



Urbis Pty Ltd  
Doyalson Wyee RSL Structure Plan  
Preliminary site investigation - FINAL REPORT

May 2018

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# 1. Introduction

## 1.1 Background

Doyalson-Wyee Returned Services League (RSL) Club Limited (Club Ltd) currently occupy or own an area totalling approximately 40 hectares located at 49-65 Wentworth Avenue, 80-90 Pacific Highway, and 100-120 Pacific Highway, Doyalson, NSW 2262 (the site).

Club Ltd contribute to the vitality of Doyalson and the wider community by providing services to members and the wider community with services such as food and drink outlets, a café, TAB facility, auditorium, poker machines, office space, RSL memorabilia and museum displays, children's play equipment, and a gymnasium.

Club Ltd engaged Urbis Pty Ltd (Urbis) to assist with a best use analysis and development of a development plan for the site, as well as for the adjacent property located at 130 Pacific Highway, Doyalson, as an option to purchase. Urbis subsequently engaged GHD Pty Ltd (GHD) to provide technical input to the site investigations and structure plan design.

Within the scope of works for the site, provision was made for GHD to undertake a contamination assessment at the site and 130 Pacific Highway to identify potential constraints which may influence future development. The contamination assessment comprised a desktop study, site inspection and preparation of this preliminary site investigation (PSI) report to identify areas of potential concern. The findings of the PSI will be used to inform whether further detailed site investigations are required in selected areas of the site.

## 1.2 Objectives

The objectives of the PSI, as detailed in Guidelines for Consultants Reporting on Contaminated Sites (OEH, 2011) and the National Environment Protection (Assessment of Site Contamination) Amendment Measure (as amended 2013) (NEPC, 2013) were to:

- Identify to the extent practicable, using available information, the potential sources of contamination which may pose constraints to the proposed development.
- Provide recommendations for further detailed site investigations, if required, to assess areas of potential environmental concern.

## 1.3 Scope of work

The scope of works for the contaminated land assessment included a desktop study, site inspection, and preparation of a preliminary site investigation report detailed in this section.

### 1.3.1 Desktop Study

The desktop study included a review of existing information pertaining to the project including:

- Current and historical aerial photographs
- Environmental site setting within the project area including drainage, geology, hydrogeology and soil conditions
- Publically available information
- Regulatory searches including databases managed by NSW OEH and NSW EPA
- Previous site investigations and existing documentation relevant to the environmental setting and potential for contaminated land management issues

- Historical title deeds
- Section 149 Planning Certificates

#### 1.3.2 Site inspection

GHD completed a site inspection of accessible areas within the project footprint on 16 February 2018. During the inspection, the following were considered:

- Land use immediately adjacent to the project area.
- Identification of potential sources of contamination
- Target areas of potential concern identified during the desktop evaluation

130 Pacific Highway is a private property, not owned or occupied by Club Ltd, and was not inspected at this time.

#### 1.3.3 Deliverables

This summary report, which details the findings of the desk based review, provides a photographic log of the site inspection, and describes the conditions encountered on site at this time.

This report also describes areas of potential concern and makes recommendations for further investigation to understand the nature and extent of potential contamination within the project footprint.

## 2. Site identification

### 2.1 Legal identification

The legal description of the site is presented in **Table 1** and a description of the adjacent property located at 130 Pacific Highway, Doyalson, is presented in **Table 2**. The site boundaries are shown in **Figure 1 of Appendix A**. Collectively these areas are identified as the project footprint.

#### 2.1.1 On-site identification

Table 1 Site identification details

Parameter	Details
Site address	80 Pacific Highway, Doyalson, NSW 2262 90 Pacific Highway, Doyalson, NSW 2262 100 Pacific Highway, Doyalson, NSW 2262 110 Pacific Highway, Doyalson, NSW 2262 120 Pacific Highway, Doyalson, NSW 2262 49-65 Wentworth Avenue, Doyalson, NSW 2262
Title identification	Lot 1 DP 503655 Lot 11 DP 240685 Lot 49 DP 707586 Lot 7 DP 240685 Lot 62 DP 755266 Lots 1-9 DP 215875
Area	45 hectares (approximately)
Local government area	Central Coast Council
Registered site owner	Doyalson Wyee RSL Club Ltd
Current site use	Commercial/industrial, public open space/recreation
Proposed site use	Commercial, indoor and outdoor recreation, health service, childcare and staged residential use

### 2.1.2 Off-site identification

Table 2 Off-site identification details

Parameter	Details
Site address	130 Pacific Highway, Doyalson, NSW 2262
Title identification	Lot 3 DP 240685
Area	9.15 hectares (approximately)
Local government area	Central Coast Council
Registered site owner	Nicholas Dawydko and Bronka Dawydko
Current site use	Low-density residential

## 2.2 Zoning

The *Wyong Local Environment Plan 2013* is the principle legal document for guiding development and planning decisions made by Central Coast Council (council). The LEP (2014) enables council to encourage and assist responsible development, and to enable the council to apply strategic land use planning for the region. Three zonings exist for the site and 130 Pacific Highway, as detailed in **Table 3**.

Table 3 Land use zoning and description

Zone	Address	Purpose of zoning
RE2 Private recreation	49-65 Wentworth Avenue, Doyalson	To enable land to be used for private open space or recreational purposes.
	80 Pacific Highway, Doyalson	To provide a range of recreational settings and activities and compatible land uses.
	90 Pacific Highway, Doyalson	To protect and enhance the natural environment for recreational purposes.
		To offer opportunities for tourism development that is compatible with the natural environment.
RU6 Transition		To allow for alternative uses of open space areas for community purposes that are compatible with surrounding areas.
		To enable land uses that are compatible with, and complementary to, recreational uses.
	100 Pacific Highway, Doyalson	To protect and maintain land that provides a transition between rural and other land uses of varying intensities or environmental sensitivities.
	110 Pacific Highway, Doyalson	
	120 Pacific Highway, Doyalson	To minimise conflict between land uses within this zone and land uses within adjoining zones.

Zone	Address	Purpose of zoning
	130 Pacific Highway, Doyalson	To ensure that interim land uses do not have an adverse impact on the conservation or development potential of land identified for future investigation in the North Wyong Shire Structure Plan or Wyong Settlement Strategy.
E3 Environmental management	130 Pacific Highway, Doyalson	<p>To protect, manage and restore areas with special ecological, scientific cultural or aesthetic values.</p> <p>To provide for a limited range of development that does not have an adverse effect on those values.</p>

## 2.3 Development

The Wyong Local Environment Plan 2013 permits and prohibits various activities and developments for each zone type to preserve the purpose of each zoning. A summary of these activities is provided in

Table 4 Zone activities permitted without consent

Zone	Activities permitted without consent
RE2	Nil
RU6	Nil
E3	Home occupations

Table 5 Zone activities permitted with consent

Zone	Activities permitted with consent
RE2	Amusement centres, boat launching ramps, boat sheds, building identification signs, business identification signs, camping grounds, caravan parks, charter and tourism boating facilities, community facilities, eco-tourist facilities, emergency services facilities, entertainment facilities, environmental facilities, environmental protection works, flood mitigation works, food and drink premises, function centres, information and education facilities, jetties, kiosks, marinas, markets, mooring pens, moorings, recreation areas, recreation facilities (indoor), recreation facilities (major), recreation facilities (outdoor), registered clubs, roads, sewerage systems, water recreation structures, water supply systems.

Zone	Activities permitted with consent
RU6	Air transport facilities, animal boarding or training establishments, bed and breakfast accommodation, building identification signs, business identification signs, community facilities, dual occupancies, dwelling houses, electricity generating works, emergency services facilities, environmental facilities, environmental protection works, extensive agriculture, farm buildings, flood mitigation works, home-based child care, home businesses, home industries, home occupations, horticulture, information and education facilities, recreation areas, recreation facilities (outdoor), research stations, roads, waste or resource management facilities, water recreation structures, water supply systems.
E3	Bed and breakfast accommodation, building identification signs, business identification signs, community facilities, dual occupancies, dwelling houses, eco-tourist facilities, emergency services facilities, environmental facilities, environmental protection works, extensive agriculture, farm buildings, farm stay accommodation, flood mitigation works, home-based child care, home businesses, home industries, horticulture, information and education facilities, recreation areas, research stations, roads, roadside stalls, secondary dwellings, sewage treatment plants, water recreation structures, water recycling facilities, water supply systems.

Table 6 Zone activities prohibited

Zone	Activities prohibited
RE2	Any development not specified in Table 4 or Table 5
RU6	Any development not specified in Table 4 or Table 5
E3	Industries, multi dwelling housing, residential flat buildings, retail premises, seniors housing, service stations, warehouse or distribution centres.

## 3. Site history

### 3.1 Land ownership

The site is currently owned by Trustees of the RSL (New South Wales branch) or Doyalson-Wyee RSL Club Ltd as summarised in **Table 7**.

Table 7 Title and ownership summary

Lot number and address	Address	Purchased	Owner
Lot 1 to Lot 9 in DP 215875	49-65 Wentworth Avenue, Doyalson, NSW 2262	2014	Dennis Leslie Rayner, Robert Francis Couper and Malcolm Anthony Player Hundt (RSL Trustees)
Lot 1 DP 503655	80 Pacific Highway, Doyalson, NSW 2262		
Lot 11 DP 240685	90 Pacific Highway, Doyalson, NSW 2262	2017	Doyalson-Wyee RSL Club Ltd
Lot 49 DP 707586	100 Pacific Highway, Doyalson, NSW 2262		
Lot 7 DP 240685	110 Pacific Highway, Doyalson, NSW 2262	2012	
Lot 62 DP 755266	120 Pacific Highway, Doyalson, NSW 2262	2017	
Lot 3 DP 240685	130 Pacific Highway, Doyalson, NSW	1981	

### 3.2 Current land use

The site is effectively divided into three areas, delineated by common use and physical barriers such as fences and gates. The three sections are as follows:

- 49-65 Wentworth Avenue and 80-100 Pacific Highway
- 110 Pacific Highway
- 120 Pacific Highway

The current land use for the three sections as well as off-site address 130 Pacific Highway are summarised in Table 8. A photolog which illustrates the general site condition is provided in **Appendix D**.

Table 8 Current land use

Area	Site use
49-65 Wentworth Avenue and 80-100 Pacific Highway	<p>The Doyalson-Wyee RSL buildings are located on this site. Services and facilities include:</p> <ul style="list-style-type: none"> <li>- Five food and drink outlets</li> <li>- Bottle store</li> <li>- TAB facilities and poker machines</li> <li>- Auditorium and conference facilities</li> <li>- Office space</li> <li>- RSL memorabilia and museum display</li> <li>- Children's play area</li> <li>- Gym facilities and multiple sports fields with natural turf</li> <li>- Car parking</li> <li>- Courtesy shuttle</li> </ul> <p>Also located at this property is a maintenance sheds for equipment and plant such as lawn mowers and quad bikes. The shed stores small quantities (less than 200 litres) of fuels and motor oils and has a functional sump and oil separator. Other storage sheds at this property store liquid and solid fertilisers and pesticides.</p> <p>Above- and below-ground concrete tanks capture surface water runoff for reuse on-site for irrigation of sports fields and landscaped areas.</p>
110 Pacific Highway	<p>An outdoor obstacle course run by Raw Challenge is located at 110 Pacific Highway. Many of the obstacles are solid objects, such as climbing frames and walls, some are water features or mud pits.</p> <p>Two buildings are located on the site, one is an amenities block, and the other leased by an independent party. Cricket nets are also located on this site.</p>
120 Pacific Highway	<p>A hydroponic nursery operates on this lot, which comprises a single storey 3-bedroom residential building, a processing shed and workshop, two greenhouses, irrigation shed with pumps, an office block, and a toilet block.</p>
130 Pacific Highway	<p>A low-density residential building and storage buildings and sheds are located on the site. No commercial operations appear to be present on this property at the time of these works.</p>



### 3.3 Historical land ownership

A summary of historical ownership with associated potential for contamination is summarised in **Table 9**.

Table 9 Potential contaminating activities from historical title search

Address	Historical ownership and potential contaminating activities
49-65 Wentworth Avenue	<p>Lot 1 and 2 of DP 215875 were owned by a mechanic from 1964-1975, however it is not known whether a mechanic workshop operated at this location.</p> <p>Lot 9 of DP 215875 was owned by a carpenter from 1973-1974, and another carpenter from 1974-1978, indicating that a workshop may have operated at this location.</p>
80 Pacific Highway	Historical titles for this property do not indicate potential contaminating activities.
90 Pacific Highway	Historical titles for this property do not indicate potential contaminating activities.
100 Pacific Highway	Historical titles for this property do not indicate potential contaminating activities.
110 Pacific Highway	This property was owned by a farmer from 1964-1991. It is not known whether crops or animals were farmed at this property.
120 Pacific Highway	Historical titles for this property do not indicate potential contaminating activities.
130 Pacific Highway	Historical titles for this property do not indicate potential contaminating activities.

### 3.4 Historical land use

Historical aerial photographs are presented in **Appendix B**, and a review of their contents described in **Table 10**.

Table 10 Review of historical imagery

Area	Site use
49-65 Wentworth Avenue and 80-100 Pacific Highway	<p><b>1954</b></p> <p>The property comprised a mix of cultivated fields in the north and east, and sparse vegetation in the centre and southwest. An unsealed road was visible, traversing the property from east to west. Major clearing was occurring in the west of the property, adjacent to the unsealed road.</p> <p><b>1966</b></p> <p>Property use appeared similar to the previous historical imagery, however there appeared to be approximately 10 small storage sheds adjacent to the internal road. Another small building was visible in the northwest of the property, near a dense area of vegetation.</p>

Area	Site use
	<p><b>1976</b></p> <p>Major development had occurred at the site, including development of sports fields in the centre and west of the site. A sealed car parking area had been established in the south west, and at least five additional buildings had been erected. An additional large building had also been erected adjacent to the car parking facilities. A waste water treatment pond had been established near the middle of the southern boundary.</p> <p><b>1984</b></p> <p>The sports fields were well established by this time, and the building adjacent to the parking lot had been expanded. The waste water treatment area had been expanded to the east, and fenced. Further east, significant quarrying or development was in progress, with unpaved internal roads leading to this area.</p> <p>The northern half of the site was generally covered in vegetation, excepting an area where development had occurred in the northwest of the property that may be cricket nets. A dam or pond was also present approximately 100 metres from the northern boundary, in the approximate centre of the property.</p> <p><b>1994</b></p> <p>Outdoor recreation areas associated with the RSL club building had been developed near Pacific Highway. The waste water treatment area had been decommissioned.</p> <p><b>2005</b></p> <p>Additional parking facilities had been established near the RSL club building. A third sports field had been established in the east of the site covering what may have been a quarried area identified in the 1984 image. Dense vegetation covered the northern half of the property though the pond or dam was still evident.</p> <p><b>2016</b></p> <p>Some expansion of the RSL club buildings had occurred. To the east of this, above ground water tanks had been installed. A building located between the eastern and central playing fields had been constructed (the location of the current mower shed). An additional building had been erected in the centre of the site adjacent to the car park (currently used for storage of sporting equipment).</p>
110 Pacific Highway	<p><b>1954</b></p> <p>The eastern half of the property appeared to be cultivated fields. Close to Pacific Highway in the west of the site, two large buildings were evident. An unsealed road traversed the property in a general east-west direction, starting in the southwest corner of the property before cutting north-east in the centre of the site before travelling due east again. Two buildings were located adjacent to this road in the west of the property.</p>

Area	Site use
	<p><b>1966</b></p> <p>There appeared to be a quarried area straddling the eastern boundary, with an unsealed road leading to this from Pacific Highway. The course of the unsealed road had been modified from the 1954 image, originating in the middle of the western boundary and travelling due east. A major electricity transmission line was evident traversing the site in a north-south direction near the suspected quarried area.</p> <p>One of the buildings that was previously adjacent to the internal road in the south west of the property was no longer evident. The two large buildings in the west of the property appeared to be long warehouse-type buildings.</p> <p><b>1976</b></p> <p>The internal roads had disappeared, and the majority of vegetation had been cleared from the property. The quarried area adjacent to the eastern boundary was still evident. The former buildings at the site appeared to have been replaced by smaller buildings that may be low-density residential buildings and storage sheds. The property appeared mostly covered in pasture.</p> <p><b>1984</b></p> <p>The general layout of the property appeared unchanged from the previous image, excepting a roughly oval area west of the centre of the property which appeared to be cleared of vegetation.</p> <p><b>1994</b></p> <p>Site use appeared generally unchanged from the previous image.</p> <p><b>2005</b></p> <p>The east of the property had become densely vegetated, and an area of approximately 70 x 100 metres appeared more densely vegetated than surrounding land.</p> <p><b>2016</b></p> <p>The obstacle course currently in operation at this property appeared to have been established, with many unsealed paths, shade facilities, and water obstacles constructed.</p>

Area	Site use
120 Pacific Highway	<b>1954</b>
	<p>The property was undeveloped but had been cleared of vegetation except in the southwest corner. Large bare patches of ground adjacent to Pacific Highway may indicate historical development or cultivation.</p>
	<b>1966</b>
	<p>The property was generally unchanged from the previous imagery excepting some clearance of vegetation in the southwest of the property, and installation of the major electricity transmission line in the eastern corner. An irrigation or retention dam was identified in the eastern portion of the property.</p>
	<p>The northeast site boundary did not appear to be a physical delineation of this property, and activities appeared to extend further northeast into the adjacent property, 130 Pacific Highway, Doyalson.</p>
	<b>1976</b>
	<p>A low-density residential building had been constructed in the southwest of the property with a curving driveway leading to this from Pacific Highway. The property appeared mostly covered in pasture.</p>
	<b>1984</b>
	<p>Site use appeared generally unchanged from the previous image.</p>
	<b>1994</b>
	<p>Major redevelopments had occurred at the property with two large outdoor propagation areas established in the north and west, and an irrigation dam in the east of the property. In-ground cultivation also appeared to be occurring – indicated by parallel furrows in the pasture.</p>
	<b>2005</b>
	<p>A large greenhouse had been erected in the approximate centre of the property, adjacent to the two outdoor growing areas, and coving the area previously thought to be used for outdoor cultivation. An additional long building had also been built to the north of this greenhouse and in the location of the current pump shed.</p>
	<b>2016</b>
	<p>The outdoor propagating areas in the north and west had been decommissioned, though an additional storage building had been constructed immediately north of the dam on this property.</p>

Area	Site use
130 Pacific Highway	<b>1954</b> The south-eastern half of the property appeared undeveloped and covered in sparse vegetation. The northwest of the property appeared to contain some buildings, as well as cultivated land – potentially indicating use of the land for market gardens.
	<b>1966</b> The property appeared generally unchanged from the previous imagery excepting installation of the major electricity transmission line in the southeast of the property. The buildings in the northwest appeared to be long warehouses.
	<b>1976</b> The large warehouses in the northwest of the property had been demolished, though discolouration or disturbance of the ground cover indicates their former location. Approximately four small buildings remained scattered in the northwest of the property.
	<b>1984</b> Site use appeared generally unchanged from the previous image.
	<b>1994</b> A low-density residential building had been constructed adjacent to the southwest property border, but the remaining site use appeared unchanged.
	<b>2005</b> Site use appeared generally unchanged from the previous image.
	<b>2016</b> Site use appeared generally unchanged from the previous image.

### 3.5 Review of environmental reports

No historical environmental assessment reports for the site or 130 Pacific Highway were available for review at the time of these works.

### 3.6 Section 149 certificates

A section 149(2) and (5) planning certificate is a certificate which describes the relevant planning instruments and development control plans associated with a property. It also describes whether loose-fill asbestos insulation is included in any residential premises on the site and whether any restrictions or considerations under the *Contaminated Land Management Act 1997*. A summary of the Section 149 certificates pertaining to asbestos and contamination is provided in **Table 11**.

Table 11 Section 149 Certificate summary

Address	Loose-fill asbestos insulation	<i>Contaminated Land Management Act 1997</i>
49-65 Wentworth Avenue	None listed	Nil prescribed matters
80 Pacific Highway	None listed	Nil prescribed matters
90 Pacific Highway	None listed	Nil prescribed matters
100 Pacific Highway	None listed	Nil prescribed matters
110 Pacific Highway	None listed	Nil prescribed matters
120 Pacific Highway	None listed	Nil prescribed matters
130 Pacific Highway	None listed	Nil prescribed matters

### 3.7 Licences

No licences have been issued for the site under the *Protection of the Environment Operations Act 1997*

### 3.8 List of contaminated sites

A search of the NSW EPA *List of NSW contaminated sites notified to EPA* returned four sites in the vicinity of the site as listed in **Table 12**. Each of these sites is listed as not requiring regulation under the *Contaminated Land Management Act 1997* indicating that the NSW has completed an assessment of the contamination at the site and has decided that regulation under the *Contaminated Land Management Act 1997* is not required.

Table 12 Contaminated sites notified to EPA

Name	Distance from site	Direction from site	Status
Munmorah Colliery	86 m	East	Regulation under the <i>Contaminated Land Management Act 1997</i> not required
Munmorah Power Station	86 m	East	Regulation under the <i>Contaminated Land Management Act 1997</i> not required
Mannering Colliery	100 m	Northwest	Regulation under the <i>Contaminated Land Management Act 1997</i> not required
Lot 3 DP 259306 (former brickworks)	700 m	South	Regulation under the <i>Contaminated Land Management Act 1997</i> not required

### 3.9 PFAS investigation programme

The NSW EPA is undertaking an investigation programme to assess the legacy use of per- and poly-fluoroalkyl substances (PFAS) across NSW. The NSW EPA included Munmorah and Colongra Power Stations following advice from Generator Property Management and Snowy Hydro that PFAS has been detected in the soil, surface water, and groundwater at and around these plants. NSW EPA noted that the risk to workers at these sites is low as groundwater and surface water at these sites are not used for cooking or drinking purposes, and no produce is grown or produced on these sites for consumption (NSW EPA, 2017).

NSW EPA advised that additional information was required to determine the extent of the contamination and to determine whether local residents are coming into contact with PFAS. Additional information includes sampling of biota around the Tuggerah Lakes System, and undertaking a water use survey of nearby residents (NSW EPA, 2017).

The PFAS investigation area for Munmorah and Colongra Power Stations abuts the eastern boundary of 80-110 Pacific Highway and the northeast boundary of 130 Pacific Highway and is presented in **Appendix C**.

### 3.10 Services

GHD has prepared a comprehensive services report for the site (GHD, 2018). The scope for the services report included undertaking a dial before you dig (DBYD) search. Services found to be in the vicinity of the site are summarised in **Table 13**.

Notably, a high pressure gas trunk line runs parallel to the boundary of 110 Pacific Highway within an easement approximately 20 metres wide, which is clearly indicated by signage. In addition, transmission line with an easement of approximately 18 metres traverses 100-120 Pacific Highway and 130 Pacific Highway. These services are described in detail in GHD (2018)

Table 13 Existing services

Utility provider	
Ausgrid	Electricity
Jemena	Gas
Telstra	Telecommunications
NBN Co	Telecommunications
Wyong Water	Water

## 4. Geology and hydrogeology

### 4.1 Topography

Topography in the greater area is described as undulating to hilly areas with some steep slopes and cliffs, rock outcrops, and narrow terraced valleys. In the vicinity of the site, Pacific Highway traverses a ridge between Mannering and Colongra Creeks. The land slopes to the northeast and southeast towards Colongra Lake, and to the northwest towards Mannering Lake. The area to the southeast of Pacific Highway is characterised by creeks, rivers and lakes which form gently sloping river valleys dipping towards the south and southeast. Similarly, to the northwest, waterways have created gently sloping valleys towards the northwest. Mannering Lake to the northwest originated as Mannering Creek, but has expanded into a lake due to its use as the ash dam for the Vales Power Station at Mannering Park.

### 4.2 Groundwater

Three groundwater wells are located within 500 m of the site and are summarised in **Table 14**. At the time of their installation groundwater was found to be within 3.0 m of the ground surface.

Direction of groundwater flow at the site is unable to be determined based on the available data, however it is likely to follow local topography and flow generally eastwards towards Colongra Lake.

Table 14 Summary of groundwater wells

Well ID	Registered use	Completion date	Well depth	Standing water level	Distance from site	Direction from site
GW027930	Domestic	01/04/1967	29.80 mBGL	3.0 mBGL	153 m	Southwest
GW027933	Domestic	01/10/1967	3.60 mBGL	-	182 m	Southwest
GW027929	Domestic	01/04/1967	29.20 mBGL	2.70 mBGL	198 m	Southwest

### 4.3 Surface water

Multiple surface water bodies are located on the site, or within 500 metres. Many of the surface water bodies have undergone significant modifications from their original state and are utilised for irrigation, or as disposal locations servicing the nearby power stations. Direction of surface water runoff is likely to be towards Colongra Lake. A summary of nearby surface water bodies is provided in Table 15.



Table 15 Summary of surface water bodies

Name	Distance from site	Description
Unnamed dam	0 m	An unused dam located at 100 Pacific Highway with an approximate area of 700 m <sup>2</sup> . Vegetation around the dam appears healthy.
Unnamed dam	0 m	A man-made surface water feature covering an area of approximately 1000 m <sup>2</sup> associated with the obstacle course located at 110 Pacific Highway
Unnamed dam	0 m	A dam located at 120 Pacific Highway utilised for irrigation and mixing of fertiliser
Unnamed creek	0 m	<p>An unnamed tributary to Colongra Lake which was observed to be dry during the site inspection.</p> <p>The creek originates in the northwest corner of 110 Pacific Highway, travels northeast into 120 Pacific Highway, intersects with the dam located at 120 Pacific Highway before travelling further northeast, swinging southeast, and entering Colongra Lake.</p> <p>This creek was observed to be dry at the time of the site inspection.</p>
Mannering Lake	150 m	<p>Mannering Lake is located approximately 150 m west of the site, across Pacific Highway. It is associated with the Vales Point Power Station at Mannering Park and currently functions as the ash dam for Delta Electricity.</p> <p>Environmental Protection Licence 761 indicates that activities undertaken at the site include chemical storage, coal works, and sewage treatment.</p>
Colongra Lake	550 m	Colongra Lake is a manmade lake built to dispose of bottom ash generated by the adjacent Munmorah Power Station.

#### 4.4 Flood potential

The Section 149 Certificates for the site and 130 Pacific Highway indicate that these are not located within a flood prone area.

## 4.5 Geology

Geology for the majority of the site is characterised by the Narrabeen Group of the Mesozoic era, which comprises sandstone, interbedded sandstone and siltstone, claystone, and conglomerate. Areas in the northeast and southeast of the site, as well as 130 Pacific Highway, comprise alluvium from the Quaternary period, typically comprising gravel, sand, silt and clay, from both marine and freshwater deposits. The site and 130 Pacific Highway lie within a mining subsidence district indicating potential for the land to sink following the extraction of coal or minerals from beneath the surface. Geological descriptions from borelogs for bores drilled within 500 m of the site are presented in **Table 16**.

Table 16 Summary of driller's borelogs

Bore ID	Depth (mBGL)	Summary of geology
GW027930	0.00-0.30	Soil
	0.30-0.76	Stones
	0.76-6.7	Clay
	6.7-7.31	Sandstone (soft)
	7.31-29.87	Conglomerate (water supply)
GW027929	0.00-0.30	Soil
	0.30-1.37	Clay with gravel
	1.37-4.87	Clay
	4.87-7.92	Sandstone
	7.92-29.26	Conglomerate (water supply)

## 4.6 Acid sulfate soils

The majority of the site is classified as Soil Class 5 for acid sulfate soils, indicating that the probability that it contains acid sulfate soils is extremely low (1-5%). However, areas in the southeast of 80-90 Pacific Highway, east of 120 Pacific Highway, and southeast of 130 Pacific Highway are classified as Class 4. Class 4 indicates a low probability (6-70%) of acid sulfate soils being present, and considerations need to be given to activities on Class 5 land that have the potential to alter groundwater levels. A figure indicating acid sulfate soil potential is presented in **Appendix C**.

## 4.7 Meteorology

The closest weather monitoring station to the site is Norah Head (monitoring site 061366), located approximately 10 km southeast of the site. A summary of meteorological conditions at this monitoring station is provided in **Table 17**.

Table 17 Summary of local meteorology

Observation type	Measurement	Description
Mean maximum temperature	26.1°C	January and February
Mean minimum temperature	9.8°C	July
Mean maximum monthly rainfall	146.7 mm	June
Mean minimum monthly rainfall	56.0 mm	October
Mean maximum wind speed	28.6 km/h	November (3 pm conditions)

## 5. Site condition

A photographic log of the site conditions was collected during the site inspection undertaken on 16 February 2018 and is presented in **Appendix D**. Access to 130 Pacific Highway, Doyalson was not permitted at the time of the inspection, and observations described below do not include that property.

### 5.1 Odours

No odours were observed during the site inspection.

### 5.2 Staining

A small amount of staining was observed in the vehicle maintenance shed located at 80-90 Pacific Highway. The staining appeared relatively new and covered an area of less than 0.5 m<sup>2</sup> and was located adjacent to stored motor oils. This area was generally clean and tidy and concrete surfaces were in good condition. There is a sump on the concreted forecourt which is connected to an oil/water separator.

### 5.3 Stockpiles and dumping

A number of stockpiles were identified during the site inspection. The location of these is indicated in Figure 2 in **Appendix A** and photographs provided in **Appendix D**. A description of the stockpile content is summarised in **Table 18**.

Table 18 Stockpile description

Stockpile ID	Location (latitude / longitude)	Description
A	-33.196319° / 151.529012°	Located at 100 Pacific Highway, north of the central playing field, the stockpile covers an area of approximately 2000 m <sup>2</sup> and ranging in height from 1-3 metres. Based on discussions with site personnel, GHD understands that the stockpile contained mostly fill material and garden refuse, however some construction rubble was observed on top of the stockpile including blocks of concrete, bitumen, gravel and wood.
B	-33.195647° / 151.529137°	Located approximately five metres north of Stockpile A, this stockpile appeared to contain mostly garden refuse in a conical pile approximately 60 m <sup>2</sup> and two metres tall.
C	-33.195662° / 151.528515°	A mixed stockpile abutting the northwest flank of Stockpile A containing garden refuse and demolition waste including concrete blocks, scrap metal and bricks. Approximately 120 m <sup>2</sup> in area and ranging from 1.0 to 1.5 metres tall.
D	-33.193787° / 151.532521°	Uncontrolled dumping has occurred in the northeast corner of 110 Pacific Highway across an area occupying approximately 2000 m <sup>2</sup> . Dumped materials observed included reels from electrical wire, wooden pallets, metal guttering, running shoes, whitegoods, mattresses, treated timber, tyres from the obstacle course, and water bottles.

Stockpile ID	Location (latitude / longitude)	Description
		Bare ground in this area may indicate distressed vegetation.
E	-33.192040° / 151.528321°	Evidence of uncontrolled dumping over an approximate area of 1000 m <sup>2</sup> in the southwest corner of 120 Pacific Highway. Material appeared to mostly comprise plastic pots and reels for twine which are likely associated with the nursery operations at the site. Material also included treated timber, brick and ceramic fragments, small oil cans, car tyres, bread trays,
F	-33.19205 / 151.52953	Uncontrolled dumping of material across a paddock and in a vegetated area comprising scraps of plastic laminated webbing, empty fertiliser sacks, plastic pots, cardboard, string, wooden pallets, jute bags, and fish scales (nutrients).
G	-33.190091 / 151.530068	Former outdoor propagation area which has been decommissioned. Waste in this area includes broken ceramic pots and tiles, bricks, concrete, and fragments of plastic irrigation pipe. Also in this area is stockpiled vegetation along the western edge of this paddock that also contains plastic and metal irrigation pipes, and treated timber.
H	-33.19075 / 151.529649	Stockpile adjacent to the incinerator located at 120 Pacific Highway containing ash and coke.

## 5.4 Filling

Observed or suspected filling activities for each property are described in **Table 19**. During the site inspection, the site contact indicated that records for the imported fill likely did not exist.

**Table 19 Description of potential filling**

Location	Description
49-65 Wentworth Avenue	No indication of filling activities.
80-90 Pacific Highway	<p>Filling activities may have occurred during the construction of the Doyalson RSL Club buildings during the 1970s.</p> <p>Backfilling of the wastewater treatment area in the 1990s.</p> <p>Filling to create the central playing field in the 1970s and the eastern-most playing field in the 1990s or 2000s. A significant change in elevation of approximately 2.5-3.0 metres was observed at the eastern and southern extents of the playing fields.</p>
100 Pacific Highway	No indication of filling activities.

Location	Description
110 Pacific Highway	<p>Historical maps indicated a creek was once extant at this part of the site, which appears to be backfilled.</p> <p>Potential quarrying on the eastern boundary which may have been backfilled.</p> <p>Potential former industrial area in the west of the property which was decommissioned prior to the 1966 historical image.</p> <p>Backfill around the high-pressure gas main would likely comprise material won from the excavation.</p> <p>Backfill around the transmission line would likely comprise material won from the excavation.</p>
120 Pacific Highway	<p>Land-forming activities were undertaken in the 1990s to establish two large outdoor growing areas, as well as excavation of an irrigation/retention dam.</p> <p>Backfill around the transmission line would likely comprise material won from the excavation.</p>
130 Pacific Highway	<p>Backfill around the transmission line would likely comprise material won from the excavation.</p>

## 5.5 Chemical storage

A search of the SafeWork NSW database for Schedule 11 hazardous chemicals store at the site was not included in the scope of this report, however evidence of chemical storage at the site is described in **Table 20**.

Table 20 Description of chemical storage at the site

Location	Description
80-90 Pacific Highway	<p>A storage shed located at 80-90 Pacific Highway displayed signage indicating chemical storage in each of the two rooms.</p> <p>In the eastern-most room, approximately 100 L of garden chemicals (e.g. pesticides, herbicides, nutrients) was observed to be stored un-bundled on a metal shelf. Two cupboards in the back of this room displayed signage indicating storage of flammable and corrosive chemicals, though access to view their contents was not possible due to stored furniture and machinery located in front of these.</p> <p>In the western-most room, storage was of mostly dry products in sacks loaded on pallets and included calcium, 'blood and bone', lime, and fertiliser.</p>

Location	Description
80-90 Pacific Highway	Un-bunded motor oils were observed in a vehicle maintenance shed located at 80-90 Pacific Highway. The area surrounding the vehicle storage was tidy and clean, however there was staining on the concrete, indicating a recent small spill. This area is used for washing down vehicles, and a sump, connected to an oil/water separator were observed.
120 Pacific Highway	Storage shed located at 120 Pacific Highway displaying signage indicating chemical storage. Near this building, gas bottles were stored outside on a concrete slab, a concrete below-ground storage tank (likely sewer or water).
120 Pacific Highway	Intermediate bulk container (IBC) (1000 litres) and pump located adjacent to the northern-most nursery structure. Partially buried, empty, plastic drum near IBC and pump. Former contents unknown.
120 Pacific Highway	Un-bunded chemical storage of approximately 100 litres of liquid chlorine, eight opened 20 kg bags of nutrients including magnesium sulphate, nitrogen and potassium, metal chelates (combined iron, manganese, copper and zinc), 20 litre container of fungicide, and four 1000 litre IBCs with unknown contents. Water tanks are located outside of this shed. Boggy ground and algal growth indicates leaking pipework or tanks.

## 5.6 Burning

An incinerator is located at 120 Pacific Highway. Surrounding its concrete footings are deposits of ash and coke, and nearby was a stockpile of ash and coke of 5 m<sup>3</sup>. A coal bunker is located adjacent to the incinerator and during the site inspection was observed to contain approximately 5 m<sup>3</sup> of coal.

## 5.7 Summary of potential contamination

A matrix summary of the site history and potentially contaminating activities at each address is provided in the

Potential contaminant source	49-65 Wentworth Avenue and 80-100 Pacific Highway	110 Pacific Highway	120 Pacific Highway	130 Pacific Highway
Uncontrolled fill used for land-forming, including backfill of wastewater treatment facilities, sports fields and creek beds.	X	X	X	
Waste water treatment area	X			
Storage of motor oils, liquid and solid chemicals in un-bunded areas	X		X	X
Staining from motor oils and/or potential seepage from motor oil sump	X			
Potential industrial buildings pre-1970s		X		X
Potential market-gardens			X	X
Potential quarried area		X		
Uncontrolled dumping / stockpiled or unknown materials (includes demolition waste)	X	X	X	
Buildings containing potential asbestos containing material			X	



## 6. Conceptual site model

A conceptual sit model (CSM) is a representation of site-related information regarding contamination sources, receptors and the exposure pathways between these. The development of a CSM provides the framework for identifying contamination sources and how potential receptors may be exposed to contamination.

### 6.1 Sources

#### 6.1.1 Historical - onsite

The site has had various historical uses including waste water treatment and potentially market gardens and industrial operations. Potential historical onsite sources are considered to include:

- Waste water treatment
- Uncontrolled fill for landforming and backfilling of waterways
- Industrial-type buildings (pre-1970s)
- Uncontrolled dumping and stockpiling of material

#### 6.1.2 Current - onsite

The site has had various current uses including commercial plant propagation, and maintenance of recreational areas. Potential current onsite sources include:

- Storage of motor oils, chemicals, and liquid and solid fertilisers
- Seepage from the base of the sump
- A building on-site potentially constructed from asbestos containing material
- Stockpiles of unknown materials and uncontrolled dumping
- An operational incinerator, coal bunker, and ash stockpile

#### 6.1.3 Off-site

Potential off-site contamination sources include:

- Lake Mannering which serves as an ash disposal area for the Mannering Power Station and is potentially hydraulically up-gradient of the site
- The PFAS investigation area to the east of the site associated with the Munmorah and Colongra Power Stations

### 6.2 Receptors

When evaluating potential adverse health or environmental effects from exposure to a contaminated site, all potentially exposed populations should be considered. For the site, the key populations or receptors of interest are considered to include:

- Current recreational users of the site
- Current commercial/industrial users of the site
- Current residential occupants of nearby properties
- Intrusive maintenance (utility) or construction workers (excavations)
- Future residential occupants at the site

### 6.3 Pathways

The primary pathways by which receptors could be exposed to the sources of contamination are considered to be:

- Direct contact with soil, groundwater, or surface water
- Inhalation or ingestion of soil, groundwater, or surface water
- Inhalation of vapours
- Inhalation of particulate matter
- Surface and storm water runoff
- Vertical and horizontal migration through the unsaturated zone into the saturated zone and horizontal migration within the groundwater

### 6.4 Potential source-pathway-receptor linkages

Based on the information collected for this preliminary site assessment, the CSM described in **Table 21** has been developed and graphical representations are presented in **Appendix E** for each of:

- 49-65 Wentworth Avenue, 80-90 Pacific Highway and 100 Pacific Highway
- 110 Pacific Highway
- 120 Pacific Highway

During the site inspection, 130 Pacific Highway was not accessed as this is private property. However, based on available information including historical imagery and the presence of current site buildings, a graphical CSM has also been developed for this parcel of land.

Table 21 Potential source-pathway-receptor linkages CSM

Source	Contaminant of potential concern	Potential pathways	Potential receptors	Complete linkages
Waste water treatment area	Heavy metals, nutrients such as nitrogen and phosphorous	Leaching to groundwater	On-site groundwater	<b>Possible</b> – groundwater investigation required
		Direct contact with soil	Recreational users Site workers/current commercial users of the site Intrusive maintenance workers Future residents	<b>Possible</b> – targeted soil investigation required.
		Inhalation or ingestion of soil	Recreational users Site workers/current commercial users of the site Intrusive maintenance workers Future residents	<b>Possible</b> – targeted soil investigation required.
Uncontrolled fill for landforming and backfilling of waterways	Asbestos, heavy metals	Direct contact with soil	Recreational users Site workers/current commercial users of the site Intrusive maintenance workers Future residents	<b>Possible</b> – targeted soil investigation required.

Source	Contaminant of potential concern	Potential pathways	Potential receptors	Complete linkages
		Inhalation or ingestion of soil	Recreational users Site workers/current commercial users of the site Intrusive maintenance workers Future residents	<b>Possible</b> – targeted soil investigation required.
Industrial-type buildings (pre-1970s)	Asbestos, polychlorobiphenyls (PCBs), heavy metals	Direct contact with soil	Recreational users Site workers/current commercial users of the site Intrusive maintenance workers Future residents	<b>Possible</b> – targeted soil investigation required.
		Inhalation or ingestion of soil	Recreational users Site workers/current commercial users of the site Intrusive maintenance workers Future residents	<b>Possible</b> – targeted soil investigation required.
Uncontrolled dumping and stockpiling of material	Asbestos, heavy metals, petroleum hydrocarbons	Direct contact with soil	Recreational users Site workers/current commercial users of the site Intrusive maintenance workers Future residents	<b>Possible</b> – targeted soil investigation required.

Source	Contaminant of potential concern	Potential pathways	Potential receptors	Complete linkages
		Inhalation or ingestion of soil	Recreational users Site workers/current commercial users of the site Intrusive maintenance workers Future residents	<b>Possible</b> – targeted soil investigation required.
Storage of motor oils, chemicals, and liquid and solid fertilisers	Petroleum hydrocarbons, oils, greases, solvents, nutrients, chlorine, pesticides	Leaching to groundwater or surface run-off	On-site groundwater or waterways	<b>Possible</b> – groundwater and surface water investigation required
		Direct contact with soil	Recreational users Site workers/current commercial users of the site Intrusive maintenance workers Future residents	<b>Possible</b> – targeted soil investigation required.
		Inhalation or ingestion of soil	Recreational users Site workers/current commercial users of the site Intrusive maintenance workers Future residents	<b>Possible</b> – targeted soil investigation required.

Source	Contaminant of potential concern	Potential pathways	Potential receptors	Complete linkages
		Inhalation of vapours	Intrusive maintenance workers Site workers/current commercial users of the site Future residents	<b>Possible</b> – targeted soil and/or groundwater and/or vapour investigation required.
Seepage from the base of the sump	Petroleum hydrocarbons	Leaching to groundwater	On-site groundwater	<b>Possible</b> – groundwater investigation required
		Direct contact with soil	Intrusive maintenance workers	<b>Possible</b> – targeted soil investigation required.
		Inhalation or ingestion of soil	Intrusive maintenance workers	<b>Possible</b> – targeted soil investigation required.
		Inhalation of vapours	Intrusive maintenance workers	<b>Possible</b> – targeted soil and/or groundwater and/or vapour investigation required.
On-site buildings potentially constructed from asbestos containing material	Asbestos fibres	Inhalation of fibres	Recreational users Site workers/current commercial users of the site Future residents	<b>Possible</b> – Hazardous materials assessment required

Source	Contaminant of potential concern	Potential pathways	Potential receptors	Complete linkages
Incinerator, coal bunker, and ash stockpile	Benzo(a)pyrene, heavy metals, dioxins, furans	Direct contact with soil	Recreational users Site workers/current commercial users of the site Future residents	<b>Possible</b> – targeted soil investigation required.
		Inhalation or ingestion of soil	Recreational users Site workers/current commercial users of the site Future residents	<b>Possible</b> – targeted soil investigation required.
Lake Mannering	Benzo(a)pyrene, heavy metals, dioxins, furans	Leaching to groundwater or surface runoff	On-site groundwater or waterways	<b>Possible</b> – groundwater and surface water investigation required
PFAS investigation area associated with the Munmorah and Colongra Power Stations	PFAS	Leaching to groundwater	On-site groundwater	<b>Possible</b> – groundwater investigation required

## 7. Conclusions and recommendations

### 7.1 Conclusions

As described in **Section 1.2**, GHD was engaged to complete a preliminary site investigation to identify potential sources of contamination which may impact the site for future redevelopment, and to provide recommendations for further detailed site investigations, if required, to assess areas of potential environmental concern.

Based on the findings of the historical information review, understanding of current land use and observations made during the site walkover potential sources of contamination has been identified at the site. These include:

- Storage of chemicals in un-bunded areas across several areas of the site
- Imported fill from unknown sources used for landscaping, building up sports fields and backfilling waterways
- Potential former industrial use at 110 Pacific Highway
- Uncontrolled dumping and stockpiles of waste materials located in several areas across the site
- Leaking irrigation systems
- Incinerator and associated coal bunker and ash/coke stockpile.

In addition, the proximity of the site to Mannering Lake and the adjacent PFAS investigation area associated with Munmorah and Colongra Power Stations, indicate that off-site sources of contamination may exist.

Current and future use of the site by recreational users, maintenance workers and residents indicate that potentially complete pathways between contaminants and receptors exist.

### 7.2 Recommendations

A number of potentially complete contaminant source-pathway-receptor linkages currently exist for the site and the following actions are recommended:

- A detailed site investigation (DSI) targeting the potential on-site contaminant sources detailed in **Section 6.1** of this report to characterise the nature and extent of contamination at the site
- Based on the findings of the DSI, determine whether any complete source-pathway-receptor linkages exist at the site
- Assessment of groundwater flow direction to identify whether contamination associated with the adjacent PFAS investigation has the potential to migrate to within the site boundaries
- A hazardous materials (HAZMAT) survey on existing buildings to determine whether they contain potentially hazardous materials (i.e. asbestos) to inform management of these buildings during future redevelopment works undertaken at the site
- Undertake a site inspection at 130 Pacific Highway to identify any potential contaminant sources, pathways, and receptors.



## 8. Limitations

*This report: has been prepared by GHD for Urbis Pty Ltd and may only be used and relied on by Urbis Pty Ltd for the purpose agreed between GHD and the Urbis Pty Ltd as set out in section 1.2 of this report.*

*GHD otherwise disclaims responsibility to any person other than Urbis Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.*

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# Appendices

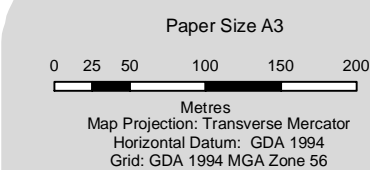
# Appendix A – Figures

**Figure 1 – Site boundary and layout**





- LEGEND
- Roads
  - Waterways
  - 150m bufer
  - Site boundary
  - 130 Pacific Highway



Doyalson Wyee RSL  
Doyalson Wyee RSL Contamination Assessment

Job Number	21-27104-03
Revision	A
Date	24 Apr 2018

Locality and site map

Figure 1



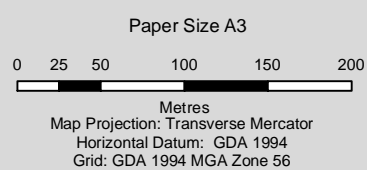
**Figure 2 – Potential site constraints**





LEGEND

- |                       |                                 |
|-----------------------|---------------------------------|
| — Roads               | □ Cadastre                      |
| — Waterways           | □ Potential contaminant sources |
| □ Site boundary       | □ Chemical storage              |
| □ 130 Pacific Highway | □ Fill / stockpile              |
| □ 150m bufer          | □ Other                         |



Doyalson Wyee RSL  
Doyalson Wyee RSL Contamination Assessment

Job Number 21-27104-03  
Revision A  
Date 08 May 2018

Potential contaminant sources

Figure 2

G:\21\27104\GIS\Maps\Working\21\_27104\_2019\_Doyalson\_Wyee\_RSL\_Potential\_Contaminant\_Sources.mxd

Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmall@ghd.com.au W www.ghd.com.au

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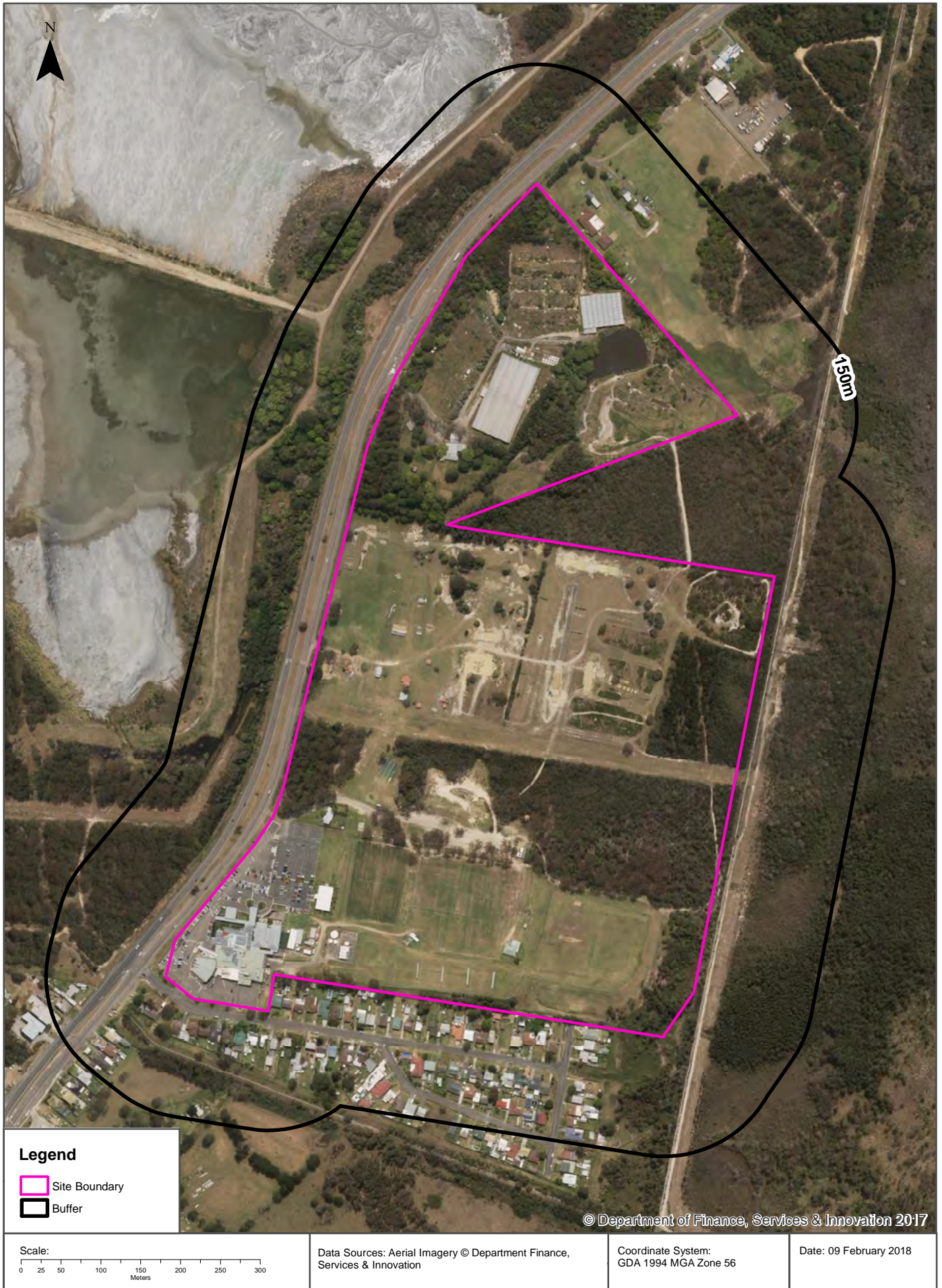
Data source: Roads, HydroLine - NSW LPI DTDB 2015. Cadastre - NSW LPI DCDB 2012. Aerial Imagery - NSW DFSI Sixmaps 2017. Created by:kqvelasco



## Appendix B - Historical aerial imagery

# Aerial Imagery 2016

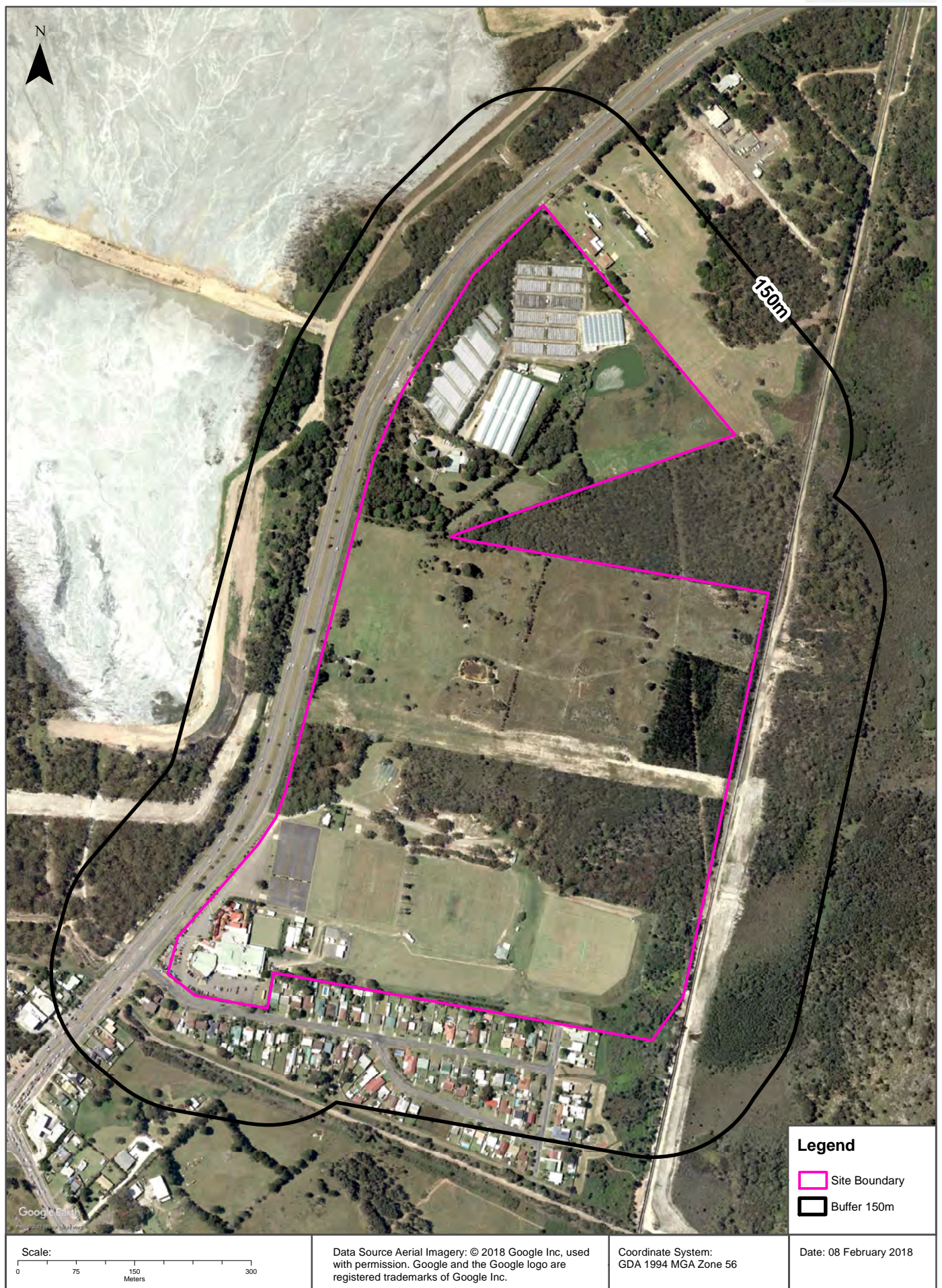
Pacific Highway & Wentworth Avenue, Doyalson, NSW 2262





## Aerial Imagery 2010

Pacific Highway & Wentworth Avenue, Doyalson, NSW 2262





## Aerial Imagery 2005

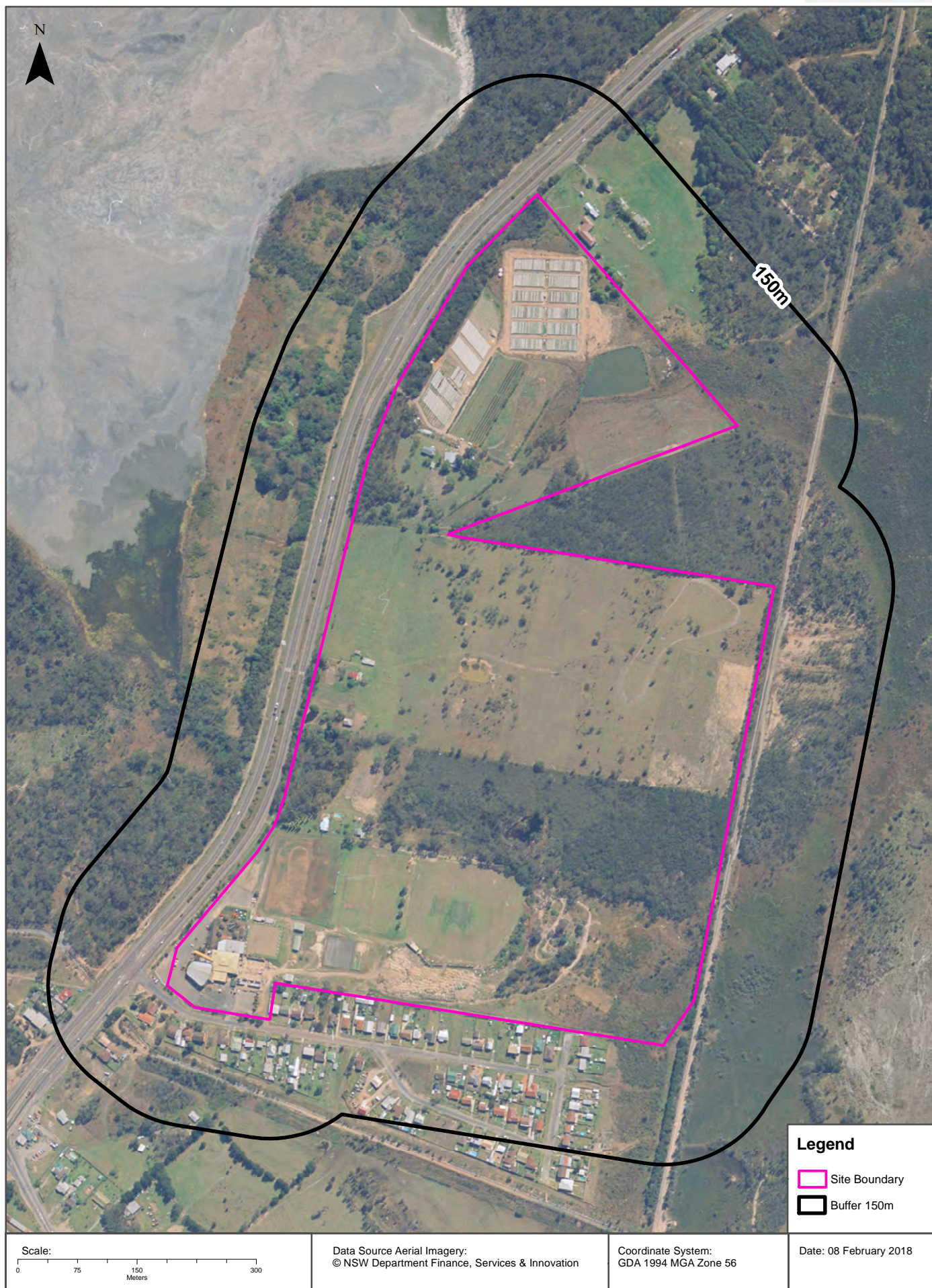
Pacific Highway & Wentworth Avenue, Doyalson, NSW 2262





## Aerial Imagery 1994

Pacific Highway & Wentworth Avenue, Doyalson, NSW 2262





## Aerial Imagery 1984

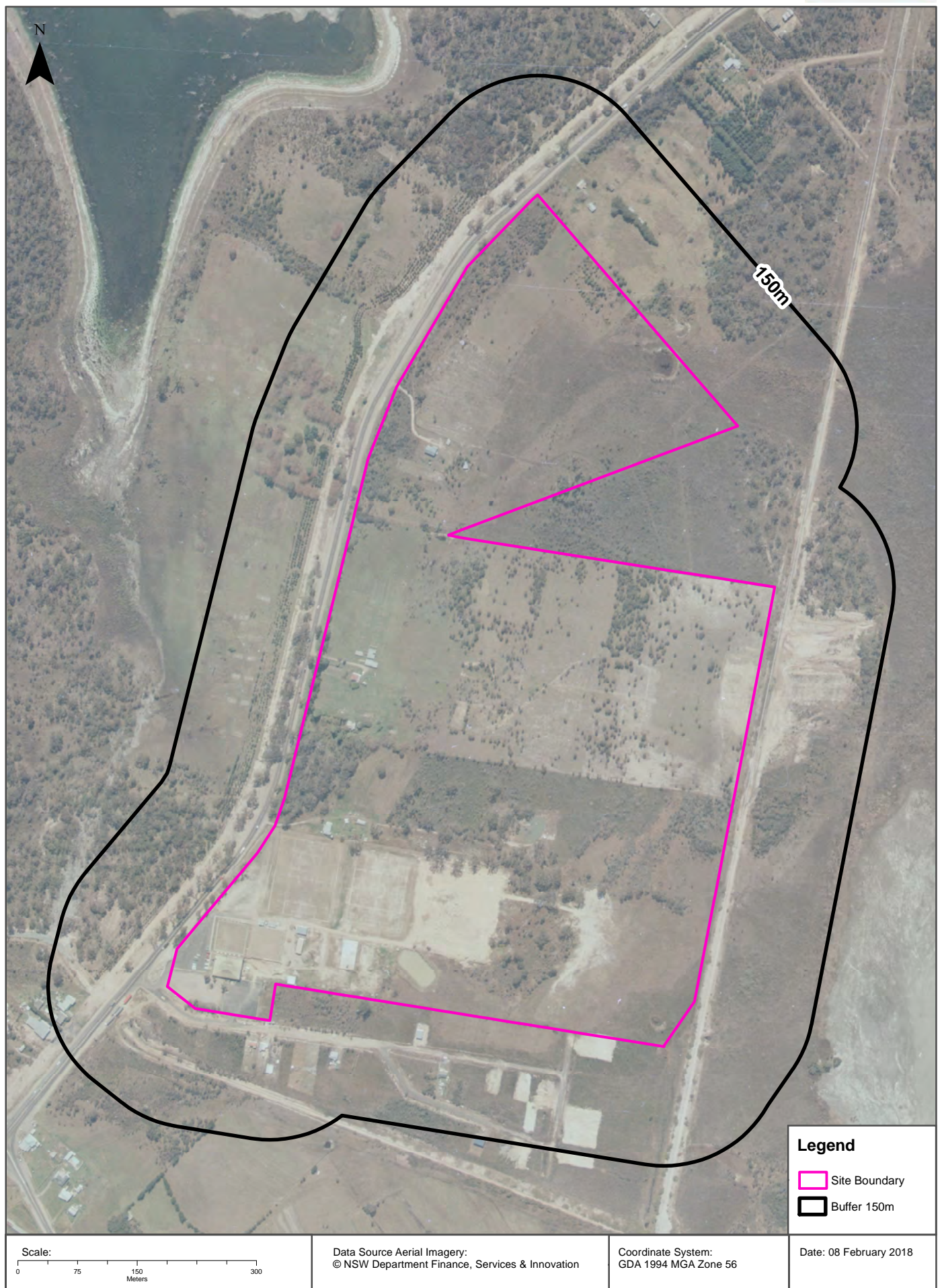
Pacific Highway & Wentworth Avenue, Doyalson, NSW 2262





## Aerial Imagery 1976

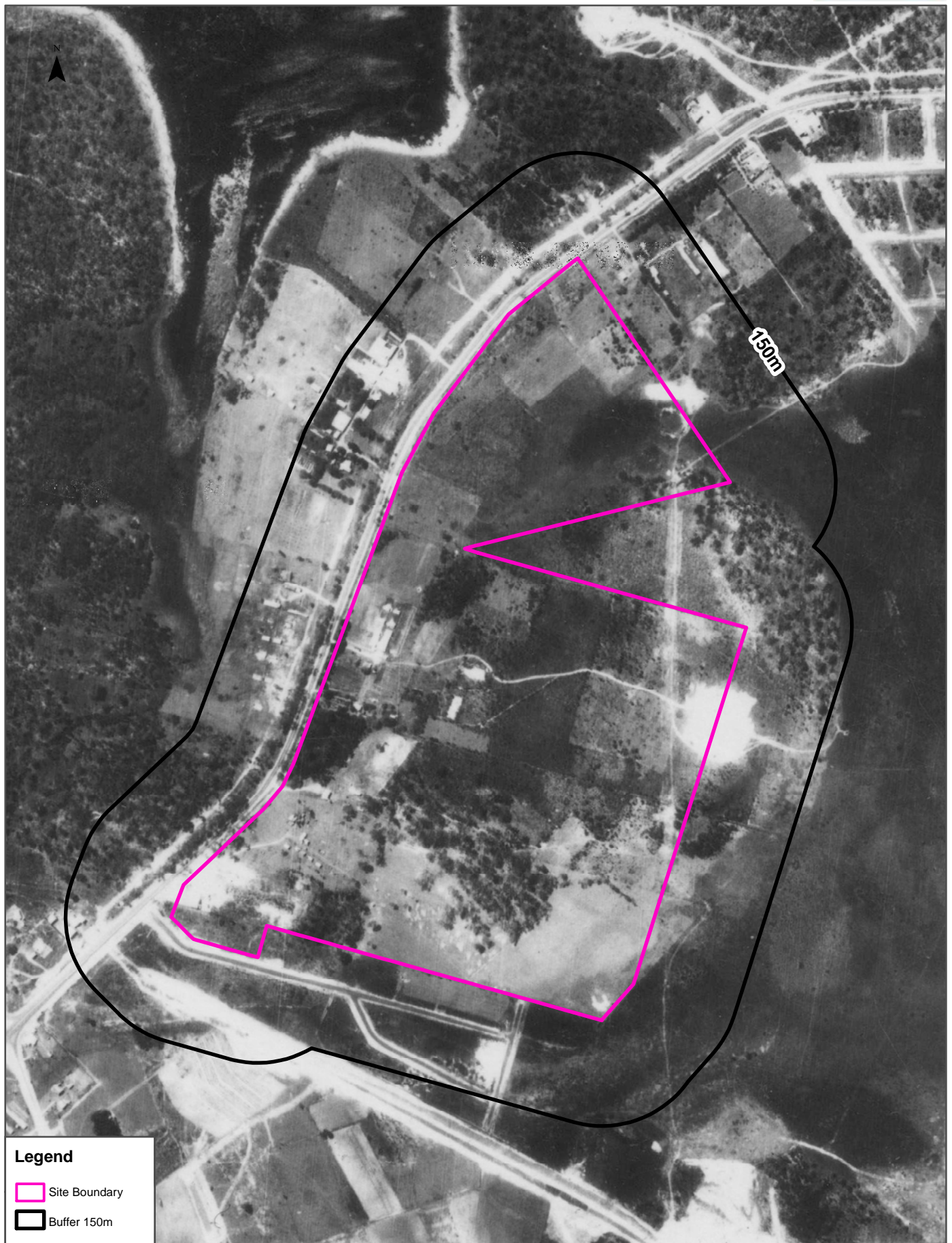
Pacific Highway & Wentworth Avenue, Doyalson, NSW 2262





## Aerial Imagery 1966

Pacific Highway & Wentworth Avenue, Doyalson, NSW 2262



Data Source Aerial Imagery:  
© NSW Department Finance, Services & Innovation

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 09 February 2018



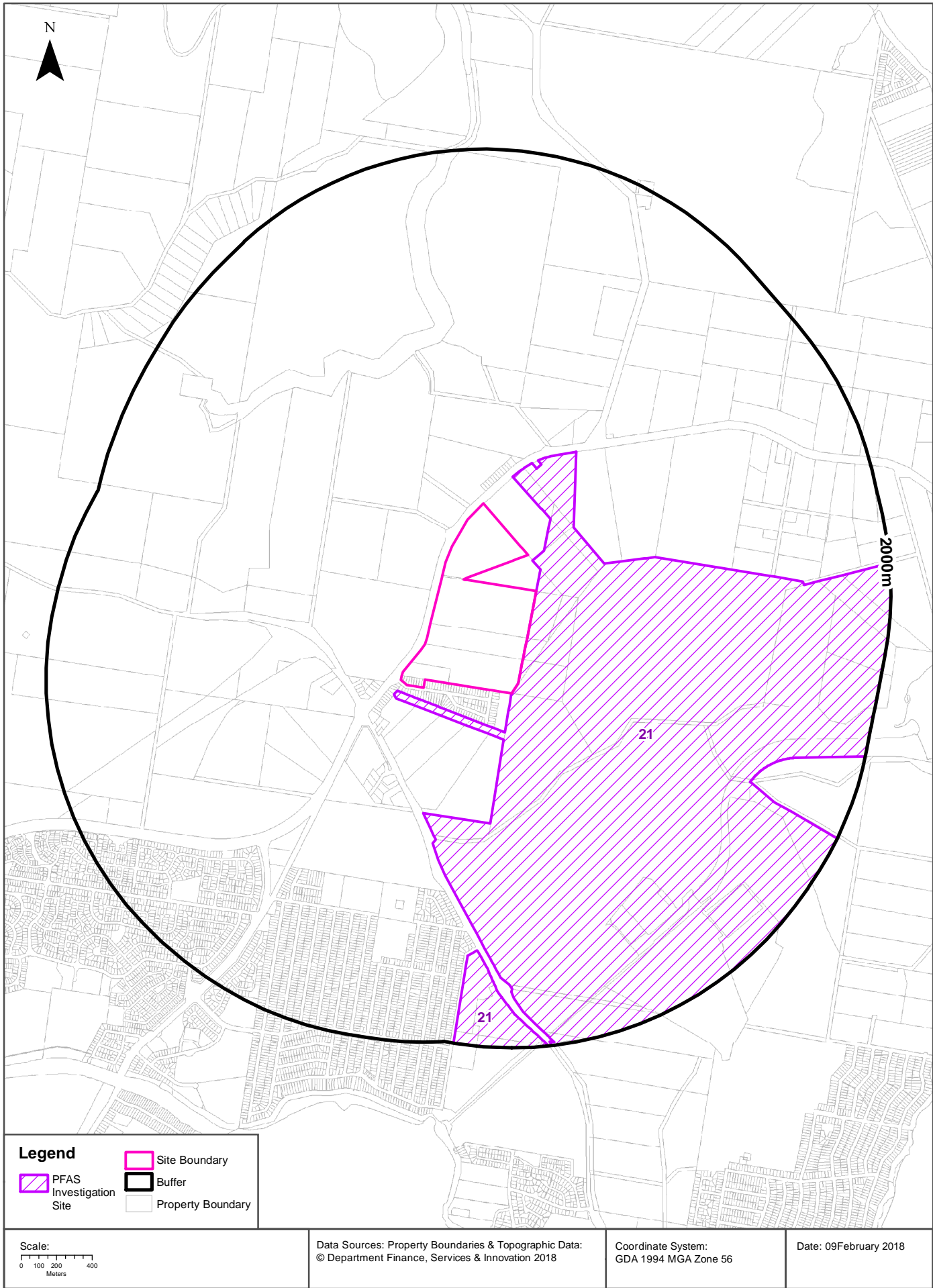
Aerial Imagery 1954

Pacific Highway & Wentworth Avenue, Doyalson, NSW 2262



<p>Scale:</p> <p>0 75 150 300</p> <p>Meters</p>	<p>Data Source Aerial Imagery:</p> <p>© NSW Department Finance, Services &amp; Innovation</p>	<p>Coordinate System:</p> <p>GDA 1994 MGA Zone 56</p>	<p>Date: 09 February 2018</p>
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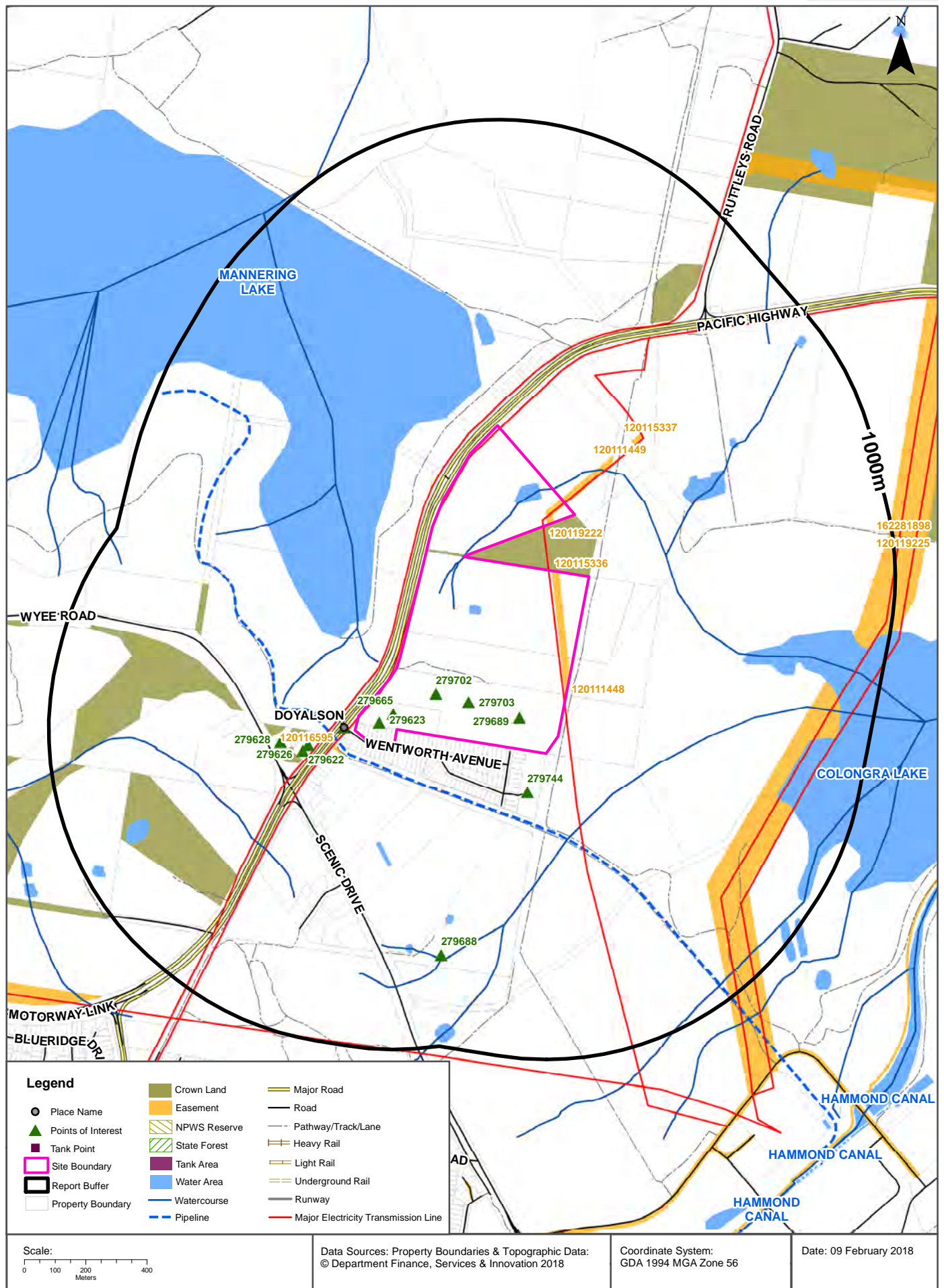
# Appendix C – Planning maps

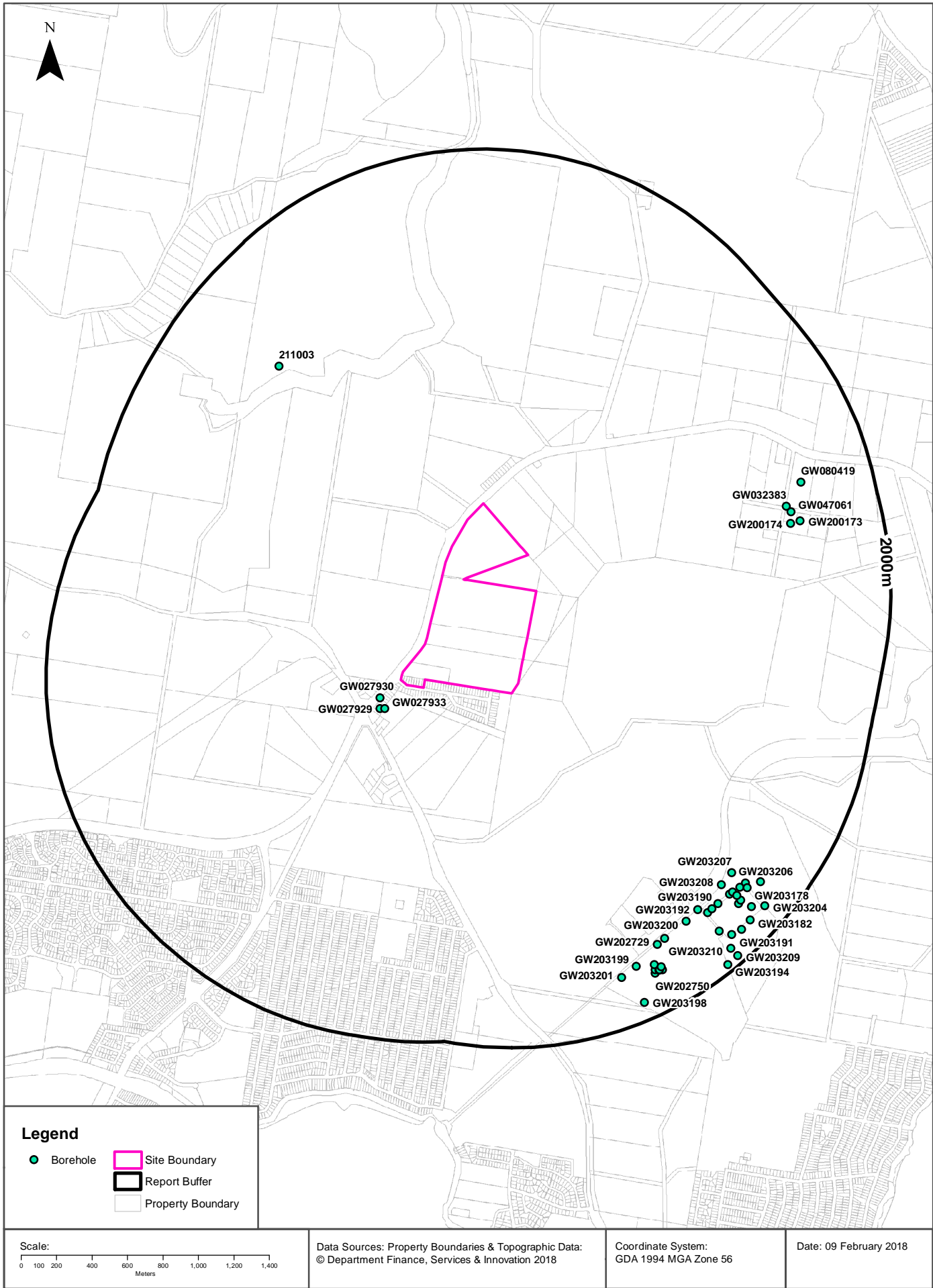




# Topographic Features

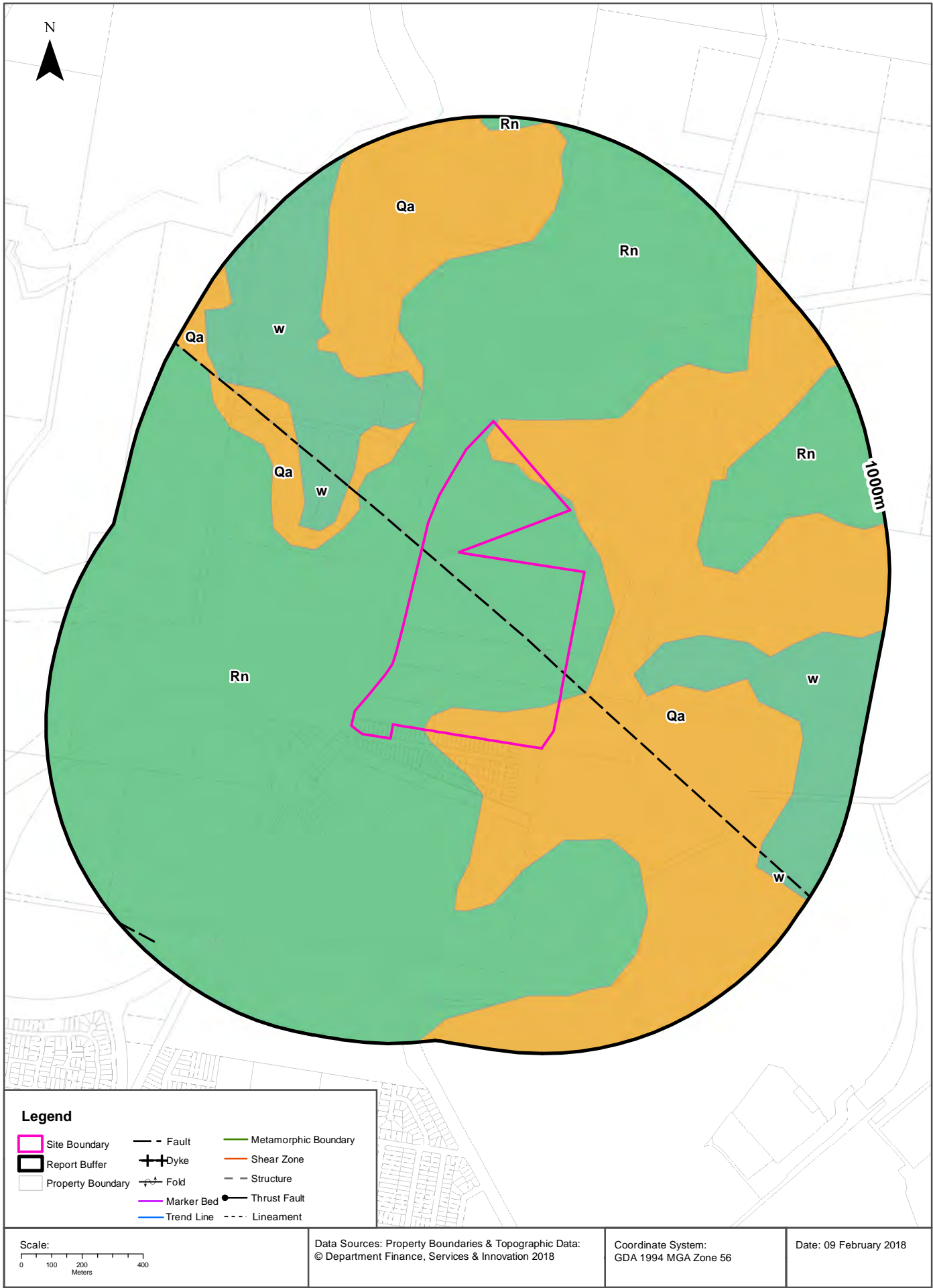
Pacific Highway & Wentworth Avenue, Doyalson, NSW 2262





Geology 1:250,000

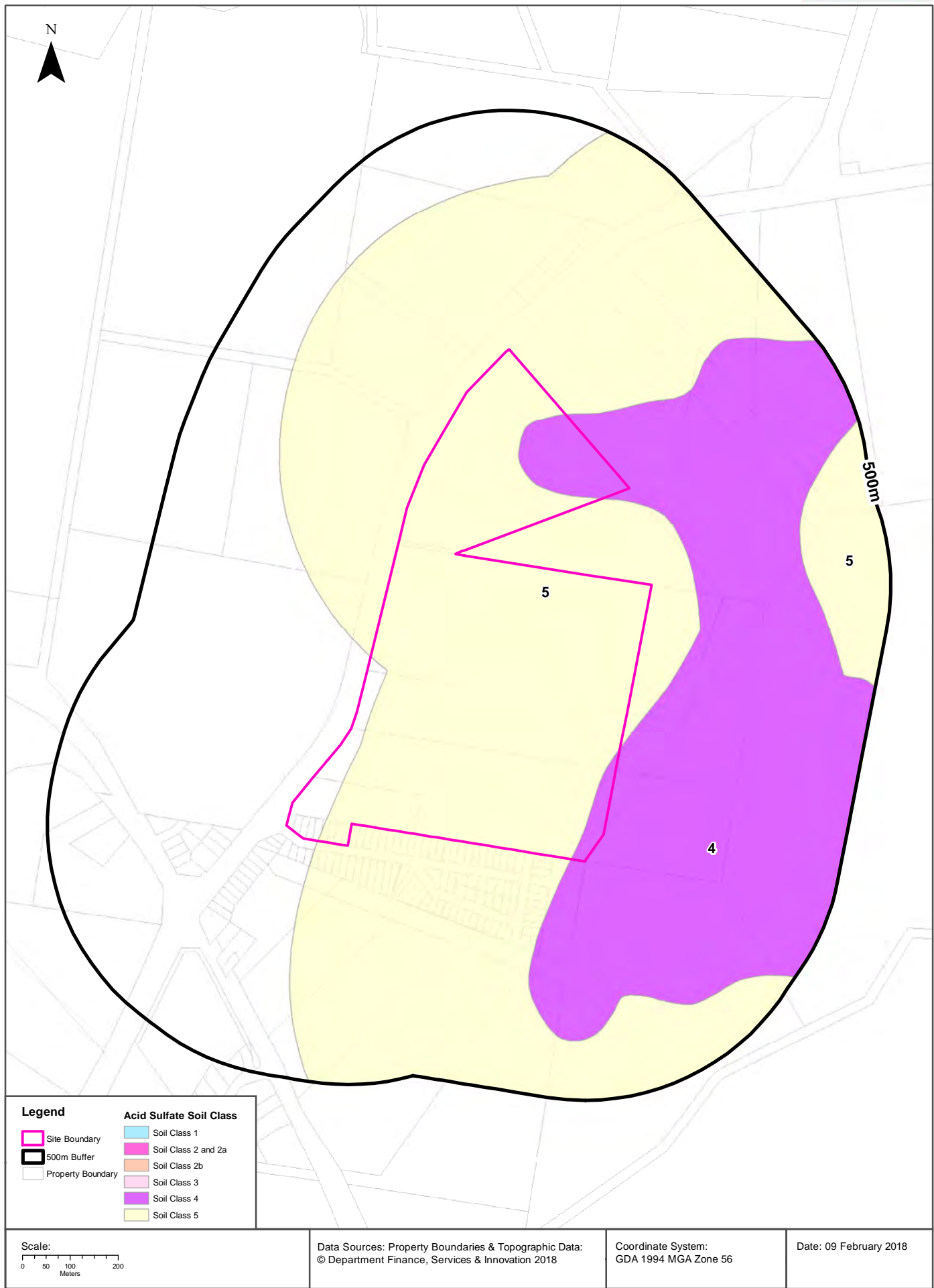
Pacific Highway & Wentworth Avenue, Doyalson, NSW 2262

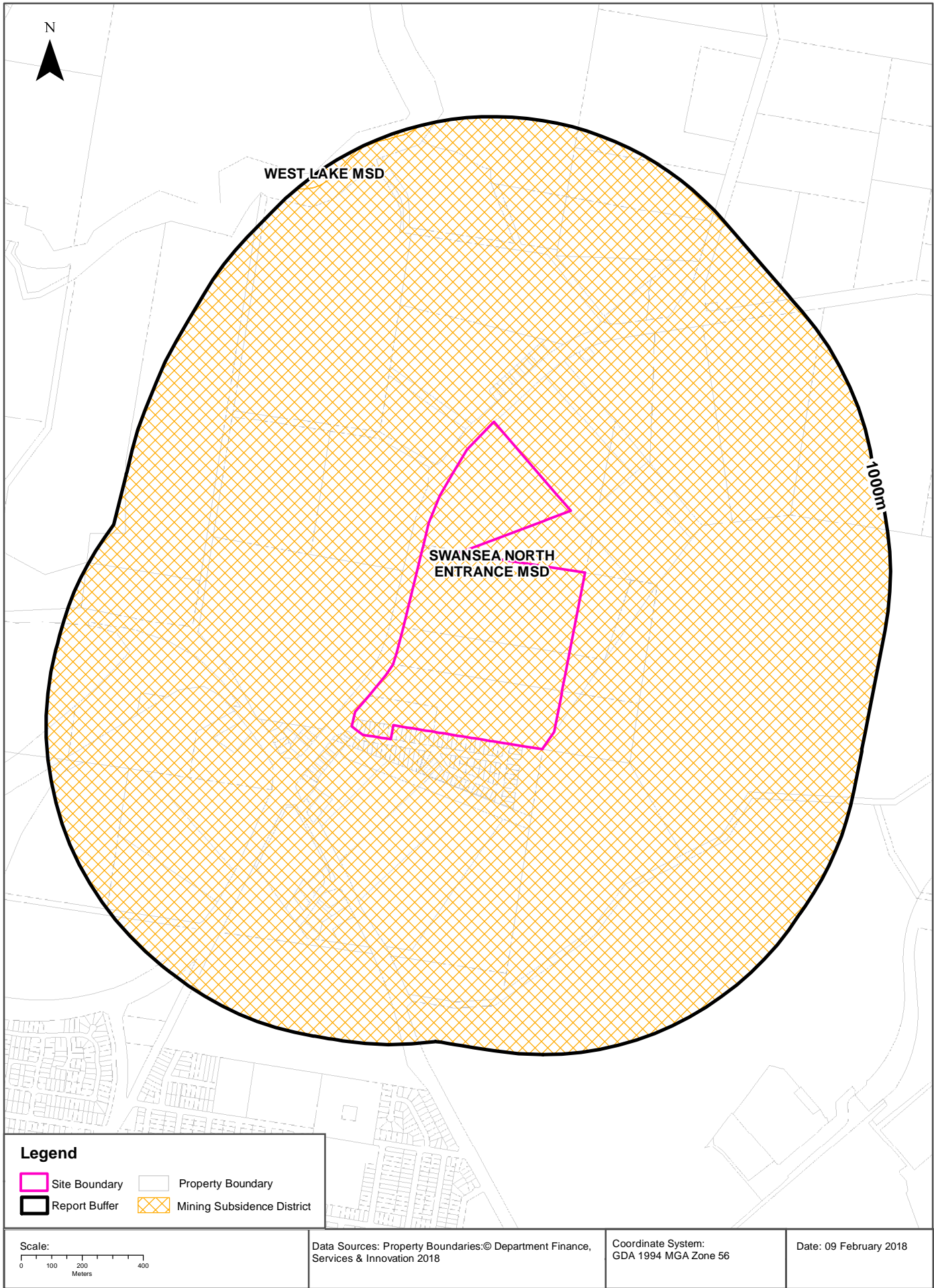




Acid Sulfate Soils

Pacific Highway & Wentworth Avenue, Doyalson, NSW 2262

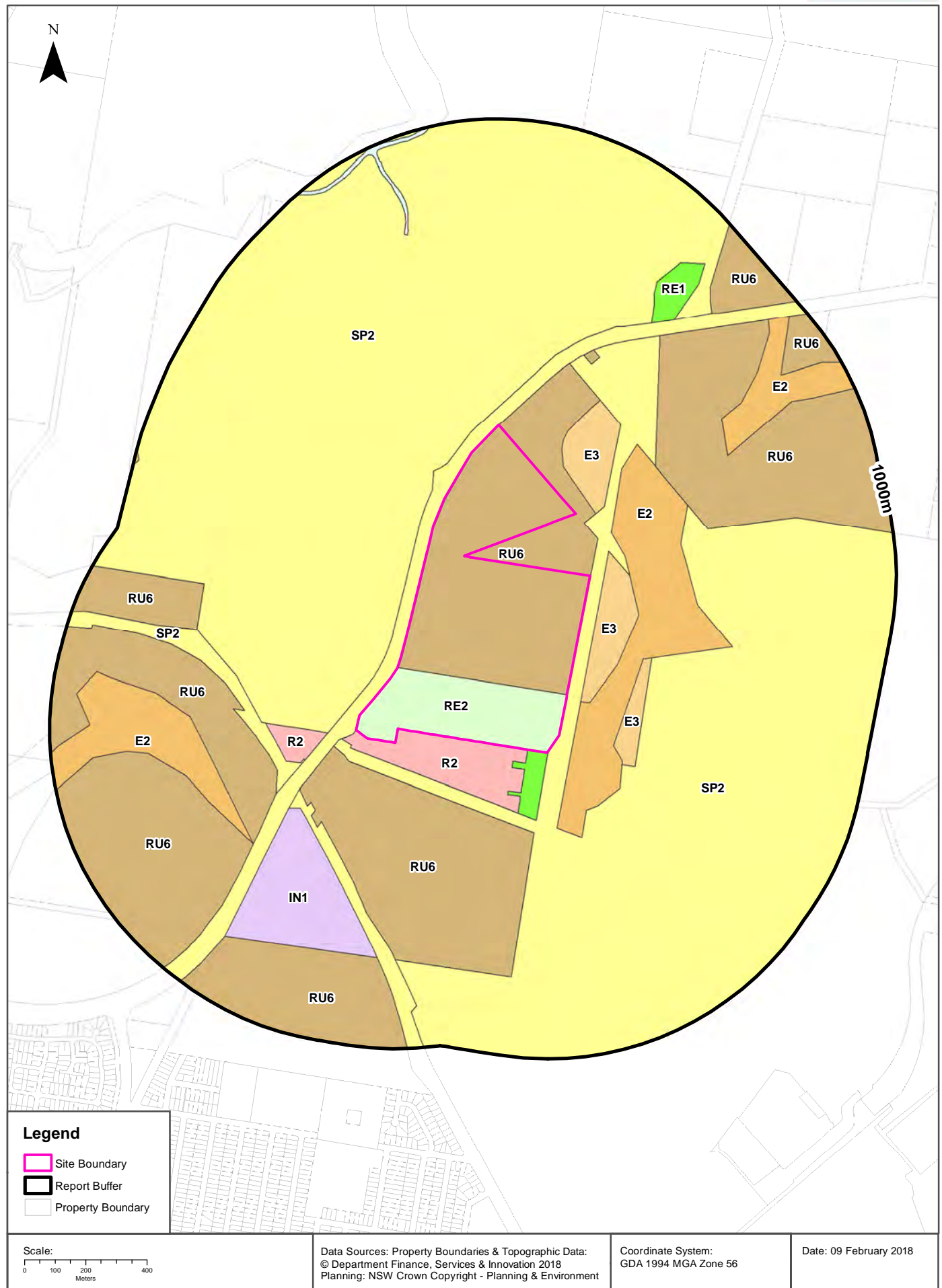






# LEP Planning Zones

Pacific Highway & Wentworth Avenue, Doyalson, NSW 2262



## Appendix D - Photographic log



## General site overview

View looking east over 80-90 Pacific Highway.



View over playing fields located at 100 Pacific Highway



Example of built obstacles  
located 110 Pacific Highway



Eastern-most greenhouse  
located at 120 Pacific  
Highway. Image taken  
looking eastwards.





## Surface water bodies

Surface water body located at 100 Pacific Highway.



Culvert of dry, unnamed creek which traverses both 110 and 120 Pacific Highway before entering Colongra Lake.



Dam located at 120 Pacific Highway adjacent to greenhouses.

Algal growth adjacent to the greenhouses may indicate high nutrient load resulting from fertiliser runoff or discharge.


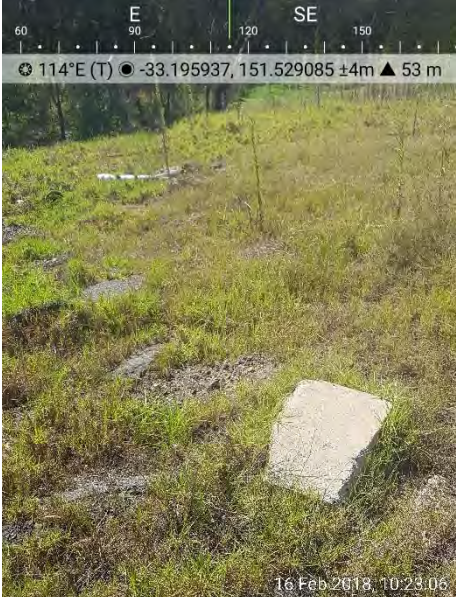


Potential outflow pipes into dam. Algal growth in this area may indicate high nutrient load in discharge water.





## Stockpile, filling and uncontrolled dumping

<p>Stockpile A seen facing northwest</p>	
<p>Building rubble including concrete and bitumen on top of Stockpile A</p>	

Stockpile B containing garden refuse



Stockpile C containing garden refuse and demolition waste.



Stockpile C continued





Area of uncontrolled dumping identified as Stockpile E located at 120 Pacific Highway. Materials appeared to be associated with the nursery operations at the site.



Area of uncontrolled dumping identified as Stockpile F at 120 Pacific Highway. Material comprises scraps of plastic laminated webbing, empty fertiliser sacks, plastic pots, cardboard, string, pallets, jute bags, fish scales (nutrients).



Area identified as Stockpile G. Former outside propagation area. All infrastructure has been demolished. Waste in this area includes broken ceramic pots and tiling, brick, concrete cobbles, broken plastic irrigation pipes





Area identified as Stockpile G. Stockpiled vegetation waste as well as plastic and metal irrigation pipes and treated timber.

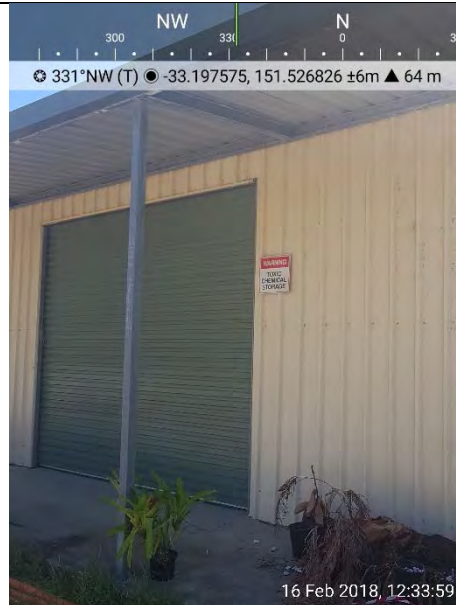


Stockpile H adjacent to the incinerator located at 120 Pacific Highway, Doyalson.



# Chemical storage

Signage indicating chemical storage at 80 Pacific Highway.



Within the chemical storage sheds at 80 Pacific Highway. Chemicals included herbicides, pesticides, and plant nutrients.



Within the chemical storage sheds at 80 Pacific Highway. Un-banded cupboards indicating storage of flammable and corrosive chemicals. Access to these was prevented by stored furniture.



Stored motor oils in the vehicle maintenance shed located at 80 Pacific Highway.

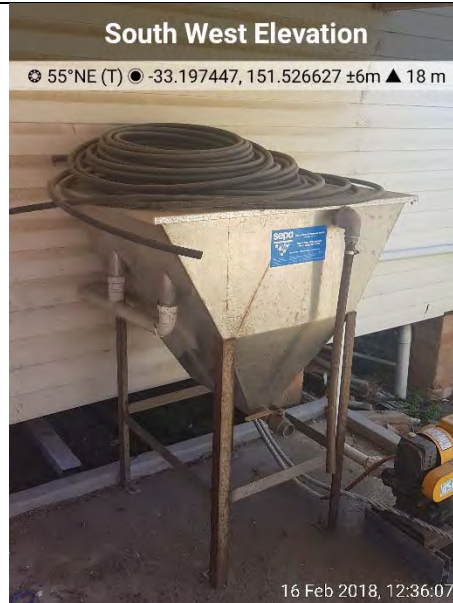


Grate covering sump outside the roller door to the vehicle maintenance shed at 80 Pacific Highway.





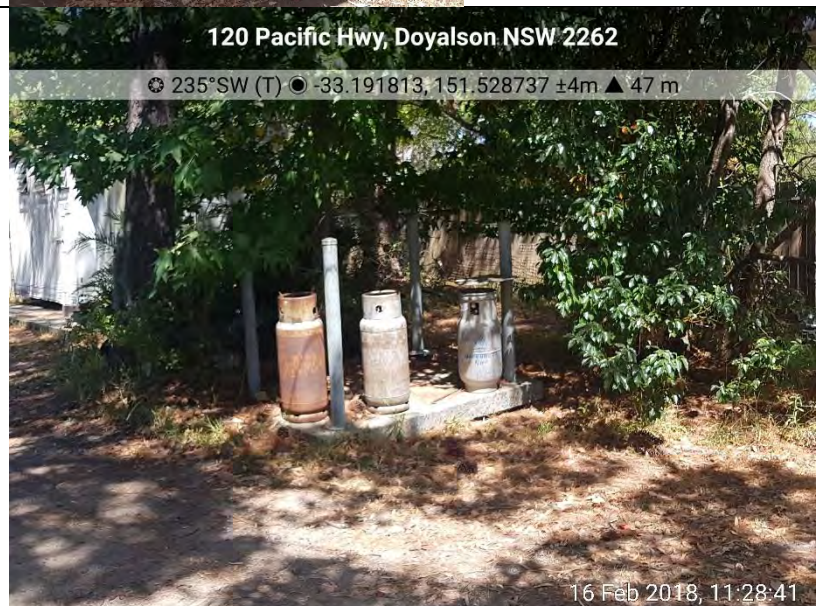
Oil water separator adjacent to the vehicle maintenance shed at 80 Pacific Highway.



Storage shed located in the southwest of 120 Pacific Highway with signage indicating chemical storage. Access to the shed was possible through the back, however there was no indication of chemical storage in the area that was accessible, and the adjoining door between rooms was locked.



Storage of gas bottles at  
120 Pacific Highway  
Doyalson.





An intermediate bulk container (IBC) and pump adjacent to the northern-most nursery at 120 Pacific Highway.



Partially buried plastic drum (empty) located near IBC and pump at 120 Pacific Highway. The drum was not labelled and its former contents unknown.



Storage of approximately 100 L of liquid pool chlorine within chemical storage sheds at 120 Pacific Highway.



Storage of open bags of miscellaneous nutrients within chemical storage sheds at 120 Pacific Highway.



Open IBCs with irrigation pipes exiting the shed within chemical storage sheds at 120 Pacific Highway.



Pipe work leading from a chemical storage shed at 120 Pacific Highway into above ground water tanks. The ground in this area was very wet, and algal growth on the surface may indicate leaking pipes containing nutrients.





Coal bunker adjacent to the incinerator. Incinerator stack is visible in the background.



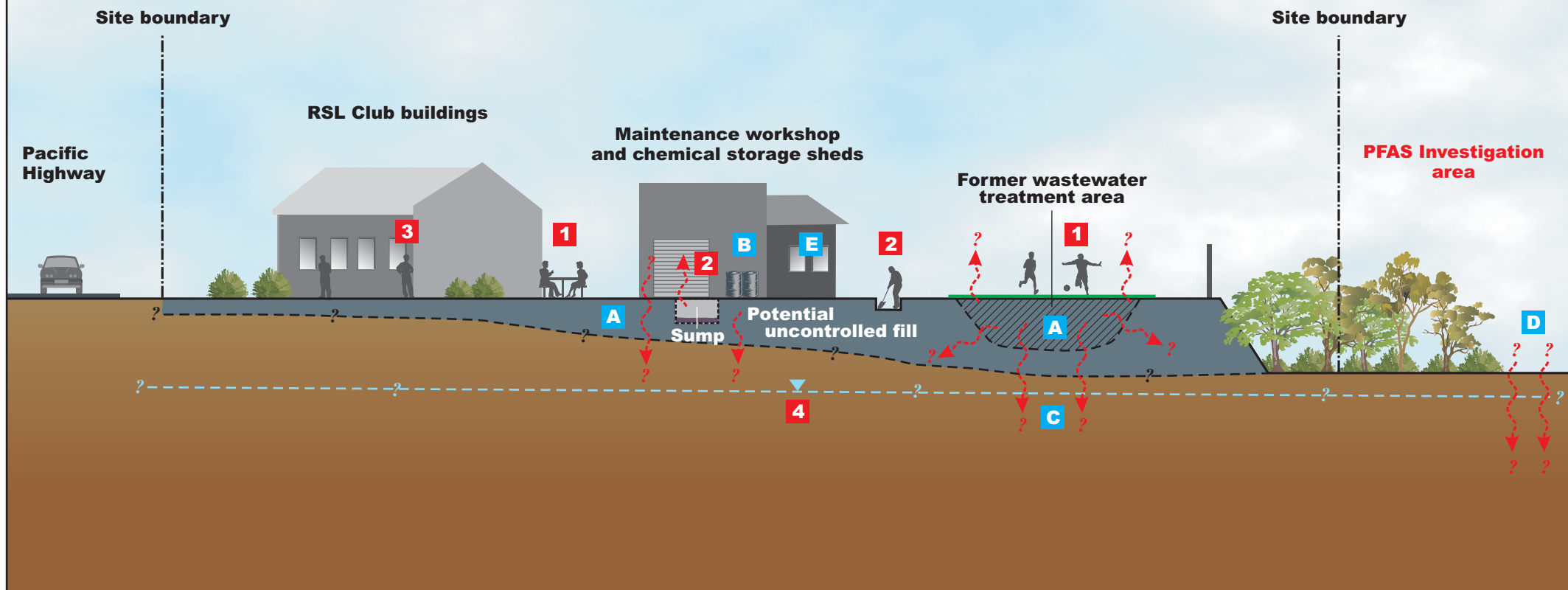
# Appendix E – Conceptual site models

## POTENTIAL CONTAMINANT SOURCES

- A** Uncontrolled fill
- B** Petroleum hydrocarbons from sump and storage of motor oils
- C** Residential contamination from wastewater treatment
- D** PFAS in soil, groundwater and surface water
- E** Chemical storage

## RECEPTORS

- 1** Recreational users
- 2** Intrusive maintenance workers
- 3** Site workers
- 4** Groundwater



Conceptual diagram only -  
not to scale

### LEGEND

- - - ? - Depth unknown
- - - ? - Groundwater (depth unknown)
- - - ? - Potential contaminant pathway



Doyalson Wyee RSL  
Doyalson Wyee RSL Structure Plan

Conceptual Site Model (49 Wentworth Avenue,  
80-90 Pacific Highway & 100 Pacific Highway)

Job Number | 21-27104  
Revision | A  
Date | 20 Apr 2018

Figure 3

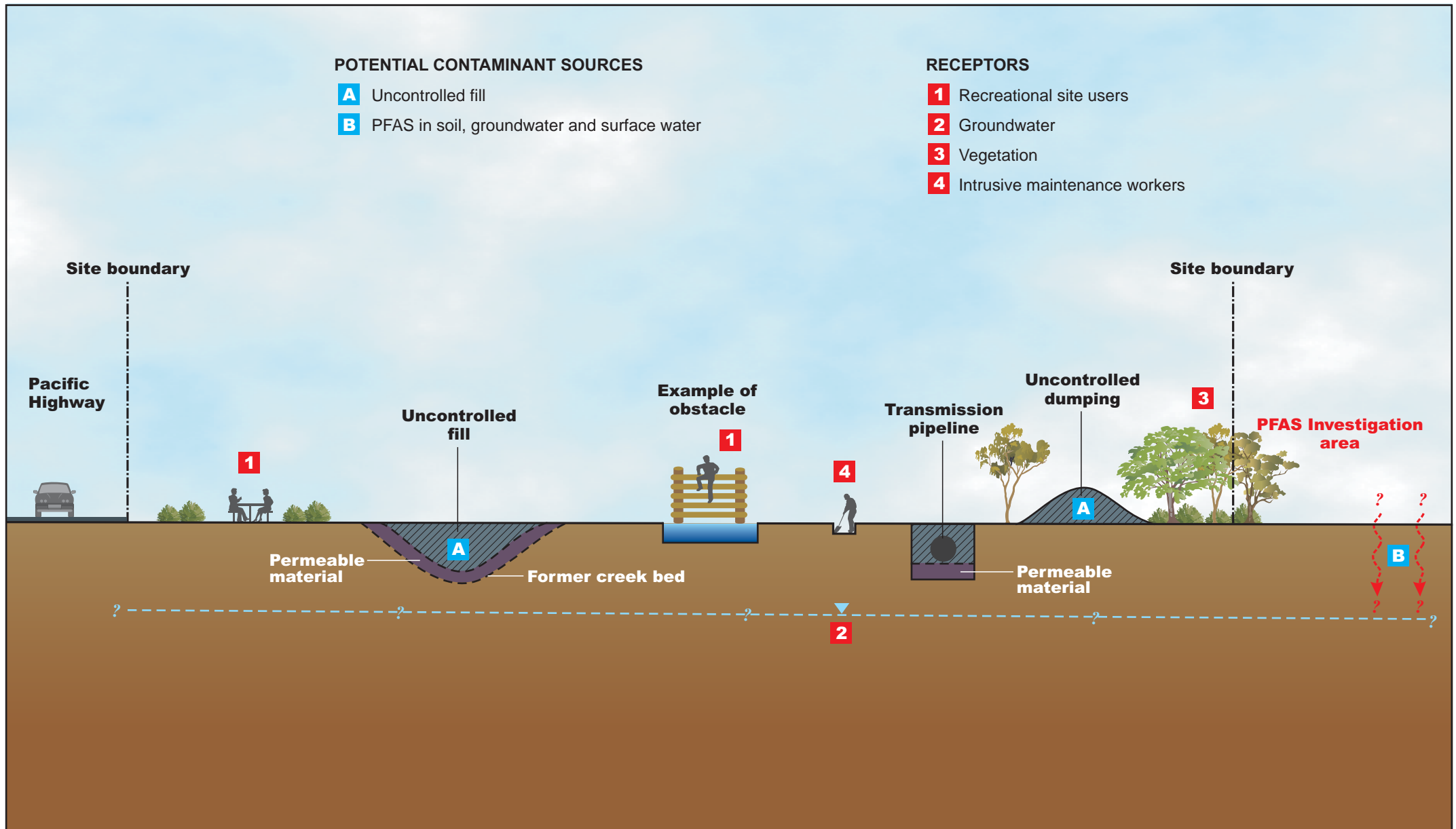


## POTENTIAL CONTAMINANT SOURCES

- A** Uncontrolled fill
- B** PFAS in soil, groundwater and surface water

## RECEPTORS

- 1** Recreational site users
- 2** Groundwater
- 3** Vegetation
- 4** Intrusive maintenance workers



Conceptual diagram only -  
not to scale

### LEGEND

- - ? - Depth unknown
- - ? - Groundwater (depth unknown)
- - ? - Potential contaminant pathway



Doyalson Wyee RSL  
Doyalson Wyee RSL Structure Plan

Conceptual Site Model (110 Pacific Highway)

Job Number 21-27104  
Revision A  
Date 20 Apr 2018

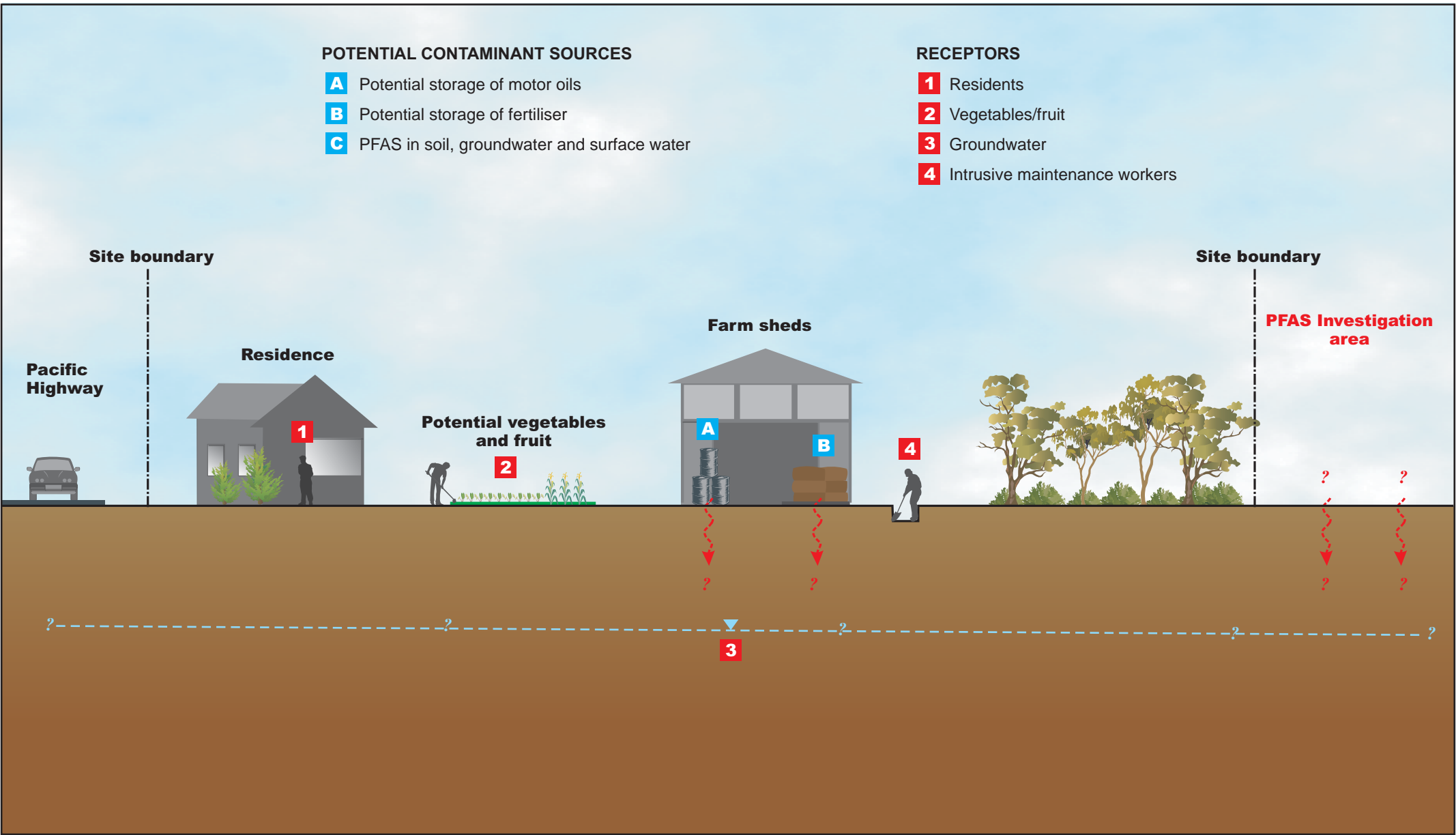
Figure 4

POTENTIAL CONTAMINANT SOURCES

- A** Potential storage of motor oils
- B** Potential storage of fertiliser
- C** PFAS in soil, groundwater and surface water

RECEPTORS

- 1** Residents
- 2** Vegetables/fruit
- 3** Groundwater
- 4** Intrusive maintenance workers



Conceptual diagram only -  
not to scale

LEGEND

- Depth unknown
- Groundwater (depth unknown)
- Potential contaminant pathway



Doyalson Wyee RSL  
Doyalson Wyee RSL Structure Plan

Conceptual Site Model (130 Pacific Highway)

Job Number | 21-27104  
Revision | A  
Date | 20 Apr 2018

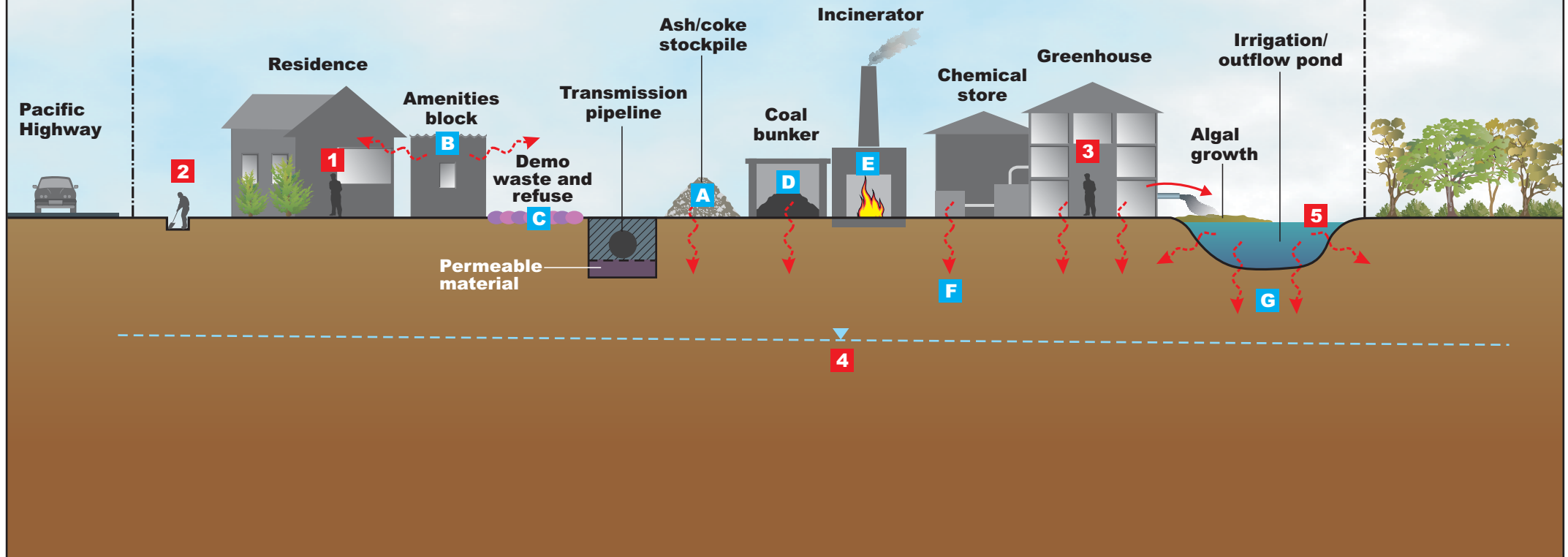
Figure 6

## POTENTIAL CONTAMINANT SOURCES

- A** Ash/coke stockpile
- B** Asbestos building materials
- C** Unknown demolition waste and refuse
- D** Coal
- E** Ash from incinerator
- F** Chemicals/nutrients and leaking pipework
- G** Leaching nutrients from surface water bodies

## RECEPTORS

- 1** Residents
- 2** Intrusive maintenance workers
- 3** Site workers
- 4** Groundwater
- 5** Surface water



Conceptual diagram only -  
not to scale

### LEGEND

- - - - - Depth unknown
- - - - - Groundwater (depth unknown)
- - - - - Potential contaminant pathway



Doyalson Wyee RSL  
Doyalson Wyee RSL Structure Plan

## Conceptual Site Model (130 Pacific Highway)

Job Number | 21-27104  
Revision | A  
Date | 20 Apr 2018

Figure 5

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92423/[https://projects.ghd.com/oc/Sydney/structuralplanfordoy/Delivery/Documents/2127104-REP-0\\_Doyalson Wyee RSL\\_Preliminary Site Investigation DRAFT.docx](https://projects.ghd.com/oc/Sydney/structuralplanfordoy/Delivery/Documents/2127104-REP-0_Doyalson Wyee RSL_Preliminary Site Investigation DRAFT.docx)

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Draft	Emmylou Cooke	J Hallchurch		M Taylor		8/05/2018
REV 0	Emmylou Cooke	J Hallchurch		M Taylor		16/05/2018

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