layouts and road grading in conjunction with site earthworks.

As noted in the SWC Feasibility Letter June 2016, Case Number 154616 (refer Appendix F), the proposed water supply system has been developed to connect to the existing DN200 reticulation main in the Old Northern Road to the east.

New mains have been shown in the proposed new streets to service each lot in accordance with the SWC Feasibility Letter June 2016, Case Number 154616. Where possible all water mains have been looped and dead ends have been avoided for water quality purposes.

The existing DN150 and DN100 water mains in Derriwong Road can be used to service the new lot layout. The existing mains may need adjustment in level



should the existing road gradings or the existing road alignments be changed for the new development.

The proposed water main network will require modelling to confirm final water main sizes if the rezoning application is approved and when the proposed road and lot layout is finalised.

From the review of the water supply in the area it can be seen that the proposed development for Precinct 1 can be adequately supplied with water.

## 5 Conclusion

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This report has assessed the sewerage and potable water servicing requirements for the proposed Precinct 1 development of land at the Old Northern Road, Dural.

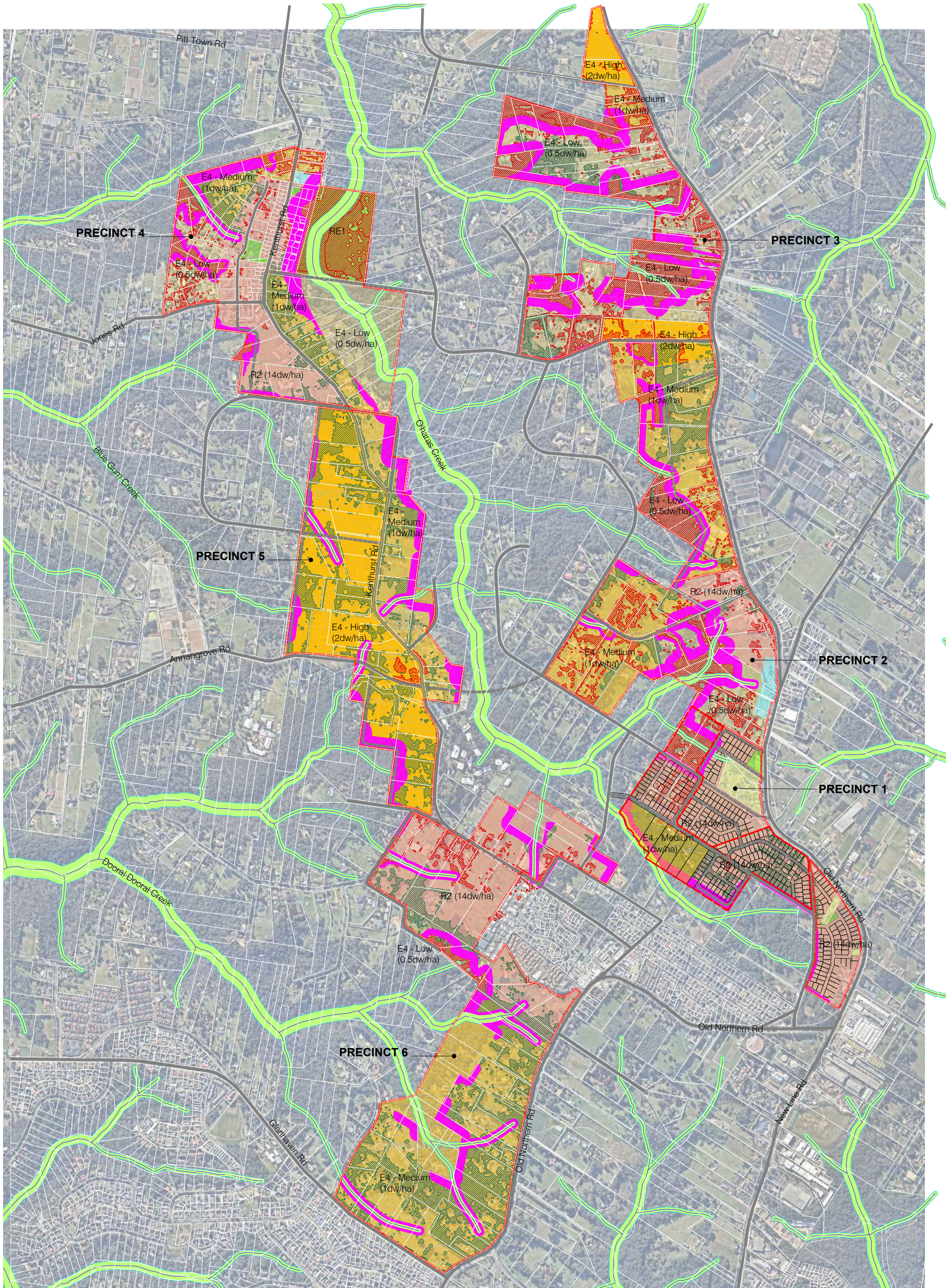
The sewerage servicing assessment has determined that the existing lead-in sewer to the existing SPS 1111 is estimated to have sufficient capacity to convey flows from the proposed full Precinct 1 development area. However, it is anticipated that an upgrade of SPS 1111 and its associated pressure main will be required following development of Stage 1 and the partial completion of Stage 2 and earlier should any other catchments not currently known pump to existing SPS 1111. This should ultimately be confirmed with flow monitoring and detailed modelling.

The potable water servicing assessment concluded that there is sufficient potable water infrastructure at the site to service the proposed Precinct 1 development area. A concept plan has been developed to demonstrate an indicative potable water servicing plan for the proposed development.

## Appendix A

Urbis - Development  
Investigation - PLN01 –  
Dural Planning Proposal



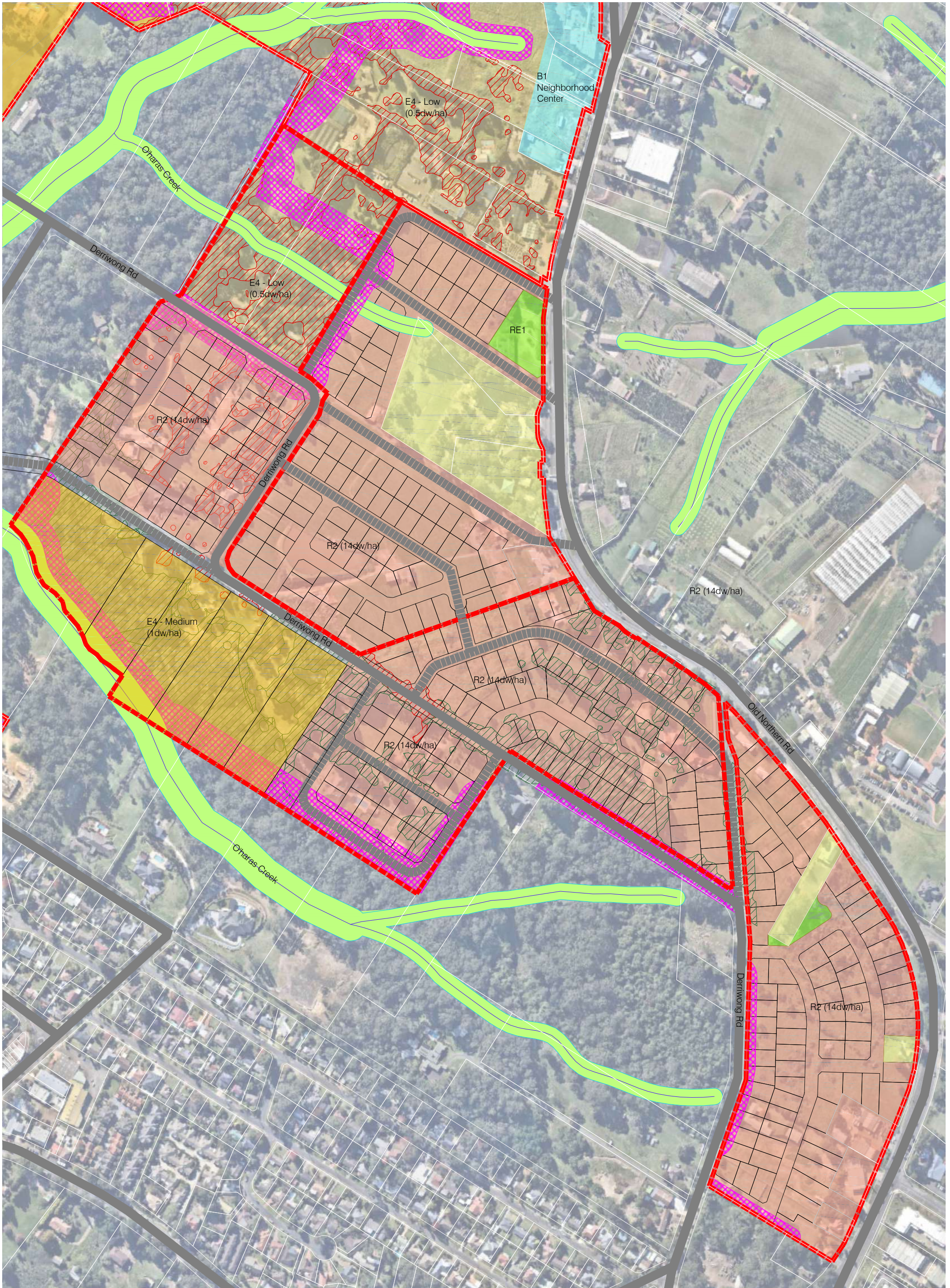




## **Appendix B**

Urbis - Precinct 1 - PLN04 –  
Dural Planning Proposal



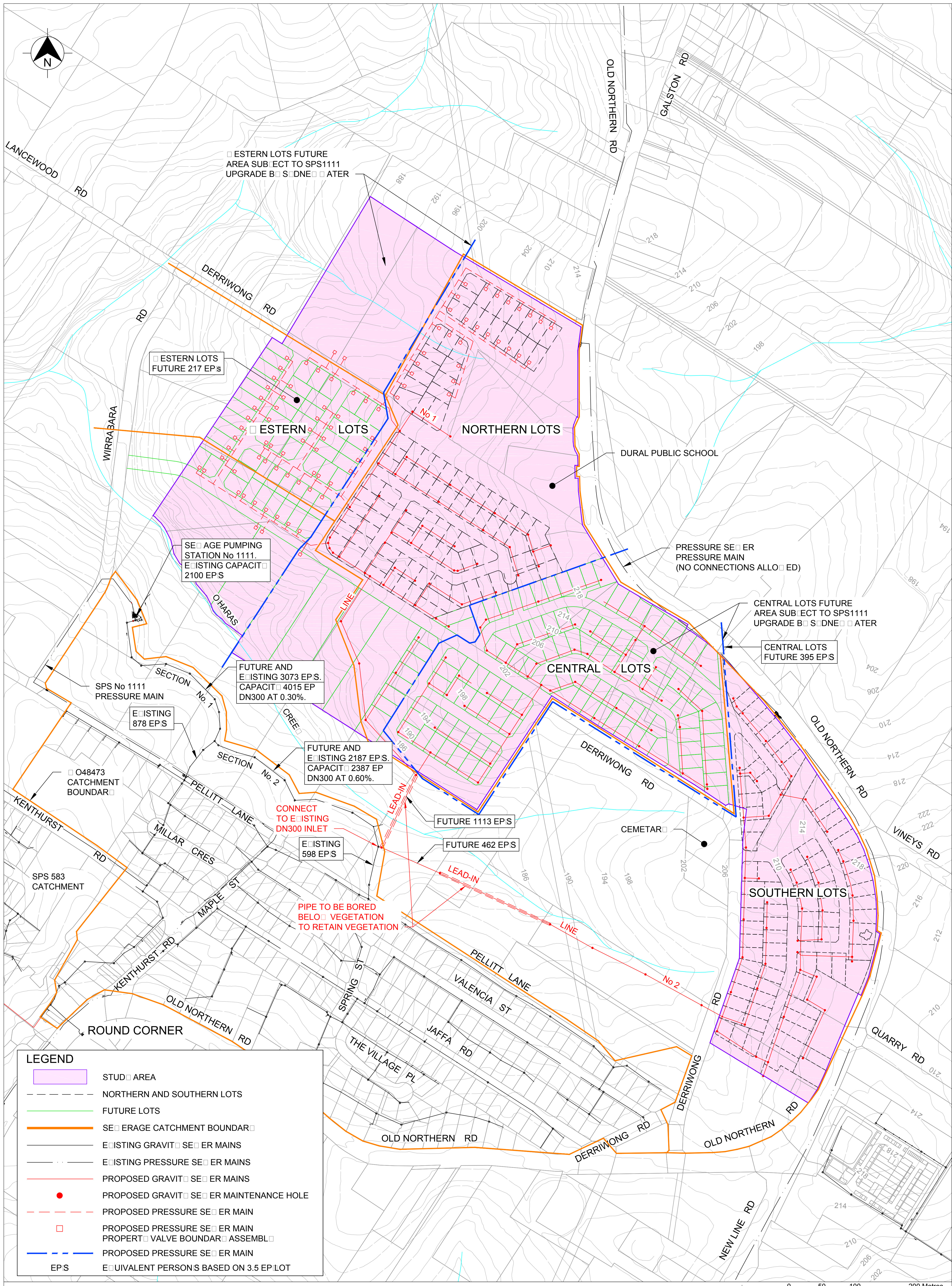




## Appendix C

Arup - Precinct 1 - Servicing  
Plan - Sewerage





ESTERN LOTS FUTURE  
AREA SUBJECT TO SPS1111  
UPGRADE BY S/DNE/DATER

ESTERN LOTS  
FUTURE 217 EPS

SEWAGE PUMPING  
STATION No 1111.  
EXISTING CAPACITY  
2100 EPS

FUTURE AND  
EXISTING 3073 EPS.  
CAPACITY 4015 EP  
DN300 AT 0.30%.

FUTURE AND  
EXISTING 2187 EPS.  
CAPACITY 2387 EP  
DN300 AT 0.60%.

EXISTING  
598 EPS

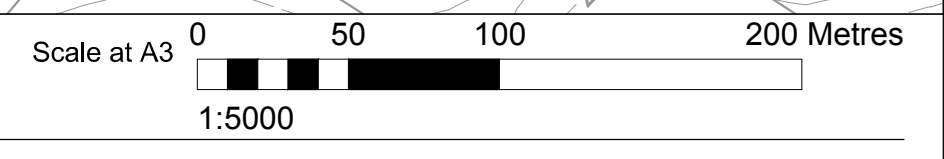
FUTURE 1113 EPS

FUTURE 462 EPS

CENTRAL LOTS FUTURE  
AREA SUBJECT TO SPS1111  
UPGRADE BY S/DNE/DATER

CENTRAL LOTS  
FUTURE 395 EPS

| LEGEND |  |
|--------|--|
|        | STUDY AREA   |
|        | NORTHERN AND SOUTHERN LOTS                                       |
|        | FUTURE LOTS  |
|        | SEWERAGE CATCHMENT BOUNDARY                                      |
|        | EXISTING GRAVITY SEWER MAINS                                     |
|        | EXISTING PRESSURE SEWER MAINS                                    |
|        | PROPOSED GRAVITY SEWER MAINS                                     |
|        | PROPOSED GRAVITY SEWER MAINTENANCE HOLE                          |
|        | PROPOSED PRESSURE SEWER MAIN                                     |
|        | PROPOSED PRESSURE SEWER MAIN<br>PROPERTY VALVE BOUNDARY ASSEMBLY |
|        | PROPOSED PRESSURE SEWER MAIN                                     |
| EPS    | EQUIVALENT PERSONS BASED ON 3.5 EP/LOT                           |



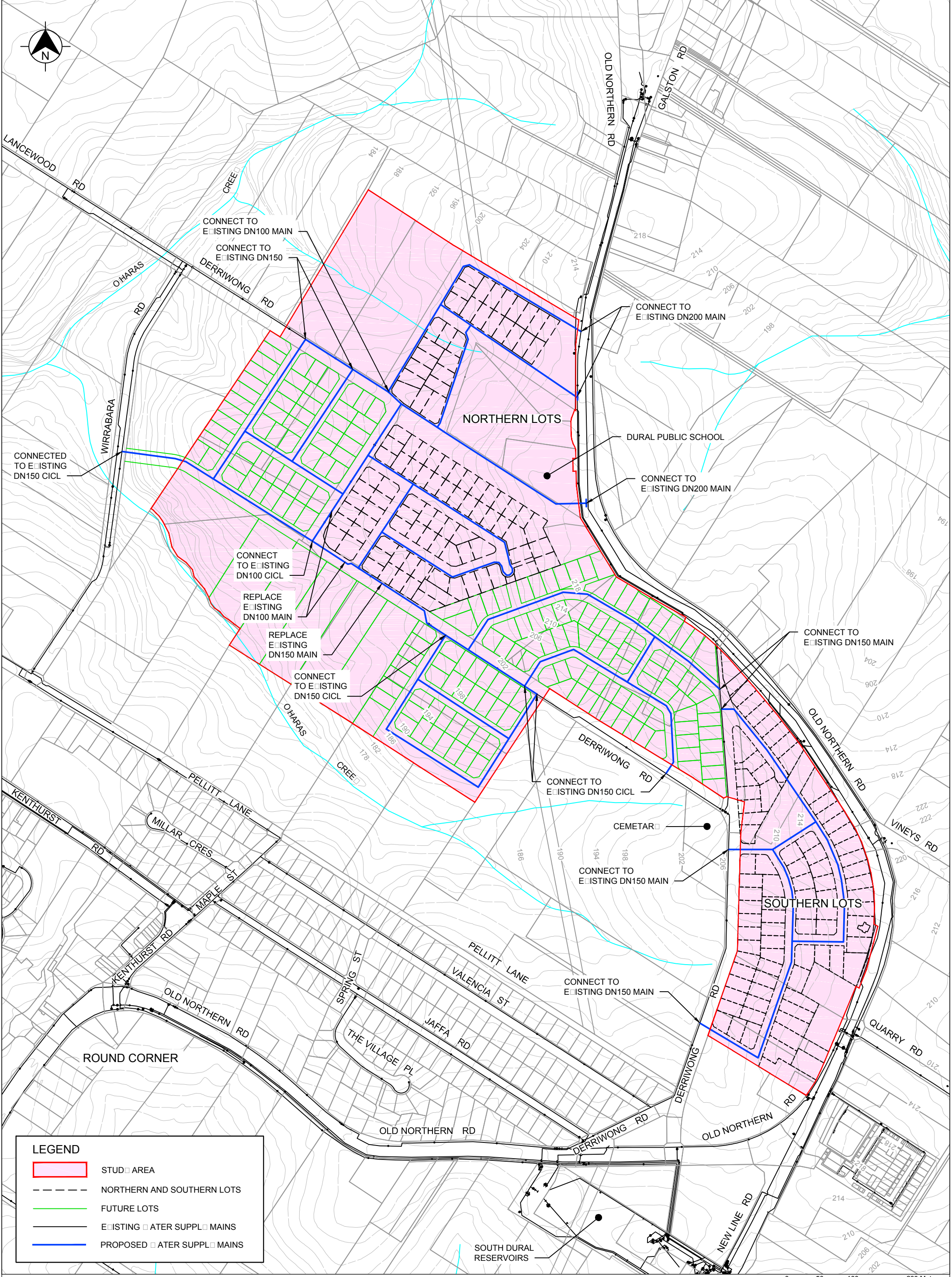
Description  
PRECINET 1 - SERVICING PLAN  
SEWERAGE



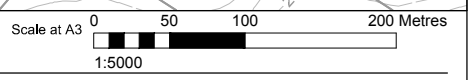


## Appendix D

Arup - Precinct 1 - Servicing  
Plan - Water supply



| LEGEND |                             |
|--------|-----------------------------|
|        | STUDY AREA                  |
|        | NORTHERN AND SOUTHERN LOTS  |
|        | FUTURE LOTS                 |
|        | EXISTING WATER SUPPLY MAINS |
|        | PROPOSED WATER SUPPLY MAINS |



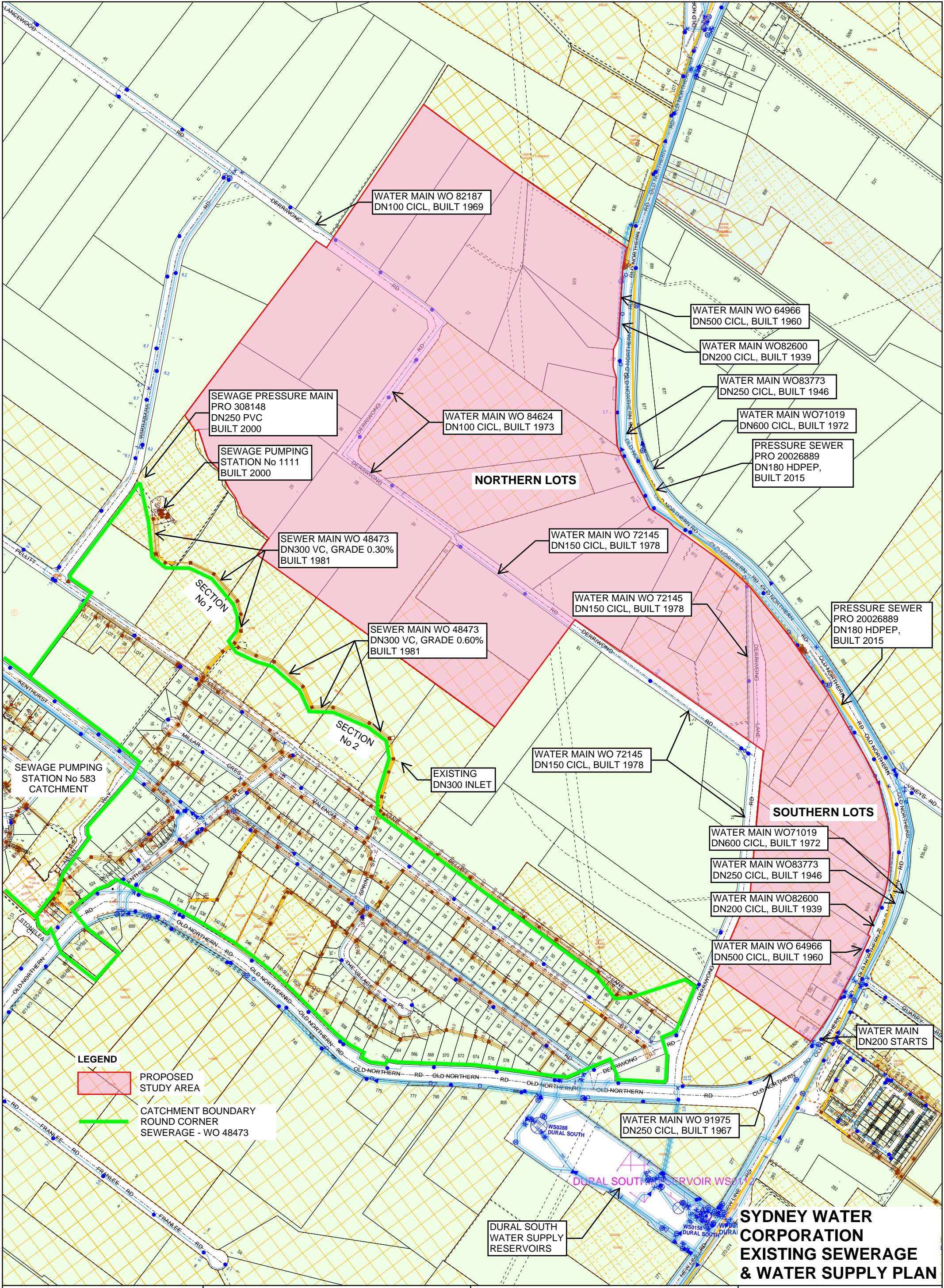
Description  
 PRECINET 1 - SERVICING PLAN  
 WATER SUPPLY





## Appendix E

Sydney Water Corporation -  
Existing Sewerage &  
Water supply Plan

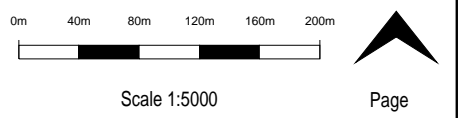


**SYDNEY WATER CORPORATION  
EXISTING SEWERAGE  
& WATER SUPPLY PLAN**

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SYDNEY WATER CORPORATION

Old Northern Road  
Map:131 Grid:K11 Edition:Sydney UBD Edition 41





## **Appendix F**

Sydney Water Corporation -  
Previous Feasibility Letter  
July 2016



1 July 2016

Urbis Pty Ltd  
c/- MGP BUILDING & INFRASTRUCTURE SERVICE PL

### FEASIBILITY LETTER

**Developer:** Urbis Pty Ltd  
**Your reference:** SY07366  
**Development:** Old Northern Road and Derriwong Road, Dural  
(Lots 11 & 12 DP 866560, Lot 2 DP 567995, Lot 1 DP 73652, Lot 1 DP 656035, Lot 1 DP 656036, Lot 1 DP 564716, Lot 1 DP656034, Lots 100 & 101 DP 713628, Lot 11 DP 825077, Lot 2 DP 565718, Lot D DP 38097, Lot X DP 501233 and Lot Y DP 39261)

**Development Description:** A seniors living area is proposed comprising a day surgery/ medical centre of 3,000m<sup>2</sup> GFA, a seniors independent living village of 56 units and a residential aged care facility of approx. 150 beds. The development will also comprise a total of 170 residential lots in the remainder of the areas highlighted averaging 700m<sup>2</sup> in area.

**Your application date:** 10 June 2016

Dear Applicant

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

If you obtain development consent for that development 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 (Coordinator).

Sydney Water will then send you either a:

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

These documents will be the definitive statement of Sydney Water's requirements.

There may be changes in Sydney Water's 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; and
- if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.

## 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 [www.sydneywater.com.au](http://www.sydneywater.com.au) > Plumbing, building & developing > Developing > Land development.

1. **Obtain Development Consent from the consent authority for your development proposal.**
2. **Engage a Water Servicing Coordinator (Coordinator).**

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

For a list of authorised Coordinators, either visit [www.sydneywater.com.au](http://www.sydneywater.com.au) > Plumbing, building & developing > Developing > Providers > Lists or call **13 20 92**.

The Coordinator will be your point of contact with Sydney Water. 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 Sydney Water costs).

3. **Developer Works Deed**

**After** the Coordinator has submitted your new application, they will receive the Sydney Water Notice and Developer Works Deed. You and your accredited Developer Infrastructure Providers (Providers) will need to sign and lodge both copies of the Deed with your nominated Coordinator. After Sydney Water has signed the documents, one copy will be returned to the Coordinator.

The Deed sets out for this project:

- your responsibilities;
- Sydney Water's responsibilities; and
- the Provider's responsibilities.

**You must do all the things that we ask you to do in that Deed.** This is because your development does not have water and sewer services and you must construct and pay for the following works extensions under this Deed to provide these services.

**Note:** The Coordinator must be fully authorised by us for the whole time of the agreement.

4. **Water and Sewer Works**

- 4.1 **Water**

Your development must have a frontage to a water main that is the right size and can be used for connection. The following information is provided to assist in planning the servicing



needs of the development, based on the information supplied:

- Strategic investigation shows that the trunk water has adequate capacity to service this development area.
- The preferred connection for each portion of the development is the DN 200 mm in Old Northern Road.
- This advice is not a formal approval of our servicing requirements. Formal requirements for servicing the developments will be determined as part of the Section 73 application phase. More information about the Section 73 application process is available on our web page in the [Land Development Manual](#).

#### 4.2 Sewer

Your development 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 your development's boundaries.

Sydney Water has assessed your application and found that:

- The development site currently is not serviced by a Sydney Water wastewater system. The nearest wastewater reticulation main is located in Pellit Lane. It is recommended that the flow is transferred by gravity to the existing sewer main in Pellit Lane.

There are two following options:

1. Build a new sewer main along the Pellit Lane and connect it to the 225mm main construed under WO 48473.
  2. Connect to the existing reticulation sewer main across the Derriwong Rd at the southern end of the development site. If this option is utilized, upsizing of the system may be required. Sizing of the mains must be in accordance with the Sewerage Code of Australia.
- The consultant will need to assess the options and come up with a suitable servicing strategy that meets all of Sydney Water requirements and submit it to Sydney Water for its review, at or prior to Section 73 application.
  - This advice is not a formal approval of our servicing requirements. Formal requirements for servicing the developments will be determined as part of the Section 73 application phase. More information about the Section 73 application process is available on our web page in the [Land Development Manual](#).
  - **You must construct a waste water main extension to serve your development.** The terms of the Deed define this extension as 'Major Works'.

- You must use Sydney Water's new **Technical Specifications for Leak Tight Sewer Systems** to plan, design and construct the sewer. This specification must be used in conjunction with (and have precedence over) the Sewerage Code of Australia, WSA02-2002 (Sydney Water Edition).

### Funding of works

Under Sydney Water's 'Funding of infrastructure to service growth' policy we may agree to contribute towards a portion of the cost of the works you are required to build. This is done either by Sydney Waters Schedule of Rates or via the Procurement process. Your Water Service Coordinator can advise you in relation to this policy, the likelihood of Sydney Water sharing a portion of the cost and the process you need to satisfy Sydney Water's probity requirements.

If you do choose to request a quote through the Schedule of Rates for Sydney Water's contribution you will avoid going through the full procurement process. Your WSC can advise you of this option.

The funding assessment will be made at the detailed design stage, prior to any construction works commencing. A firm commitment would not be made by Sydney Water until we:

- Have reviewed the detailed design and;
- Have reviewed the detailed construction quotations needed to meet our probity requirements and;
- Come to an agreement on the amount.

## 5. Ancillary Matters

### 5.1 Asset adjustments

After Sydney Water issues this Notice (and more detailed designs are available), Sydney Water may require that the water main/sewer main/stormwater located in the footway/your property needs to be adjusted/deviated. If this happens, you will 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**. Sydney Water will need to see the completed designs for the work and we will 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 Sydney Water's **Permission to Enter** form(s) for this. You can get copies of these forms from your Coordinator or the Sydney Water website. Your Coordinator 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.

### 5.3 Costs

Construction of these **future** works will require you to pay project management, survey, design and construction costs **directly to your suppliers**. Additional costs payable to Sydney Water may include:

- water main shutdown and disinfection;
- connection of new water mains to Sydney Water system(s);
- design and construction audit fees;
- contract administration, Operations Area Charge & Customer Redress prior to project finalisation;
- creation or alteration of easements etc; and
- water usage charges where water has been supplied for building activity purposes prior to disinfection of a newly constructed water main.

Note: Payment for any Goods and Services (including Customer Redress) provided by Sydney Water will be required prior to the issue of the Section 73 Certificate or release of the Bank Guarantee or Cash Bond.

Your Coordinator can tell you about these costs.

### **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 of Sydney Water 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 your building plans must be approved. This can be done at Sydney Water Tap in™. Visit [www.sydneywater.com.au](http://www.sydneywater.com.au) > Plumbing, building & developing > Building > Sydney Water Tap in™ or call 13 20 92.

This is not a requirement of the Certificate but the approval is needed because construction/building works may impact on existing Sydney Water assets (e.g. water and sewer mains). In any case, these works **MUST NOT** commence until Sydney Water has granted approval.

Your Coordinator can tell you about the approval process including:

- Possible requirements;
- Costs; and
- Timeframes.

**Note: You must obtain our written approval before you do any work on Sydney Water's systems. Sydney Water will 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.**

#### **Disused Sewerage Service Sealing**



Please do not forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to a Sydney Water sewer main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

### **Soffit Requirements**

Please be aware that floor levels must be able to meet Sydney Water's soffit requirements for property connection and drainage.

### **Requirements for Business Customers for Commercial and Industrial Property Developments**

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

#### **Trade Wastewater Requirements**

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

The permit application should be emailed to Sydney Water's Business Customer Services at [businesscustomers@sydneywater.com.au](mailto:businesscustomers@sydneywater.com.au)

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

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

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

#### **Backflow Prevention Requirements**

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

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

Separate hydrant and sprinkler fire services on non-residential properties, require the installation

of a testable double check detector assembly. The device is to be located at the boundary of the property.

Before you install a backflow prevention device:

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

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

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

### **Water Efficiency Recommendations**

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

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

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

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

### **Contingency Plan Recommendations**

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

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

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

Have you thought about a **contingency plan** for your business? Your Business Customer Representative will help you to develop a plan that is tailored to your business and minimises

productivity losses in the event of a water service disruption.

For further information please visit the Sydney Water website at: <http://www.sydneywater.com.au/OurSystemsandOperations/TradeWaste/> or contact Business Customer Services on **1300 985 227** or [businesscustomers@sydneywater.com.au](mailto:businesscustomers@sydneywater.com.au)

## **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 development and the ability of Sydney Water's system to provide that flow in an emergency. Sydney Water's Operating Licence directs that Sydney Water's mains are only required to provide domestic supply at a minimum pressure of 15 m head.

A report supplying modelled pressures called the Statement of Available pressure can be purchased through Sydney Water Tap in<sup>TM</sup> and may be of some assistance when defining the fire fighting system. The Statement of Available pressure, may advise flow limits that relate to system capacity or diameter of the main and pressure limits according to pressure management initiatives. If mains are required for fire fighting purposes, the mains shall be arranged through the water main extension process and not the Section 73 process.

## **Large Water Service Connection**

A water main will be available, once you have completed your drinking water main construction to provide your development with a domestic supply. The size of your development means that you will need a connection larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application with Sydney Water Tap in<sup>TM</sup>. You, or your hydraulic consultant, may need to supply the following:

- A plan of the hydraulic layout;
- A list of all the fixtures/fittings within the property;
- A copy of the fireflow pressure inquiry issued by Sydney Water;
- A pump application form (if a pump is required);
- All pump details (if a pump is required).

You will have to pay an application fee.

Sydney Water does not consider whether a water main 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.

## **Disused Water Service Sealing**

You must pay to disconnect all disused private water services and seal them at the point of connection to a Sydney Water water main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed



plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

**Other fees and requirements**

The requirements in this Notice relate to your Certificate application only. Sydney Water 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;
- trade waste requirements;
- large water connections and
  - council fire fighting requirements. (It will help you to know what the fire fighting requirements are for your development as soon as possible. Your hydraulic consultant can help you here.)

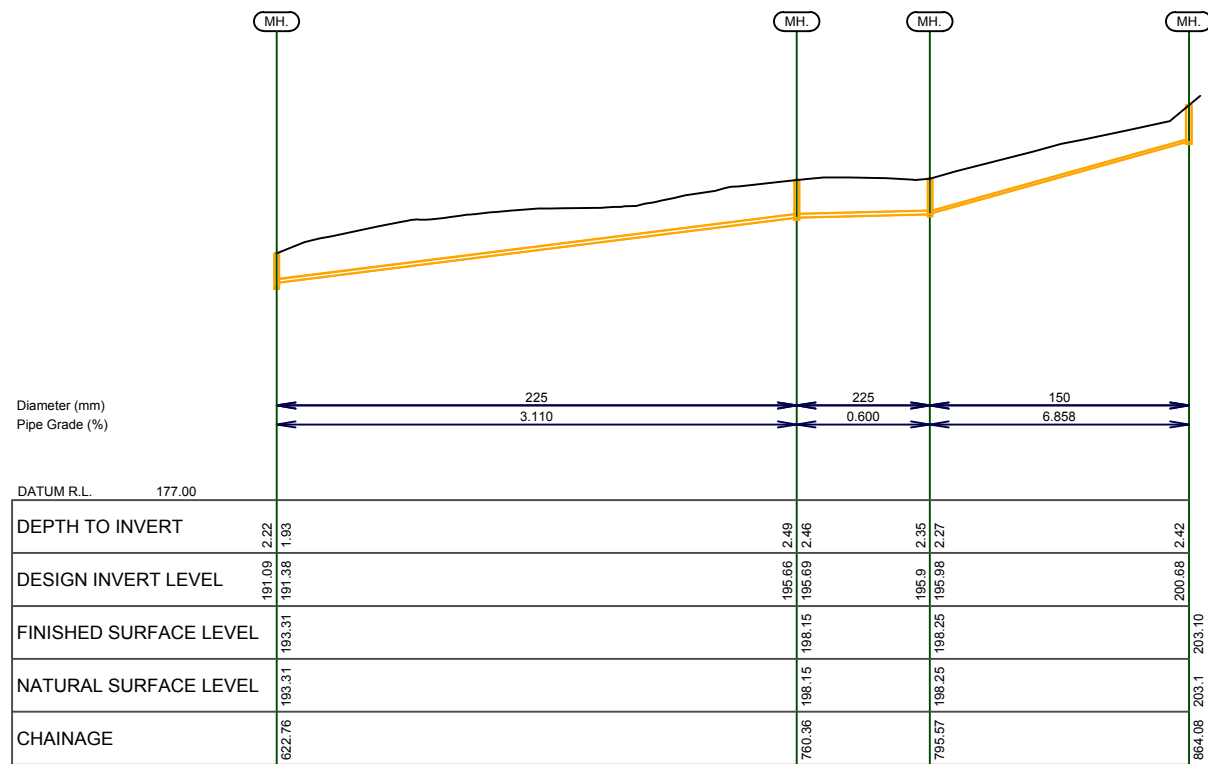
**No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from Sydney Water and to the extent that it is able, Sydney Water limits its liability to the reissue of this Letter or the return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

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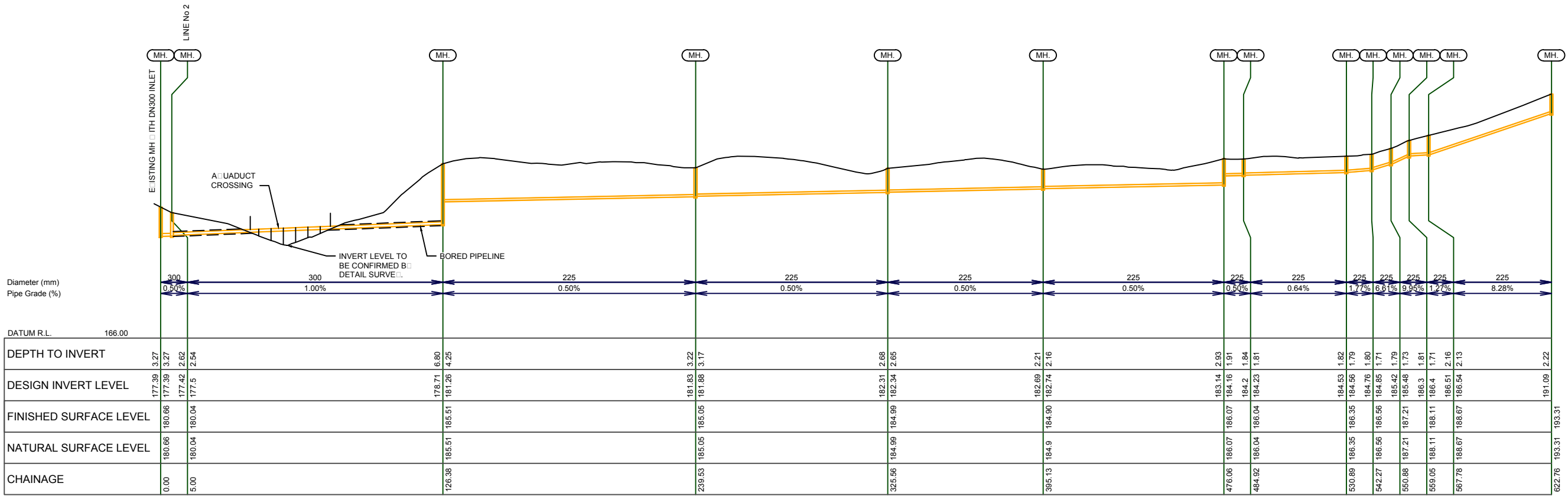
**END**

## Appendix G

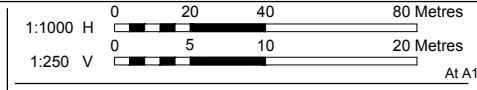
Proposed Sewer Lead-in  
Line No. 1 Longitudinal Section



Sewer-01



Sewer-01



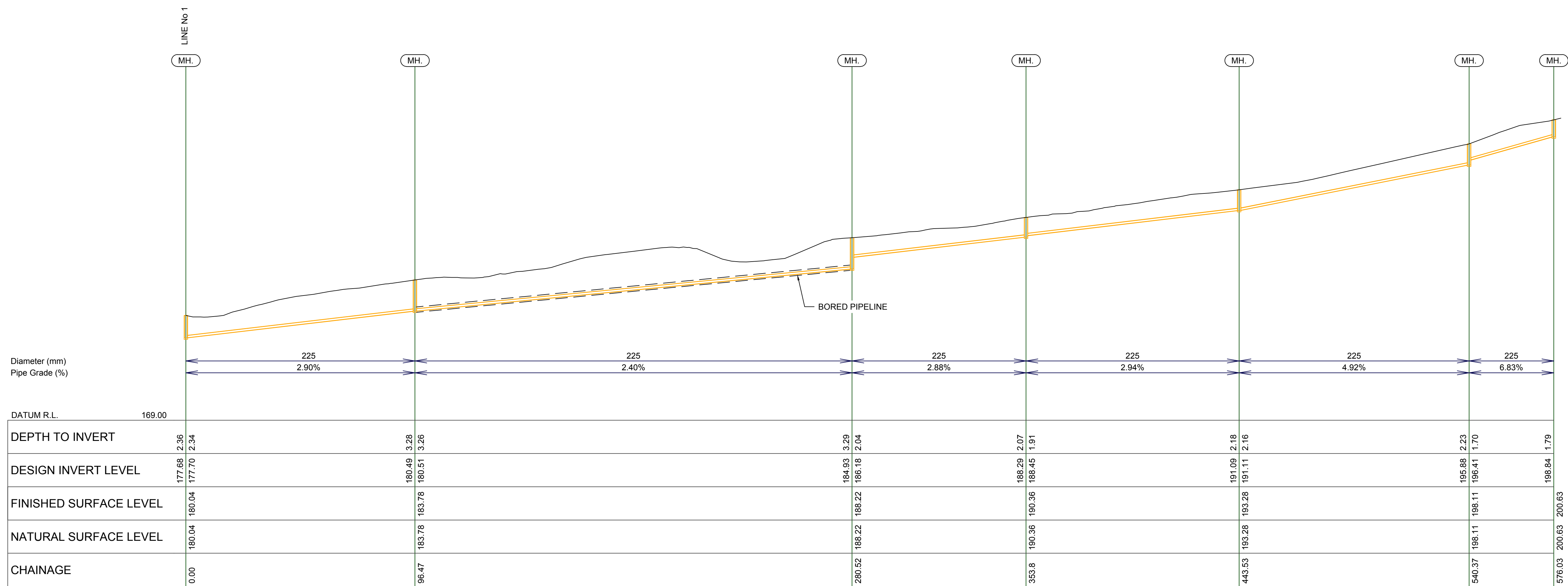
Description:  
LEAD IN LINE No 1  
LONGITUDINAL SECTION



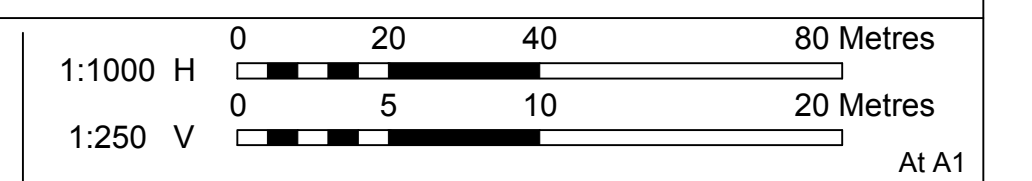


## Appendix H

Proposed Sewer Lead-in  
Line No. 2 Longitudinal Section



Sewer-02



Description:  
LEAD IN LINE No 2  
LONGITUDINAL SECTION









ANGEL PLACE  
LEVEL 8, 123 PITT STREET  
SYDNEY NSW 2000

URBIS.COM.AU  
Urbis Pty Ltd  
ABN 50 105 256 228

24 April 2019

Mr Michael Edgar  
General Manager  
The Hills Shire Council  
via email

Dear Michael,

## OLD NORTHERN ROAD-DERRIWONG ROAD PLANNING PROPOSAL | PUBLIC BENEFIT OFFER

This letter concerns the status and ongoing consideration of the Derriwong Road- Old Northern Road Planning Proposal (23/2016/PLP).

The Planning Proposal was first reported to The Hills Shire Council (**the Council**) on 13 December 2016, where the Council determined to hold the proposal in abeyance until a wider area planning study was completed.

Subsequently the proponent (Dural Development Management Services Pty Ltd) lodged a rezoning review application and the Sydney West Central Planning Panel (**the Panel**) determined on 21 April 2017 not to submit the planning proposal for Gateway Determination. The Panel advised that the Planning Proposal should be held until Council completed the wider Dural area study (now referred to as the 'Dural Urban Capability Assessment'), however noted that they would be willing to consider the planning proposal again if the Council had not completed the study by December 2017.

As you are aware, Council staff reported the outcomes of the Dural Urban Capability Assessment to the Council at the Council meeting held on 26 March 2019. The Council resolved unanimously to support the recommendation that:

- 1. Council receive the report outlining the outcomes of the Urban Capability and Capacity Assessment for the Dural locality.*
- 2. Council discontinue any further investigations with respect to the rezoning of rural land for urban development within the Dural locality at this time.*
- 3. If the proponent of any future planning proposal to rezone land within the Dural locality is able to demonstrate that they can deliver the required local and regional infrastructure upgrades at no cost to Council, Council consider such a planning proposal and review its position with respect to rezoning within the Dural locality at that time.***
- 4. Invite Hornsby Shire Council to join with The Hills Shire Council in lobbying the State Government for the funding of essential upgrades to Old Northern Road / New Line Road to address existing road capacity problems in Dural;*

*5. Approach the Roads and Maritime Services for the re-classification of Annangrove Road from a sub-arterial road to an arterial road to recognise the higher traffic volumes that are expected on Annangrove Road in the near future; and*

*6. Lobby the State Government for the reservation of a corridor that will facilitate a future bypass road between Annangrove Road and Old Northern Road, plus a funding commitment for the construction of a bypass road that will be needed as a consequence of population increase in the North West Growth Centre.*

**(Emphasis Added)**

We are informed by the Business Paper that the Dural Urban Capability Assessment concludes that the site is capable of being rezoned for 'urban purposes', aligning with the intended outcome of the Planning Proposal. As such the proposed rezoning of the site has site-specific merit as previously demonstrated, and strategic merit in the context of a wider area planning study.

However, the Dural Urban Capability Assessment also concluded that infrastructure capacity issues (primarily traffic and transport infrastructure) did not facilitate additional residential density in the locality. To ensure development occurs in an orderly and feasible manner, upgrades to such infrastructure are therefore required prior to and/or concurrently with the progression of site-specific planning proposals that seek to rezone land within the study area.

With respect of Council resolution point 3, the proponent of the Old Northern Road-Derriwong Road Planning Proposal has demonstrated that they can deliver the required local and regional infrastructure upgrades, at no cost to government, as required by the Dural Urban Capability Assessment. As such the Council is required to review its position with respect to the Planning Proposal at this time.

While detail of the local and regional infrastructure upgrades proposed has been submitted to the Hills Shire Council within the Planning Proposal and subsequent Planning Proposal Addenda, a formal Public Benefit Offer has been prepared (**Attachment A**). This Public Benefit Offer demonstrates how the proponent can deliver the necessary local and regional infrastructure upgrades as summarised below:

- Sewerage upgrades in the immediate locality around the site enabling the removal of septic systems from the playground of the adjacent Dural Public School;
- Road widening to enable safer drop-off and pick-up of students at Dural Public School;
- Securing a corridor through the northern site for a future regional road connection between Annangrove Road and Old Northern Road and providing for a diversion of traffic away from Round Corner; and
- Provision of local open space.

Further, additional funding was allocated to relieve existing road congestion at Dural in proximity of the site at the 2019 Federal Budget.

The proponent has therefore demonstrated that notwithstanding the increased residential density facilitated by the Planning Proposal (in a strictly 'low density' zoning and environment), the local and regional infrastructure constraints identified within the Dural Urban Capability Assessment are readily addressed by the proposal.



As such, we request that the Hills Shire Council staff revise their assessment of the Planning Proposal in accordance with Council resolution point 3.

Should you require any additional information in relation to the proposed Public Benefit Offer or the Planning Proposal, please do not hesitate to contact me on (02) 8233 9990 or at [aryan@urbis.com.au](mailto:aryan@urbis.com.au).

Yours sincerely,

A handwritten signature in black ink, appearing to read "A. Ryan". The signature is fluid and cursive, with a horizontal line extending to the right.

Ashleigh Ryan  
Associate Director- Planning

Attachment A – Proposed Public Benefit Offer



# PROPONENT'S PUBLIC BENEFIT OFFER IN CONNECTION WITH A PLANNING PROPOSAL

**This is an offer by:** Dural Development Management Services Pty Ltd ACN 608 498 705 (The Proponent)

**For:** Planning Proposal (23/2016/PLP) including amendment to the written instrument and maps of The Hills Local Environmental Plan 2012 (the LEP) to achieve the following:

- Amend the zoning of the site as shown on the site Zoning Map from RU6 Transition to R2 Low Density Residential;
- Amend the minimum lot size for subdivisions as shown on the Lot Size Map for the site from a minimum of 2 hectares to 700m<sup>2</sup> with an additional clause under Part 7 of the LEP to permit a maximum of 101 residential allotments within the Northern parcel of the site with a minimum lot size of 600m<sup>2</sup>;
- Amend the Height of Buildings Map as it applies to the site to reduce the control from a maximum height of 10 metres to a maximum height of 9 metres (consistent with the adjacent R2 Low Density Residential zone); and
- Include an additional clause to Part 7 of the LEP to facilitate the delivery of part of a new road connection between Annangrove and Old Northern Roads.

**At:** Land located at Old Northern Road and Derriwong Road, Dural including 618 Old Northern Road, 626 Old Northern Road, 21 Derriwong Road, and 27 Derriwong Road, Dural (**the northern site**); and 584 Old Northern Road, 586 Old Northern Road, 590 Old Northern Road, 600, 600A, 602, 606 Old Northern Road, and 5-7 Derriwong Road, Dural (**the southern site**).

This offer relates to both the northern site and the southern site as per the Planning Proposal. It is however anticipated that this offer would be formalised in two separate Planning Agreements for each parcel respectively. As such, this offer comprises two parts as detailed below.

This offer includes public benefit 'works delivered in kind' and land dedication to the Hills Shire Council. The general nature and extent of the provision to be made under the offer are as follows:

## **Part A – Northern Site**

Prior to the release of a subdivision certificate for any residential lots on the R2 Low Density Residential zone within the northern site boundaries, the following is required to be delivered by the proponent or future developer:

1. Excise of approximately (subject to survey detail) 9,900sqm of land area from the site and dedication to The Hills Shire Council for the purposes of a New Regional Road with a 32m wide road reserve.
2. Excise of approximately (subject to survey detail) 3,364sqm of land area from the site and dedication to The Hills Shire Council for an additional drop-off/pick-up parking facility to service the adjacent Dural Public School.
3. Construction of the civil works required to deliver the New Regional Road including but not limited to footpaths, landscape islands, kerb and gutter, asphalt roads, line markings, and road and street signage.
4. Physical works required to connect the New Regional Road to Derriwong Road and the New Regional Road to Old Northern Road via non-signalised intersections, where possible within the northern site boundary and land owned by The Hills Shire Council.
5. Provision of services within the boundaries of the site including cut and fill, excavation, concrete pipework, backfill, connection to existing main, surcharge inlet pits, street lighting to be connected into existing grid in consultation with The Hills Shire Council.
6. Remediation of the entire subject site in accordance with the recommendations of the relevant Remedial Action Plan, where required. All land to be dedicated to The Hills Shire Council will be remediated prior to the dedication.
7. Construction of a signalised intersection at the eastern boundary of the site and Old Northern Road.
8. Stormwater management measures for the northern site including dual-function water quality and detention basis, swales, and rain gardens as indicatively proposed within '*Old Northern Road, Dural – Precinct 1 Stormwater Management Strategy*', prepared by ARUP, dated 22 December 2017.
9. Connection of the Northern Site and the adjacent Dural Public School to the existing Sewerage Pumping Station via a pressure sewerage system as indicatively proposed within '*Old Northern Road, Dural – Precinct 1 Sewerage and Water Supply Strategy*', prepared by ARUP, dated 21 December 2017. No upgrades are required to the potable water supply to service the proposal, or the sewage pumping station and pressure main on the Northern Site.

10. Dedication of approximately 4,000sqm land area within the Northern Site to The Hills Shire Council for the purpose of Local Open Space. Alternatively, local developer contributions will be payable to The Hills Shire Council as per the relevant local developer contributions plan at the time of the approval of relevant development application for the purposes of Local Open Space.

### **Part B – Southern Site**

Prior to the release of a subdivision certificate for any residential lots on the R2 Low Density Residential zone within the southern site boundaries, the following is required to be delivered by the proponent or future developer:

1. Excise of approximately (subject to survey detail) 1,000sqm of land area from the site adjacent to the Dural Memorial Hall for the purposes of community use.
2. Provision of services within the boundaries of the site including cut and fill, excavation, concrete pipework, backfill, connection to existing main, surcharge inlet pits, street lighting to be connected into existing grid in consultation with The Hills Shire Council.
3. Stormwater management measures for the southern site including dual-function water quality and detention basis, swales, and rain gardens as indicatively proposed within '*Old Northern Road, Dural – Precinct 1 Stormwater Management Strategy*', prepared by ARUP, dated 22 December 2017.
4. Upgrade of the existing Sewerage Pumping Station and pressure main as required to service the southern site indicatively proposed within '*Old Northern Road, Dural – Precinct 1 Sewerage and Water Supply Strategy*', prepared by ARUP, dated 21 December 2017. No upgrades are required to the potable water supply to service the proposal on the southern site.
5. All works proposed under Part A are to be completed prior to the release of a subdivision certificate for any residential lots on the southern site to ensure public benefit works are completed in full prior to the increase in residential density facilitated by the Planning Proposal on the southern site.

**Terms of Offer:** The works described above are to be detailed in a Cost Plan prepared by a Quantity Surveyor and agreed between all parties the subject of the future Planning Agreement(s).

Local infrastructure works delivered 'in kind' by the proponent and otherwise costed under an applicable developer contributions plan are to be deducted from the total relevant Developer Contributions required for future development applications.



Should the Planning Proposal not be supported in the complete manner described in this offer, the proponent reserves the right to revisit the terms of this public benefit offer to proportionately reduce public works proposed to ensure project feasibility.

It is intended that should development consent be granted, this offer will be consolidated and crystallised into a Planning Agreement(s) with the Council. The agreement will comply with the requirements of the *Environmental Planning and Assessment Act 1979* and Regulations and contain mechanisms for completion of any works and / or land dedication. The Planning Agreement may be registered on the certificate of title to the land by the Registrar-General.

**Name of Proponent:** Dural Development Management Services Pty Ltd ACN 608 498 705

**Attachment A** – Northern Site Master Plan

**Attachment B** – Southern Site Master Plan

**Attachment C** – Old Northern Road, Dural – Precinct 1 Stormwater Management Strategy

**Attachment D** – Old Northern Road, Dural – Precinct 1 Sewerage and Water Supply Strategy



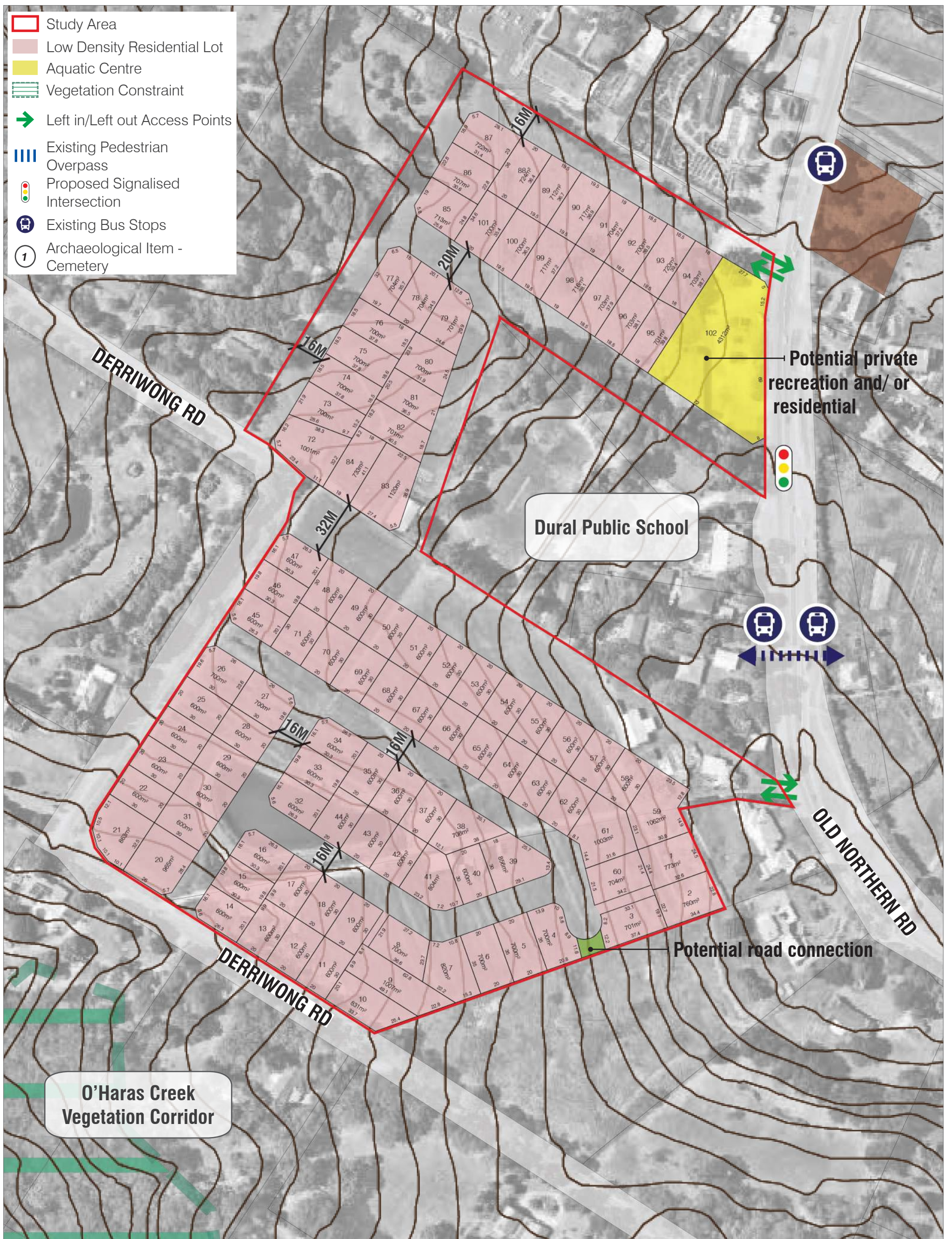


Figure 1: Northern Site Plan

SCALE 1:2,000 @ A3





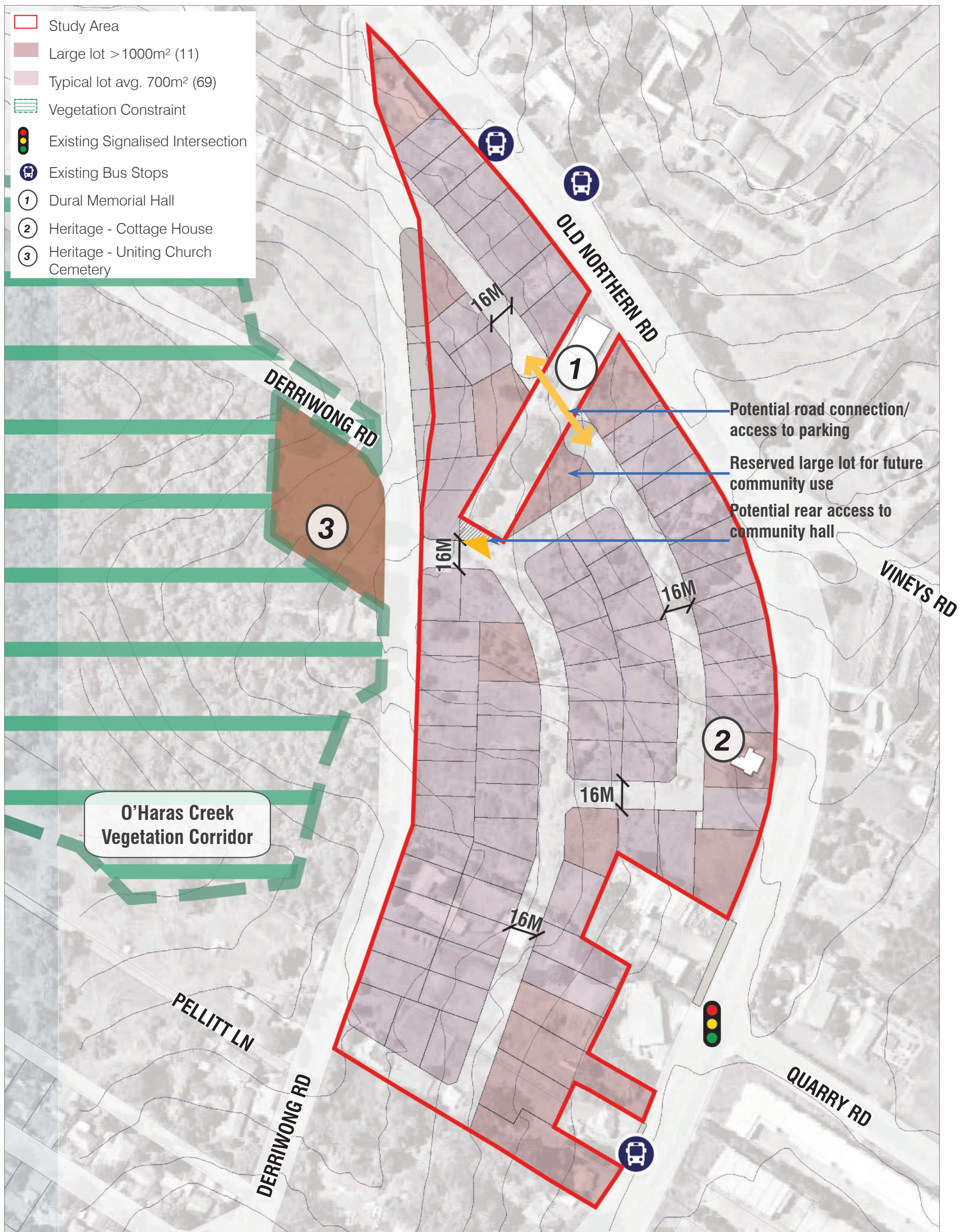


Figure 2: Southern Site Plan







ANGEL PLACE  
LEVEL 8, 123 PITT STREET  
SYDNEY NSW 2000

URBIS.COM.AU  
Urbis Pty Ltd  
ABN 50 105 256 228

7 May 2019

Mr Michael Edgar  
General Manager  
The Hills Shire Council  
via email

Dear Michael,

## OLD NORTHERN ROAD-DERRIWONG ROAD PLANNING PROPOSAL | CLARIFICATION ON OUTSTANDING MATTERS

This letter concerns the status and ongoing consideration of the Derriwong Road- Old Northern Road Planning Proposal (23/2016/PLP).

Further to the meeting held between the proponent and The Hills Shire Council (**the Council**) staff on 1 May 2019, this letter clarifies the proponent's position on a number of outstanding matters relating to the Planning Proposal – ahead of a Council staff recommendation being drafted in support of the Planning Proposal.

### 1. AT 'NO COST' TO GOVERNMENT

Council staff reported the outcomes of the Dural Urban Capability Assessment to the Council at the Council meeting held on 26 March 2019. The Council resolved unanimously to support the recommendation including:

*3. If the proponent of any future planning proposal to rezone land within the Dural locality is able to demonstrate that they can deliver the required local and regional infrastructure upgrades at no cost to Council, Council consider such a planning proposal and review its position with respect to rezoning within the Dural locality at that time.*

The Public Benefit Offer submitted to the Council on 24 April 2019 demonstrates that, in accordance with the Council resolution, the development of the proponent's site under the planning proposal can deliver the required local and regional infrastructure upgrades at no cost to Council. While Council staff have indicated their satisfaction that the proposal can deliver the required local infrastructure, concern has been raised regarding the delivery of regional road infrastructure in light of the recent recommendations made for the South Dural Planning Proposal.

Specifically, one of the stated reasons not to proceed with the South Dural Planning Proposal was that the proposal did not adequately demonstrate the "no additional cost to Government" principle of the relevant Gateway Determination. Within the South Dural Planning Proposal documentation, it was clarified through traffic modelling that the **existing** State road network is currently underperforming, and upgrades are required, including works to New Line Road, and Old Northern Road to a value of between \$158 million - \$300 million.

The Business Case and Infrastructure Strategy submitted with the South Dural Planning Proposal took the position that the cost of the regional road infrastructure upgrades should be apportioned between current traffic volumes and traffic generated as a result of the proposal. This, in our view, is a reasonable position. The NSW Department of Planning and Environment however stated in 2018 that

*“in the absence of guaranteed cost recovery from the development, the proposal cannot be supported by the Department at this time”.*

It is the proponent’s position that the Derriwong Road- Old Northern Road Planning Proposal is markedly different to the South Dural Planning Proposal with respect of the apportionment of regional road upgrades.

Apportionment of the cost of regional road upgrades is appropriate for this Planning Proposal as:

- The existing State road network is currently underperforming, and upgrades are required irrespective of this planning proposal including works to New Line Road and Old Northern Road.
- Federal Government funding, to the approximate value of \$10 million, has been allocated within the 2019 Budget specifically for upgrades to New Line Road to alleviate existing traffic congestion.
- The Traffic Impact Assessment prepared by AECOM to support the Planning Proposal (2016) confirms the anticipated AM and PM peak trips resulting from the proposal is 156 and 161 trips respectively. This is significantly less than the South Dural Planning Proposal and is more readily accommodated within the existing road network.
- Specifically, the Traffic Impact Assessment confirms that only works at the three proposed access points to the site are required to accommodate traffic generated by the proposal, compared to works required to accommodate background traffic growth.
- However, if the State Government do not provide additional funding to adequately fund or complete upgrade works to the existing road network to accommodate existing populations, including approved growth within the North West Growth Centre, we note this planning proposal provides the following regional road infrastructure:
  - The proposal can accommodate the upgrade of the intersection of Old Northern Road / Vineys Road from an existing give-way signal is proposed to be upgraded to a roundabout as part of developer contributions levied from the Southern Site. This work is required to accommodate the increase in background traffic, not as a result of the proposal.
  - Old Northern Road / Derriwong Road is proposed to be converted to a LIFO to alleviate impacts to this intersection from background traffic growth, however this is reliant on a new access point on Old Northern Road provided by the planning proposal to allow the banned right turn movements at the intersection as an alternate way to access to road network.
  - At the Council meeting held on 26 March 2019, the Council resolved to lobby the State Government for the reservation of a corridor that will facilitate a future bypass road between Annangrove Road and Old Northern Road, as a consequence of the population increase in the North West Growth Centre. The proposal facilitates a 32m wide road reserve for a part of such required regional road upgrades. This is proposed to be delivered through an additional clause to Part 7 of *The Hills Local Environmental Plan 2012*. Securing this corridor is critical for long term alleviation of existing traffic deficiencies within the region, and specifically for the Dural and Round Corner locality.
  - The proposal includes a pick-up/drop-off zone for the Dural Public School off Old Northern Road which alleviates *existing* traffic movements and congestion associated with the School pick-up/drop-off on Old Northern Road during school peak hours (AM and PM).
- Development facilitated by the planning proposal is able to contribute significantly to the required upgrades to the regional road network that the Government would otherwise be required to fund to adequately accommodate existing populations and traffic movements in the locality.



As such, development facilitated by the planning proposal can deliver infrastructure upgrades to not only support the proposed development but to alleviate existing infrastructure deficiencies to the benefit of the broader community. In addition to the works proposed within the Public Benefit Offer, the planning proposal has demonstrated that it can deliver the required local and regional infrastructure upgrades without cost to Government.

## 2. PLANNING PRIORITY C18 – ‘BETTER MANAGING RURAL AREAS’ CENTRAL CITY DISTRICT PLAN

Since the lodgement of the Planning Proposal, the Greater Sydney Commission finalised the Greater Sydney Regional Plan (**Regional Plan**) and the Central City District Plan (**District Plan**). Of particular relevance to this Planning Proposal, Planning Priority C18 ‘Better Managing Rural Areas’ is supported by two actions:

*73. Maintain or enhance the values of the Metropolitan Rural Area using place-based planning to deliver targeted environmental, social and economic outcomes.*

*74. Limit urban development to within the Urban Area.*

We understand that the Regional Plan states that urban development will only be considered in the Metropolitan Rural Area in the urban investigation areas, and that there are no urban investigation areas in the Central City District. Further, we understand that “further rural residential development is generally not supported” in the District’s rural areas. However, it is also stated within the District Plan that:

- The towns and villages such as Dural and Glenorie in the District’s Metropolitan Rural Area offer essential retail and community services within rural settings.
- Ongoing planning and management of rural towns and villages will need to **respond to local demand for growth, the character of the town or village and the surrounding landscape and rural activities**. Rural and bushland towns and villages will not play a role in meeting regional or district-scale demand for residential growth.
- **Limited growth of rural residential development could be considered where there are no adverse impacts** on the amenity of the local area and where the development provides incentives to maintain and enhance the environmental, social and economic values of the Metropolitan Rural Area. This could include the creation of protected biodiversity corridors, buffers to support investment in rural industries and protection of scenic landscapes.
- Maintaining and enhancing the distinctive character of each rural and bushland town and village is a high priority.

The proposal can meet the District Plan criteria for the ongoing planning and management of towns such as Dural and support the limited growth of residential development in this instance as:

- The proposal specifically supports the **local demand for growth** as:
  - The proposal provides a road reserve for a future regional road connection that is required to alleviate existing and future traffic volumes in and around the Dural local centre;
  - The proposal will facilitate the delivery of housing diversity within the area, while maintaining a low-density environment, and provide an affordable choice for families of the locality, otherwise currently unavailable; and

- The proposal will provide necessary infrastructure upgrades to the Dural Public School, including safe vehicle and pedestrian access, drop-off/pick-up spaces and sewerage connection – increasingly required by the local public primary school.
- The proposal supports the enhancement of **the character of the Dural town centre** as follows.
  - In determining the rezoning review request, the Sydney West Central Planning Panel determined that the proposal met the demand for larger lot residential within a rural setting.
  - The proposal includes a low-density residential zoning, with large lot residential that is not inconsistent with densities existing within the Road Corner locality and the Dural neighbourhood centre.
  - Additional setbacks to Old Northern Road are required to further align the character of the proposal with the nature and scale presenting to the main road. This can be achieved through:
    - The provision of local open space at the north eastern corner of the Northern Site, as illustrated within the Northern Site Precinct Plan (Attachment A to Public Benefit Offer);
    - The provision of additional rear setbacks for lots with a frontage to Old Northern Road on the Southern Site.
- The proposal **responds to the surrounding landscape and rural activities** as:
  - The economic analysis presented in the planning proposal found that the proposal will not result in any adverse impact on high value viable agricultural land or productive industrial lands, as demonstrated through the site characteristics and proximity to urban land.
  - The proposal does not adversely impact the urban-rural interface. Utilising the site for intensive agriculture or other rural economic activities is already constrained by the site's proximity to residential areas to the south and the school immediately adjacent the property to the north, given the need to consider appropriate buffer areas.
- The proposal **enhances the environmental, social, and economic values** of the locality as:
  - The proposal can enhance the environmental values of the locality by incorporating a vegetated corridor on the Southern Site, representing a logical extension of the O'Haras Creek vegetation corridor. The indicative location for the vegetated corridor could be accommodated on the lot described as 600 Old Northern Road, Dural.
  - The proposal enhances social infrastructure for the benefit of the community including upgrades to the local public school and provision of additional local open space.
  - The proposal enhances economic values of the locality as:
    - It provides low density residential accommodation to provide housing diversity within the area and provide an affordable choice for families of the locality that meets people's changing needs.
    - The Planning Proposal has demonstrated that there is no viable agricultural production possible on the site as it is already surrounded by residential development, in addition to the unfavourable land characteristics described within the 'Assessment of New Agricultural Enterprise Viability In Dural' submitted with the planning proposal. Accordingly, the existing zoning of the area precludes the efficient and economical use of the land.

### **3. CREATING A PRECEDENT**

We understand that it may be the Councillors' broad position to not proceed with Planning Proposals for additional residential density in the locality at this time. However, the development facilitated by the planning proposal provides local infrastructure to meet existing community demands, and includes site-specific merit that is unlikely to be duplicated by other sites in the locality including:

- The unique location of the Northern Site adjacent to the Dural Public School with the ability to provide local open space adjacent to the school, in addition to infrastructure upgrades for pick-up/drop-off and sewerage connections;
- The important location of the Northern Site in proximity to Annangrove Road and the ability to provide a connection through to Old Northern Road in accordance with Council resolution point 6 in relation to the Dural Urban Capability Assessment as resolved on 26 March 2019;
- The logical extension of the Round Corner urban area at the Southern Site, and the logical extension of the Dural neighbourhood centre at the Northern Site;
- Ability of the Northern Site to develop without requiring upgrades to the local water and sewerage infrastructure; and
- Providing a large lot residential subdivision in a low-density zoning, specifically prohibiting any town house or medium density development that is generally inconsistent with the character of the local area.

### **4. LOCAL CONTRIBUTIONS – ACTIVE OPEN SPACE**

Using the Showground Station Precinct S7.11 Contributions Plan (September 2018) as a recent precedent for costs attributable to provide active open space within the region, the cost to deliver two new playing fields for the Dural locality would likely be approximately \$6,199,676 for capital works and \$14,215,406 land acquisition costs. We anticipate a total cost to Council in the order of \$20,415,084.

The proposal includes contributions to active open space. Based on a potential contribution per person of \$2,009.89 (taken from Showground Station Precinct S7.11 contribution rates for active open space), the proposal would likely contribute approximately \$1,164,128 (based on 3.2 persons per dwelling) for the delivery of active open space.

### **5. LIKELY TIMING IMPLICATIONS**

As stated within the Public Benefit Offer dated 1 May 2019, the proposal intends for all public benefit works required to be delivered for the Northern Site to be completed prior to the release of a subdivision certificate for any residential lots on the Southern Site.

While the Sydney West Central Planning Panel noted that the Southern Site had more strategic merit than the Northern Site, the delivery of the Northern Site is the key for delivering both local and regional infrastructure for the Council as:

- It provides both a short-term community benefit through alleviating existing infrastructure deficiencies, and a long-term strategic benefit including for significant regional road upgrades;
- The Northern Site includes the 32m wide regional road reserve for the new road connection between Annangrove Road and Old Northern Road;
- The subdivision of the Northern Site will deliver a significant area of new local open space.



- The subdivision of the Northern Site delivers the works in kind benefits for Dural Public School including sewerage connection and pick-up/drop off facilities in addition to proximity to new local open space;
- The Northern Site can be subdivided without requiring upgrades to the potable water service, or the sewage pumping station and main; and

Due to the extent of works required to finalise the proposed development on the Northern Site, the commencement of works on the Southern Site is unlikely to commence until April 2023 as detailed in the table below.

| Time           | Action   |
|----------------|--|
| July 2019      | Submission of Planning Proposal for Gateway Determination  |
| September 2019 | Gateway Determination  |
| September 2020 | Gazettal of Planning Proposal  |
| October 2020   | Lodgement of Development Application for Subdivision Works for both sites (separately)   |
| March 2021     | Determination of Development Application for Subdivision Works for both sites<br>Commencement of Public Benefit Works and local infrastructure for Northern Site                         |
| March 2023     | Issuance of Residential Subdivision Certificate for Northern Site  |
| April 2023     | Earliest likely commencement of Public Benefit Works and local infrastructure for Southern Site<br>Earliest possible issuance of a Residential Subdivision Certificate for Southern Site |
| April 2025     | Issuance of Residential Subdivision Certificate for Southern Site  |

Given the likely 5+ year timeframe for the issuance of a Subdivision Certificate for the Southern Site, the requirement to upgrade the existing Sewerage Pumping Station and main, and additional traffic considerations at the intersection between Derriwong Road and Old Northern Road, we understand it may be beneficial for the Council to separate the Planning Proposal for each 'site', or proceed firstly with the rezoning of the Northern Site while additional planning work is considered for the Southern Site if necessary.

Should you require any additional information in relation to this draft response, the proposed Public Benefit Offer, or the Planning Proposal, please do not hesitate to contact me on (02) 8233 9990 or at [aryan@urbis.com.au](mailto:aryan@urbis.com.au).

Yours sincerely,

Ashleigh Ryan  
Associate Director- Planning