



**EDH Group**  
Pacific Highway, Lake Munmorah NSW  
Phase 1 Contaminated Site Investigation

February 2019

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# 1. Introduction

## 1.1 Background

GHD Pty Ltd (GHD) was engaged by EDH Group (EDH) to undertake a preliminary contaminated site investigation (PSI) of a roughly 24 hectare parcel of land located at 285 -305 Pacific Highway, Lake Munmorah NSW (the site).

## 1.2 Objective

The objective of the PSI was to assess the likelihood of contamination resulting from historic site activities and to determine whether further site assessment, management and/or remediation of contamination is required.

## 1.3 Scope of work

The scope of works for this PSI included a desk based review of information pertaining to the site and a site inspection. A one kilometre buffer surrounding the site was used for the purposes of the desktop searches. The scope of works included:

- A review of the following desktop information sources:
  - Council information, including the local environment plan (LEP) and land zoning maps.
  - Historical aerial photographs of the site which were used to assist in establishing the physical patterns of development over time and previous land uses.
  - NSW Environment Protection Authority (EPA) notices under the Contaminated Land Management Act 1997 (CLM Act) and licences held under the provisions of the Protection of the Environment Operations Act 1997 (POEO Act).
  - Published geology, hydrogeology, hydrology and topography records.
  - Mine working records available through NSW Government's 'MinView' website
- Preparation of health and safety documentation prior to conducting the site inspection.
- A site inspection undertaken by GHD to identify areas of potential contamination based on observation of surface conditions and evidence of current or former potentially contaminating activities.
- Preparation of this report documenting the findings of the investigation.

The desktop review did not include a Hazardous Building Materials assessment or search of NSW WorkCover Dangerous Goods records.



## 2. Site identification

A summary of the site identification details are provided in Table 2-1. Aerial photographs of the site are included in Appendix A. Photographs of the site are in Appendix B.

**Table 2-1 Site identification summary**

Information	Details
Street Address	285 – 305 Pacific Highway, Lake Munmorah NSW 2259
Lot and DP number	Lot 1 in DP 626787 (285 Pacific Highway) Lot 438 in DP 755266 (295 Pacific Highway) Lot 437 in DP 755266 (305 Pacific Highway)
Site Area	Approximately 24 hectares
Local Government Area (LGA)	Central Coast Council
Current Land Use Zoning	RU6 - Transition
Current Land Use	Commercial/Industrial
Proposed Land Use	R2 – Low density residential

## 3. Desktop review

Results of a desktop search undertaken by Lotsearch are included in Appendix A and are summarised in the following sections.

### 3.1 Soils and geology

Reference to the 1:100,000 scale Regional Geology Sheet for Gosford-Lake Macquarie (Sheet 9131, 9231) shows that the site is underlain by two geological units as summarised in Table 3-1.

**Table 3-1 Regional geology**

Geological unit	General Occurrence	Summary Description
Quaternary Alluvium	Minor portions in the NE and NW of site	Typically comprising gravel, sand, silt and clay
Munmorah Conglomerate	Majority of the site	Typically comprising conglomerate, pebbly sandstone, grey to green shale

#### 3.1.1 Soil landscapes

Reference to the 1:100,000 Soil Landscape Map and Report for Gosford-Lake Macquarie shows that the site is covered by two soil landscape units, as summarised in Table 3-2.

**Table 3-2 Soil Landscapes**

Soil landscape unit	General Occurrence
Wyang	Minor portions in the NE and NW of site
Doyalson	Majority of the site

The characteristic of the identified soil landscape groups are summarised as follows:

- The Wyong landscape is characterised by poorly drained deltaic floodplains and alluvial flats of Quaternary aged sediments on the Central Coast lowlands. Slope gradients are typically <3% with local relief <10 m. The typical soil profile consists of a brownish black loam to silty clay loam topsoil overlying a silty clay subsoil. Associated soils (shown as likely to be encountered close to the lake) include dark brown loose loamy sand topsoil overlying grey loose sand and brown waterlogged sand. Limitations include the possible presence of acid sulfate soils, high potential for aluminium toxicity, very strongly acid, moderate erodibility and localised shrink-swell and low wet bearing strength.
- The Doyalson soil landscape is characterised by gently undulating rises on Munmorah Conglomerate. Slope gradients are typically <10% with local relief up to 30 m. The typical soil profile consists of loose loamy sand overlying a hard setting clayey sand, sandy clay loam and/or clay. Total soil depth ranges between 0.5 and 1.5 m (but deeper in drainage lines) and is underlain by sandstone and conglomerate, and/or siltstones and claystone. Limitations include high erosion hazard, localised foundation hazard, strongly acid soils, and stoniness.

#### 3.1.2 Acid sulfate soils

Reference to the 1:25,000 Acid Sulfate Soil Risk Map for Catherine Hill Bay shows that the majority of the site has no mapped occurrence of acid sulfate soils. There is a minor section in the north east of No. 305, which is mapped as being an alluvial backswamp having a low probability of occurrence between 1 m and 3 m below the ground surface.

Reference to the Wyong Local Environmental Plan 2013 Acid Sulfate Soils Map Sheet (Figure 4 in Appendix A) ASS\_018 shows that the majority of the site has been classified as “Class 5” with a small portion of “Class 3” extending into the north east of the site.

Class 5 is defined in the “Wyong Local Environment Plan 2013 as *“Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.”*

Class 3 is defined in the “Wyong Local Environment Plan 2013 as *“Works more than 1 metre below the natural ground surface. Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.”*

### **3.2 Hydrology**

The closest permanent receiving water body from the site is Karignan Creek, approximately 800 m north-north east of the site. There are two mapped, ephemeral tributaries to Karignan Creek located on the western and eastern portion of the site. The eastern tributary has been dammed in several locations onsite and approximately 500 m to the north of the site. Karignan Creek flows in a northerly direction into Chain Valley Bay, a southern bay of Lake Macquarie.

### **3.3 Hydrogeology**

Lotsearch conducted a review of existing groundwater borehole records using the Department of Primary Industries Office of Water database on the 27 November 2018. The search was conducted to identify registered groundwater boreholes in close proximity to the site and to record information such as groundwater use and standing water level. The search revealed eight registered groundwater bores located within two kilometres of the site. The closest was a private bore for industrial use located approximately 300 m to the west of the site boundary. No standing water level is stated for this well; however, the drillers logs indicate a water bearing zone may be present at approximately 14 metres below ground level (m bgl).

According to the Hydrogeology Map of Australia (search undertaken by Lotsearch) the aquifers on site are described as porous, extensive aquifers of low to moderate productivity.

### **3.4 Historical aerial photographs**

A selection of historical aerial photographs was examined in order to assess past activities and land uses at the site. Photographs were examined from the years 1954, 1965, 1976, 1984, 1994, 2005, 2010 and 2018. Copies of the photographs are provided in the Lotsearch report presented as Appendix A. Note that there are two sets of aerial photographs presented, one set centring on Block 285 and one set covering all three blocks.

A summary of the information gained from the review of historical aerial photographs for the site and its surrounds are provided in Table 3-3.

**Table 3-3 Review of historical aerial photographs**

Photograph Information	Site	Surrounds
1954 Black and white	The site appeared to be mostly covered with sparse, native vegetation with no buildings or infrastructure observed to be present on the site.	The surrounding land uses appeared to comprise mostly vegetated land. The Pacific Highway and what would become Boronia Road on southern side of the highway is visible.
1965 Black and White	Some clearing of vegetation, a dam and small buildings on the southern portion of block 285 Pacific Highway. Small tracks are visible through block 295 towards the rear of the property. The dam in the central part of block 305 has been built.	Construction of roads for neighbouring residential development to the north-west. Clearing and storage of materials on the property 180 m to the west along the Pacific Highway. Roads and residential dwellings have been built on the southern side of the Pacific Highway and immediately to the east of the site. There are multiple buildings on the site of the current BP service station located approximately 140 m east along the Pacific Highway.
1976 Colour	The south-western quarter of block 285 Pacific Highway has been further cleared and appears planted with a possible orchard. There are several more small buildings and sheds located in the southern portion of this block. Multiple tracks have been cleared in the northern half of this block and several bare patches of land are visible to the north of the block.	Approximately 180 m to the west of the site boundary is a large industrial lot comprising stockpiles of soil material and storage of long narrow objects, possible shipping container or large culverts. Further clearing has occurring south of the highway along with construction of a large dam. The Munmorah Bowling Club and associated greens have been built.
1984 Black and White	The parallel planting of vegetation can now be seen in the north-east corner and continues in the south-western quarter of block 285 Pacific Highway. Block 295 Pacific Highway has been extensively cleared except for a few larger trees. Block 305 has had some further clearing and contains a couple of the buildings seen today including the dwelling and pool.	Houses are now visible on the neighbouring land to the west and east along with further industrial looking sheds and storage along the Pacific Highway to the west. The Pacific Highway appears to have been widened becoming dual carriage way and contains a steady flow of traffic.
1994 Colour	Parts of block 285 appear to have been re-cleared, removing the rows of vegetation from a possible small commercial orchard. The landscaping yard is visible in the south-western corner of block 295 and appears to have a dwelling towards the centre of this block along with buildings and shed associated with the landscaping business. Block 305 has had more vegetation removed from the northern portion and two further sheds built.	The residential estate to the north-west of the site has been completed. Land to the north remains mostly uncleared. There appears to have been a bushfire immediately west of the site between the boundary and residential estate. Significant residential development has occurred to east of the site south of the Pacific Highway.

Photograph Information	Site	Surrounds
2005 Colour	The three blocks appear mostly unchanged. Block 285 has seen a further decrease in areas of parallel vegetation rows and an increase in possible native regrowth. Yards associated with the dog boarding kennels can now be seen on block 305.	No significant, observable changes.
2010 Colour	Almost all vegetation resembling an orchard has been removed from block 285. Most buildings and sheds on the blocks remain the same except it appears the area of shade cloth at the landscaping yard has been removed. Minor increases and decreases in site vegetation has occurred in the north-western area of block 295.	Minor residential and light commercial developments are visible further south of the Pacific Highway. A large building has been built on the bus depot site, east of the site along the Pacific Highway (next door to the BP).
2018 Colour	The landscaping yard on block 295 appears mostly to have been decommissioned. Scattered mounds of debris and stockpiles are visible on block 295. The vegetation cover remains relatively unchanged across all blocks.	Large industrial/commercial buildings have been built along the Pacific Highway to the west of the site. Land to the north remains unchanged with native vegetation cover. No other significant or observable changes are present.

In summary, it appears the three blocks have undergone steady changes over time of surface vegetation cover as well as a change in land use and businesses from a potential orchard, landscaping yards and dog boarding kennels.

### 3.5 Regulatory information

As part of the desk based review, information was obtained from a number of sources to enable a greater understanding of the potential for contamination at the site. The desk based regulatory information review included a review of the following sources of information:

- Council information including land zoning and permissible use.
- NSW EPA, Contaminated Sites Register (notifications or incidents).
- NSW EPA, Protection of the Environment Operations (POEO) Licence register.

The findings of the information review are provided in Appendix C and are summarised below.

#### 3.5.1 Council information

The majority of the site is mapped as Class 5 for Acid Sulfate Soils (ASS) which classifies the risk of encountering ASS as extremely low (1-5%). However, the Wyong Local Environmental Plan (LEP) 2013 states 'works within 500 metres of adjacent Class 1, 2, 3, or 4 land that is below 5 metres AHD and by which the water table is likely to be lowered below 1 metre AHD on adjacent Class 1, 2, 3 or 4 land, present an environmental risk'. Class 3 ASS is mapped approximately 250 m to the north of the site.

#### 3.5.2 Contaminated sites register

A site will be on the Contaminated Land: Record of Notices only if the EPA has issued a regulatory notice in relation to the site under the CLM Act.

No contaminated land records were listed for the site or for any sites within a one kilometre radius of the site.

### 3.5.3 List of NSW contaminated sites notified to EPA

The sites appearing on the EPA "List of NSW contaminated sites notified to the EPA" indicate that the notifiers consider that the sites are contaminated and warrant reporting to EPA. However, the contamination may or may not be significant enough to warrant regulation by the EPA. The EPA needs to review information before it can make a determination as to whether the site warrants regulation.

The search did not identify any listings for the site. Two industrial sites (Munmorah Power Station and a Caltex Service Station located approximately 550 m south-west and 840 m west of the site respectively) were listed; however the NSW EPA had completed an assessment of the contamination at those sites and decided that regulation under the CLM Act was not required.

### 3.5.4 EPA PFAS Investigation Program

The NSW EPA is leading an investigation program to assess the legacy of Per- and poly-fluoroalkyl substances (PFAS) use across NSW. With the assistance of the NSW PFAS Taskforce, which includes NSW Health, Department of Primary Industries and the Office of Environment and Heritage, the EPA provide impacted residents with tailored, precautionary dietary advice to help them reduce any exposure to PFAS.

The Munmorah and Colongra Power Stations located 540 m to the south-west of the site is listed as included in the EPA PFAS investigation program.

### 3.5.5 POEO licence register

The POEO register identifies premises that are licensed for certain activities under the POEO Act. Information of particular relevance to this assessment, which are listed on the Register, includes site location, activity type, relevant clean up notice and non-compliance information. Each licence provides information on potential point and non-point sources of soil and groundwater contamination that may be generated on-site through standard operations, accidental spills and leaks.

Lotsearch undertook a search of the register and identified two premises with a POEO licence within a one kilometre radius of the site. These are summarised in Table 3-4. Neither of these activities are considered likely to have led to contamination of the site.

**Table 3-4 Licensed activities under the POEO Act 1997**

Organisation	Name	Address	Activity	Distance	Direction
Generator Property Management Pty Ltd	Munmorah Power Station	Scenic Drive	Miscellaneous licenced to discharge to waters	550 m	South West
Central Coast Council	N/A	Tuggerah Lakes and the tributaries of Tuggerah Lakes	Water based extractive activity	570 m	South

There are no delicensed activities which are still regulated by the EPA recorded within one kilometre of the site.

Former licenced activities recorded onsite under the POEO Act now revoked or surrendered are summarised in Table 3-5. As no waterways are onsite, application of herbicides in waterways throughout NSW are not considered to be potential sources of contaminants at the site.

**Table 3-5 Former activities under the POEO Act 1997**

Organisation	Location	Status	Activity
Luhrmann Environment Management Pty Ltd	Waterways throughout NSW	Surrendered	Other activities/ non-scheduled activity – application of herbicides
Robert Orchard	Various waterways throughout NSW	Surrendered	Other activities/ non-scheduled activity – application of herbicides
Sydney Weed and Pest Management Pty Ltd	Waterways throughout NSW	Surrendered	Other activities/ non-scheduled activity – application of herbicides

### 3.6 Ecological constraints

#### 3.6.1 Vegetation

The Lower Hunter and Central Coast Regional Vegetation Survey identified four vegetation units present at the site. These are summarised in Table 3-6.

**Table 3-6 Mapped vegetation units**

Description	Species
Coastal plains smooth barked apple woodland	A. costata, C. gummifera, E. capitellata, E. umbra
Coastal plains scribbly gum woodland	E. haemostoma, C.gummifera. E. capitellata, A. inopina.
Riparian melaleuca swamp woodland	Melaleuca sieberi, E. robusta
Melaleuca scrub	Melaleuca sieberi, Gahnia clarkei
Swampy Mahogany – paperbark forest	Melaleuca quinquinervia, E. robusta, C. glauca

#### 3.6.2 Groundwater and Inflow Dependent Ecosystems

The Bureau of Meteorology (BOM) maintains the Groundwater Dependent Ecosystems Atlas and Inflow Dependent Ecosystems Likelihood Data Source which gathers information from both regional and national assessments.

The site contains areas of moderate and high potential for groundwater dependent vegetation ecosystems according to regional studies. The likelihood for inflow dependent vegetation ecosystems at the site ranges from 7 to 2 out of 10.

### 3.7 Other information

The following is a summary of other information derived from desktop search:

- The site contains Bushfire Prone Land Category 1 Vegetation and vegetation buffer zones. Category 1 Vegetation also exists north of the site boundary.
- No record of former Gasworks are located within a one kilometre radius of the site.
- No sites on the National Waste Management Site database are listed within a one kilometre radius of the site.
- The site is mapped as a sensitive zone under the Protection of the Environment (Underground Petroleum Storage Systems) Regulation 2014.
- The site is located within the Swansea North Entrance Mining Subsidence District.

- Under the *State Environmental Planning Policy*, SEPP14 Coastal Wetlands are located approximately 850 m to the north of the site. The site is also mapped under SEPP 71 – Coastal Protection.
- The NSW BioNet Atlas maintained by the NSW Office of Environment and Heritage (OEH) lists species that have a NSW or federal conservation status, a NSW sensitivity status and identifies species under the migratory species agreement. The close proximity to Lake Macquarie and Lake Munmorah means several species including migratory species will be listed as identified within a 10km radius of the site. These include two species of amphibian, four reptiles, 68 species of birds, one insect, 21 species of mammals, and 25 species of plant.
- The business records of 1970 contain a motor car garage and service station located on the Pacific Highway approximately 400 m from the boundary of block 285 Pacific Highway. This description matches the present location of the BP service station, east of the site.

### **3.8 Previous investigations**

GHD had not been provided details of any previous investigations completed at the site.



## 4. Site inspection

A GHD staff member completed a site inspection on 6 December 2018. The main site features observed during the walkover are summarised in Table 4-1. Select photographs collected during the site inspection are provided in Appendix B. No access was available to the area occupied by the dog boarding kennel and associated infrastructure including the sheds and buildings.

**Table 4-1 Site inspection summary**

Items	Comments
Site conditions	<p><b>Block 285</b> is currently maintained as a private residential block with a dwelling and separate double garage located in the south-east accessed from the Pacific Highway. There is a small corrugated iron shed and shipping container near the house which is used for storage. The iron is well worn and rusted. The owner houses several horses in fenced paddocks which are mostly grassed with scattered eucalypts. The far northern portion of this block is vegetated with eucalypt forest regrowth with minimal undergrowth. This block is well maintained and tidy in regards to any dumped rubbish or wastes. There appears to be an area of mounded historical fill around the central west of the block where remnants of black builder plastic and other fabric was located. There is a phone tower and two associated buildings located in the south-eastern corner of the site in a fenced compound. The house is connected to a septic system evident by a tank located near the rear of the dwelling.</p> <p><b>Block 295</b> also contains a residential dwelling (currently being rented) located in the central west, north of the former landscaping yard. The former landscaping yard houses two businesses owned by the occupant of the rented dwelling behind. These businesses are a chainsaw and mower repair workshop, and tree lopping services. The area immediately surrounding the workshop/businesses contains rubbish such as empty engine oil containers, radiator flush fluid, tyres, spare mower parts, engine parts, batteries etc. All are currently stored on unsealed ground. There is a backhoe parked near the front of the building which appears to be leaking fuel or oil indicated by staining on the ground under the machine and a strong hydrocarbon odour. There are several large piles of mulch around the former landscaping yard also. Beyond the dwelling to the north is an area of various mounded fill containing crushed roof tiles, metal, various types of building waste and timber logs. There was no evidence of asbestos containing material (ACM) noted on the ground surface. At the rear of the block (north-west corner) there is another mound of fill material containing various building materials. The mound is up to 1.5 m high and contains crushed sandstone and concrete. No evidence of steel or other metal reinforcement is visible. Although a septic system would be consistent with neighbouring dwellings, no septic tank could be visually identified from outside the fenced house paddock. The block was vegetated with areas of open grasses paddocks and stands of eucalypts. There were two dams on the property located in the south near the former landscaping yard and along the central eastern boundary. The property contains multiple piles of discarded timber stumps, large logs and wood chips. There were also abandoned cars, light trucks and boats scattered around the block. A second phone tower was located near the south-eastern corner of the property.</p>

Items	Comments
	<p><b>Block 305</b> has been used as a dog boarding facility for the last 17 years. The property has a residential dwelling on the Pacific Highway side of the kennels, with the dog boarding sheds behind. A cattery is located in a separate building to the south west of the main residence. There is also another residential, relocatable building between the cattery and the southern boundary. Two septic tanks were visible, one near the rear of the dwelling and a second tank at the rear of a building associated with the kennels. Around the central western boundary is an area which used to contain discarded tyres and other wastes, according to the site occupant interviewed by GHD. The block is mostly open grass paddocks or vegetated with areas of eucalypts, and stands of paperbarks. In the north-eastern corner is a swampy area vegetated with various grasses and remnant swamp mahogany forest. Large parts of this block are well maintained and regularly mowed. There was little evidence of buried fill or waste materials other than two tyres near the residential dwelling. A strong hydrocarbon odour and evidence of oil on the surface of water was present around the swamp at the rear of the block. However potential sources of hydrocarbon contamination were not visible on this block.</p>
Surrounding land use	<p><b>East:</b> Residential properties east of the rear of block 305. To the east along the Pacific Highway is a bus depot and BP service station.</p> <p><b>South:</b> Pacific Highway and heavily vegetated land beyond. Munmorah United Bowling Club is located opposite block 305 on the southern side of the highway.</p> <p><b>West:</b> A bushland park is located immediately to the west of the northern half of block 285, with a residential estate beyond. Lake Munmorah Shopping Centre and a Caltex service station is located along the Pacific Highway west of the site.</p> <p><b>North:</b> An easement containing a fire trail is located immediately to the north of the site. Beyond the trail is native, uncleared vegetation.</p>
Potentially Contaminating Activities	<p><b>Underground Structures:</b> No evidence of underground storage tanks (USTs) were observed on the site at the time of investigation. No assessment of underground services was undertaken. Three septic tanks are located at the site.</p> <p><b>Litter:</b> The central block, block 295 contained many areas of litter including potentially contaminating chemicals, hydrocarbons and discarded vehicles and engines/mechanical parts as described above.</p> <p><b>Contamination indicators:</b> Staining of the ground was present under the backhoe and a truck near the former landscaping yard as well as a strong hydrocarbon odour. Oil slick and hydrocarbon odour was also identified in surface waters of the swampy area in the far north-eastern corner of the site.</p> <p><b>Potential ACM:</b> No potential ACM was observed on the site surface. No assessment was made for potential hazardous building materials within the site buildings.</p> <p><b>Fill:</b> Fill materials and stockpiles comprising building materials and waste were noted in block 295. There was also potential for fill materials on the other two blocks. Although vegetation covered much of the likely mounds of fill, evidence of their contents was visible through the vegetation at multiple locations.</p>

## 5. Preliminary conceptual site model

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

Based on the information collected as part of this investigation, the following preliminary CSM has been developed for the site.

### 5.1 Sources

Potential sources of contamination identified during the desktop assessment and site inspection include:

- Minor oil spills, identified from staining observed under machinery and around poorly kept empty oil containers on block 295.
- Fill material potentially comprising waste building material on all blocks but predominantly blocks 285 and 295.
- Rubbish around the dwelling and workshop buildings on block 295.
- Chemicals and empty chemical containers stored onsite.
- Leaks from the septic tanks identified on block 285 and 305.
- Residual chemicals from historical use of the site as an orchard or plantation.
- Potential hydrocarbon contamination from sources on adjacent properties (service stations) as indicated by odour and sheen observed on surface water at the rear of block 305.

### 5.2 Pathways

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

- Direct contact (including ingestion) with potential contaminated soil.
- Inhalation of potential contaminants in soil, if disturbed.
- Volatilisation to outdoor or indoor air and subsequent inhalation of potential hydrocarbon impacted soil or groundwater.
- Vertical and horizontal migration of potential contaminants within the groundwater.

### 5.3 Receptors

When evaluating potential adverse health/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:

- On-site residential or commercial occupants.
- Off-site occupants.
- On-site and off-site ecological receptors (soil, groundwater and intermittent surface waters).

## **5.4 Potential source-pathway-receptor linkages**

A summary of the potential contaminant source – pathway – receptor linkages is provided in Table 5-1. In summary, potentially complete linkages were noted:

- At the location of oil stained soil around machinery and oil containers.
- Where potential hydrocarbon odour and sheen noted in surface water on block 305.
- From stored chemicals and residual chemicals from historical use of the site as an orchard or plantation.
- From fill and stockpiles of unknown sources.

**Table 5-1 Preliminary CSM**

Source	Pathway	Receptor	Potential for complete linkage
<p><b>Soils</b> onsite, potentially contaminated from leaks, spills, fill material, stored chemicals, historical use of the site and adjacent land-uses.</p>	Volatilisation to indoor and outdoor air and subsequent inhalation	On-site workers, residents and visitors Intrusive maintenance workers in the vicinity of the potentially impacted soil	Possible, in the location of oil stained soil on block 295 and potential hydrocarbon odour and sheen noted in the swamp on block 305. Unlikely elsewhere given the limited extent of potentially contaminating activities with volatile contaminants.
	Direct contact	On-site workers, residents and visitors Intrusive maintenance workers in the vicinity of the potentially impacted soil Ecological receptors e.g. invertebrates and vegetation	Possible, from stored chemicals and residual chemicals from historical use of the site as an orchard or plantation and from fill of unknown sources.
	Volatilisation to indoor air and subsequent inhalation	On-site workers, residents and visitors Residents and visitors to adjacent residential properties	Unlikely due to lack of potential volatile soil impact significant enough to impact groundwater.
	Volatilisation to outdoor air and subsequent inhalation	Intrusive maintenance workers On-site workers, residents and visitors	Possible where potential hydrocarbon odour and staining was noted at the rear of block 305 and from chemicals from historical use of the site as an orchard/plantation.
<p>Potentially <b>contaminated surface water</b> or <b>groundwater</b> and possible lateral migration off site.</p>	Direct Contact (including accidental ingestion)	Intrusive maintenance workers e.g. utility trenches Ecological and recreational receptors of Karignan Creek and its tributaries	Unlikely due to lack of registered bores within 500 m of the site and supply of reticulated water to residents in the area.
	Lateral migration in surface water or groundwater	Potable groundwater extraction	

## 6. Conclusions

GHD was engaged by EDH to undertake a combined preliminary geotechnical and contamination assessment at 285 -305 Pacific Highway, Lake Munmorah NSW (the site).

GHD completed a desktop study and site walkover to evaluate the potential for contamination to be present on-site and assess potential risks posed by these contaminants to future users of the site.

In accordance with the objectives detailed in Section 1.2, and based on the information contained within this assessment, the following conclusions are made (subject to the limitations outlined in Section 8):

- The site has been used for various land uses including residential and light commercial/industrial (potential orchard, landscaping yards and dog boarding kennels) since about 1965.
- Potential sources of contamination identified during the site inspection include:
  - Minor oil spills, identified from staining observed on the ground underneath machinery.
  - Fill material potentially dumped across the site.
  - Chemicals and empty chemical containers stored onsite.
  - Engines, mechanical parts and abandoned vehicles.
  - Leaks from the septic tanks identified on block 285 and 305.
  - Residual chemicals from historical use of the site as an orchard or plantation.
  - Potential hydrocarbon contamination from sources on adjacent properties (service stations) as indicated by odour and sheen observed on surface water at the rear of block 305.

Potentially complete source-pathway-receptor linkages were noted:

- At the location of oil stained soil around machinery and oil containers.
- Where potential hydrocarbon odour and sheen noted in surface water on block 305.
- From stored chemicals and residual chemicals from historical use of the site as an orchard or plantation.
- From fill and stockpiles of unknown sources.

Based on the findings of this PSI, a detailed investigation is recommended to further investigate these potential contaminant sources and refine the CSM.

## 7. Limitations

This report: has been prepared by GHD for EDH Group and may only be used and relied on by EDH Group for the purpose agreed between GHD and the EDH Group as set out in section 1 of this report.

GHD otherwise disclaims responsibility to any person other than EDH Group 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.

GHD has prepared this report on the basis of information provided by EDH Group and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

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Except as otherwise expressly stated in this Report, GHD makes no warranty, statement or representation of any kind concerning the suitability of the site for any purpose or the permissibility of any use, development or re-development of the site.

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# Appendices



# **Appendix A – Desktop Searches**



# LOTSEARCH

LOTSEARCH AERIALS

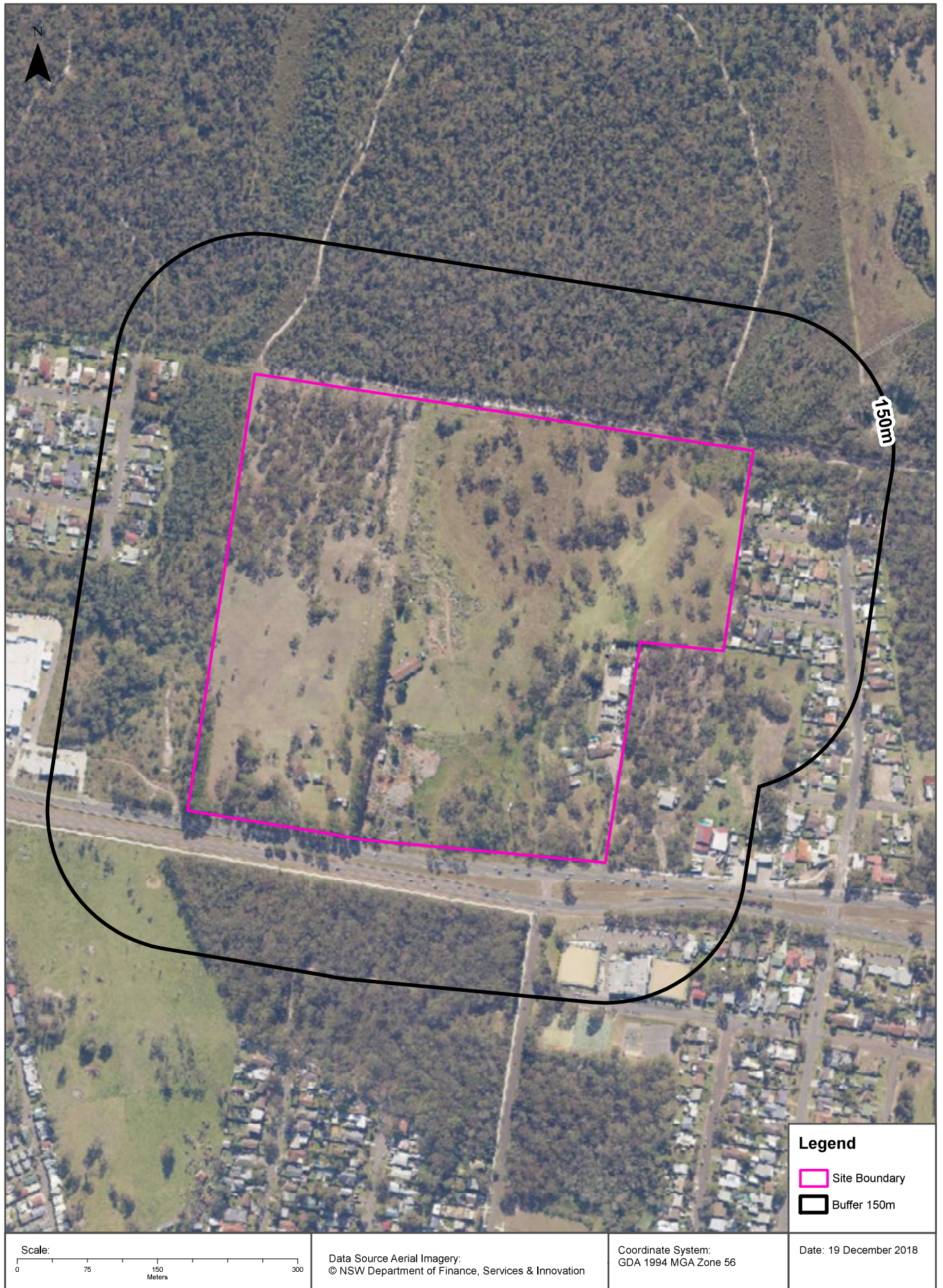
**Date: 19 Dec 2018**

**Reference: LS004705**

**Address: 285 - 305 Pacific Highway, Lake Munmorah, NSW 2259**

# Aerial Imagery 2018

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Aerial Imagery 2010

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Aerial Imagery 2005

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Aerial Imagery 1994

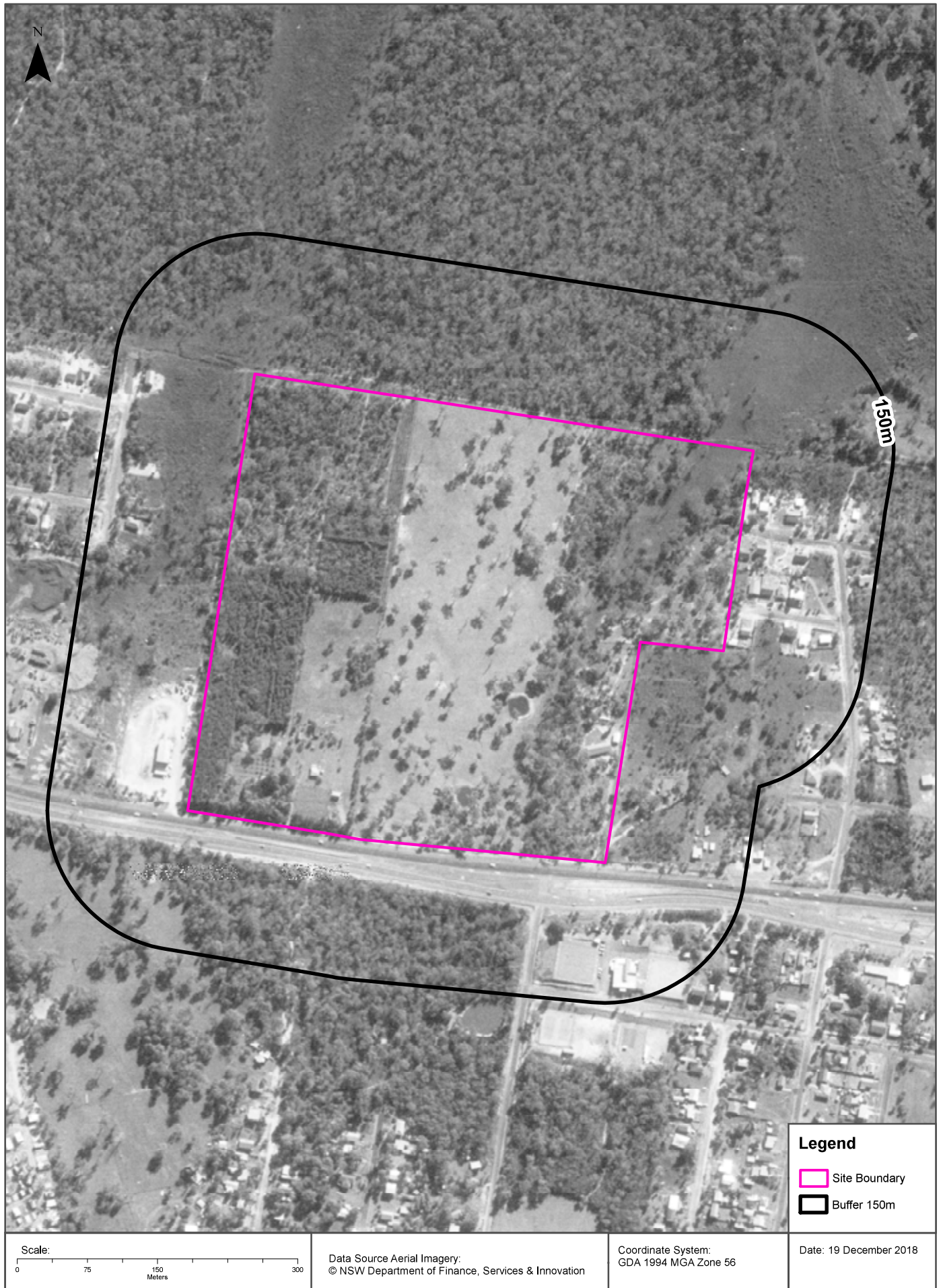
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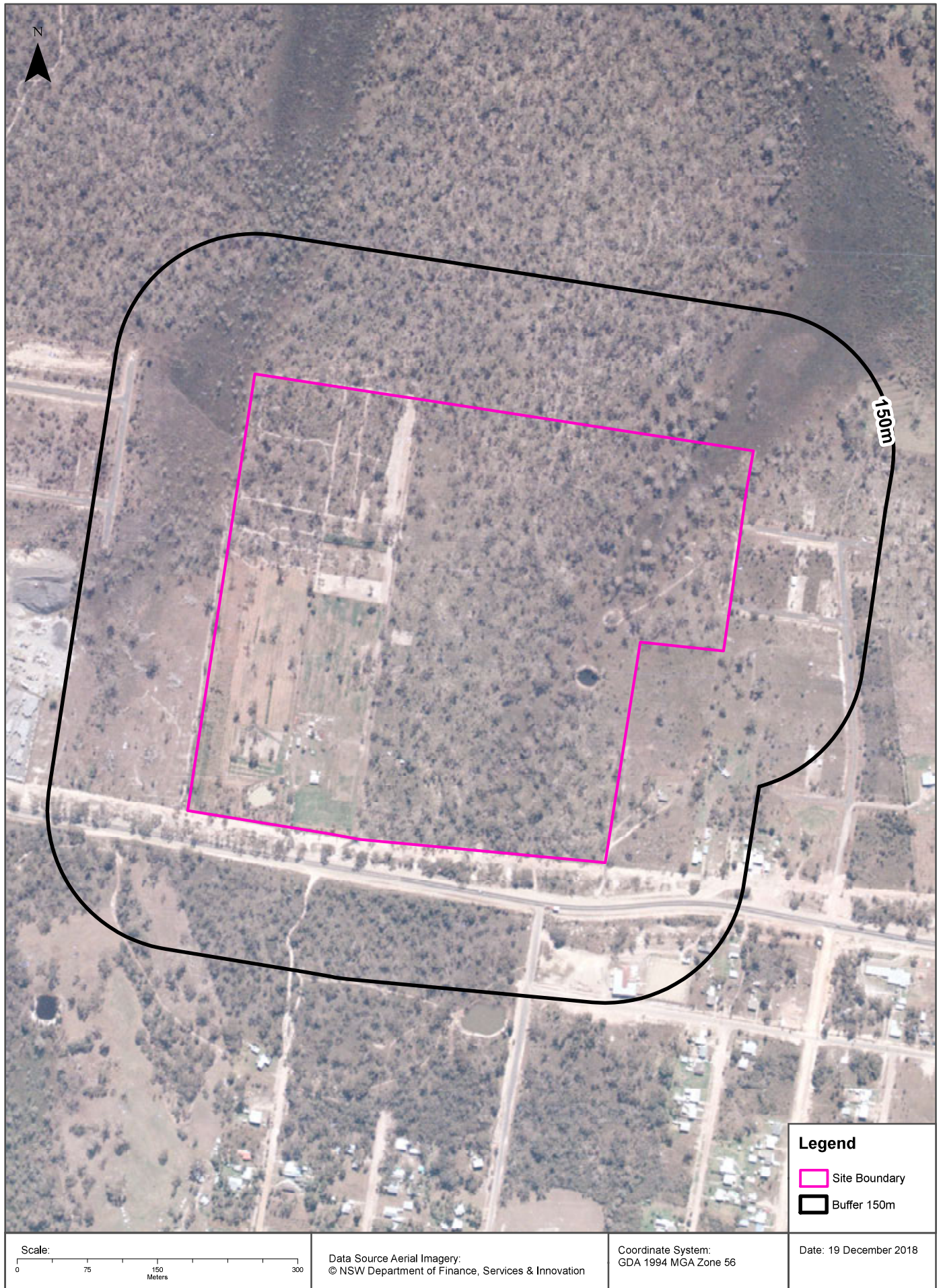
285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Aerial Imagery 1976

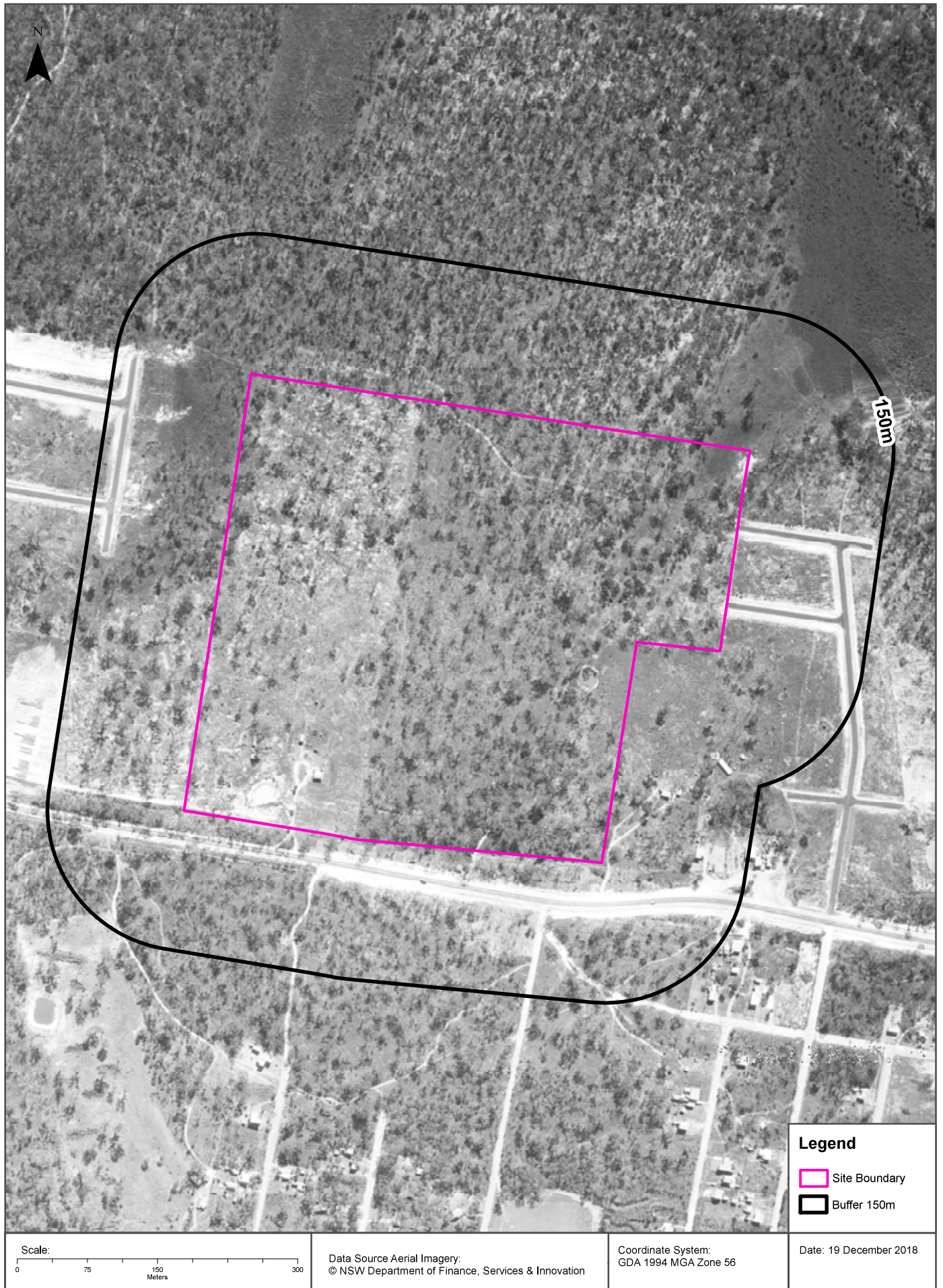
285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Aerial Imagery 1965

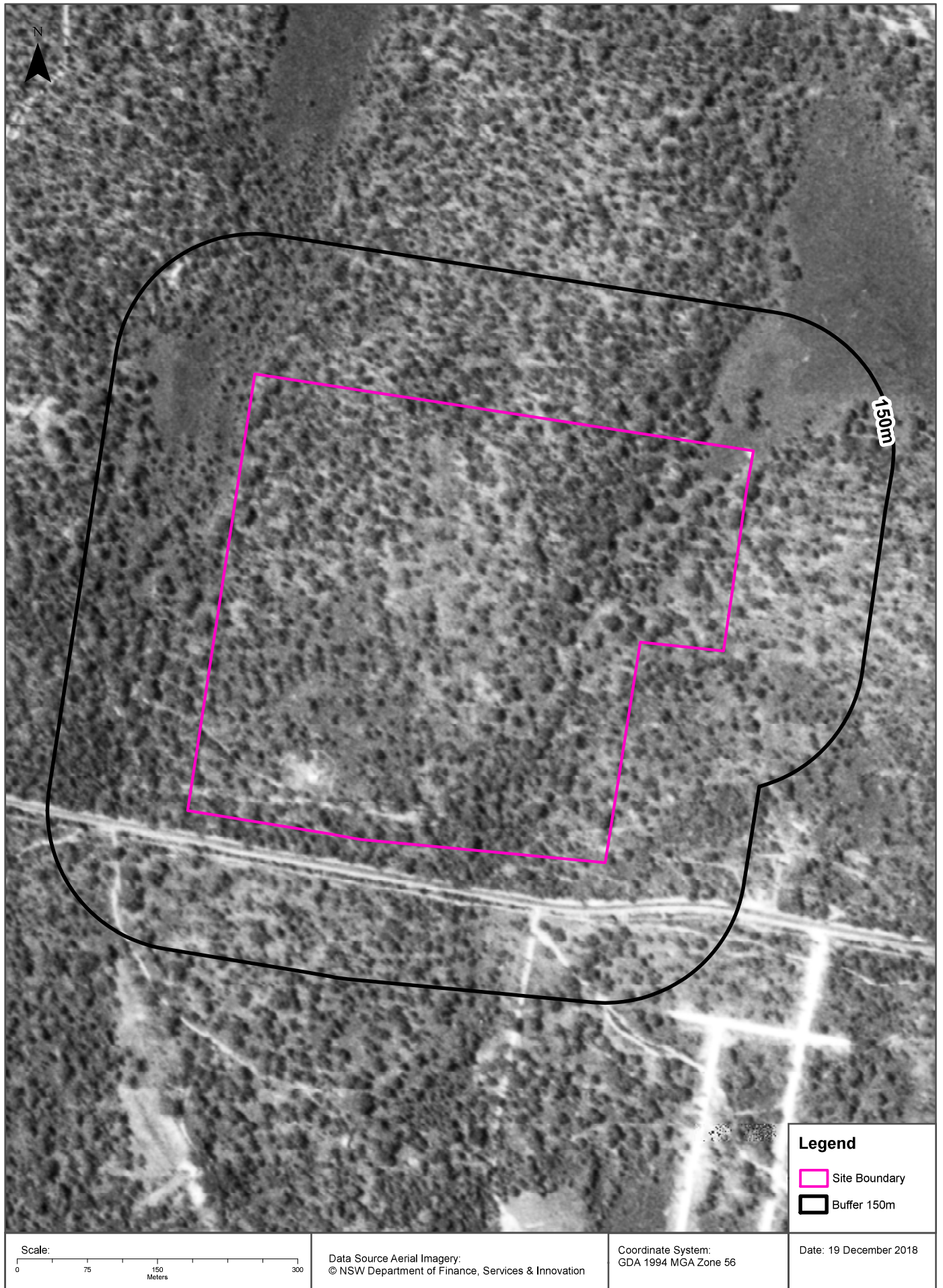
285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Aerial Imagery 1954

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



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# LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

**Date: 27 Nov 2018 10:51:27**

**Reference: LS004705 EP**

**Address: 285 - 305 Pacific Highway, Lake Munmorah, NSW 2259**

**Disclaimer:**

The purpose of this report is to provide an overview of some of the site history, environmental risk and planning information available, affecting an individual address or geographical area in which the property is located. It is not a substitute for an on-site inspection or review of other available reports and records. It is not intended to be, and should not be taken to be, a rating or assessment of the desirability or market value of the property or its features. You should obtain independent advice before you make any decision based on the information within the report. The detailed terms applicable to use of this report are set out at the end of this report.

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## Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a confidence is given under the field heading “LocConf” or “Location Confidence”.

LC Code	Location Confidence
Premise match	Georeferenced to the site location / premise or part of site
General area or suburb match	Georeferenced with the confidence of the general/approximate area
Road match	Georeferenced to the road or rail
Road intersection	Georeferenced to the road intersection
Feature is a buffered point	Feature is a buffered point
Land adjacent to geocoded site	Land adjacent to Georeferenced Site

## Dataset Listing

Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	Dept. Finance, Services & Innovation	27/11/2018	27/11/2018	Daily	-	-	-	-
Topographic Data	Dept. Finance, Services & Innovation	17/07/2018	17/07/2018	As required	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	19/11/2018	19/11/2018	Monthly	1000	0	0	2
Contaminated Land Records of Notice	Environment Protection Authority	13/11/2018	13/11/2018	Monthly	1000	0	0	0
Former Gasworks	Environment Protection Authority	06/11/2018	06/11/2018	Monthly	1000	0	0	0
National Waste Management Facilities Database	Geoscience Australia	06/11/2018	07/03/2017	Quarterly	1000	0	0	0
EPA PFAS Investigation Program	Environment Protection Authority	06/11/2018	06/11/2018	Monthly	2000	0	0	1
EPA Other Sites with Contamination Issues	Environment Protection Authority	11/01/2018	11/01/2018	As required	1000	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	01/11/2018	01/11/2018	Monthly	1000	0	0	2
Delicensed POEO Activities still Regulated by the EPA	Environment Protection Authority	01/11/2018	01/11/2018	Monthly	1000	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	01/11/2018	01/11/2018	Monthly	1000	3	3	3
UPSS Environmentally Sensitive Zones	Environment Protection Authority	14/04/2015	12/01/2010	As required	1000	1	1	1
UBD Business Directory 1982 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1982 (Road & Area Matches)	Hardie Grant			Not required	150	-	1	1
UBD Business Directory 1970 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1970 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1961 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1961 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory 1950 (Premise & Intersection Matches)	Hardie Grant			Not required	150	0	0	0
UBD Business Directory 1950 (Road & Area Matches)	Hardie Grant			Not required	150	-	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500	0	0	0
UBD Business Directory Drycleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500	-	0	2
Points of Interest	Dept. Finance, Services & Innovation	12/10/2018	12/10/2018	Quarterly	1000	0	1	25
Tanks (Areas)	Dept. Finance, Services & Innovation	15/10/2018	15/10/2018	Quarterly	1000	0	0	0
Tanks (Points)	Dept. Finance, Services & Innovation	15/10/2018	15/10/2018	Quarterly	1000	0	0	0
Major Easements	Dept. Finance, Services & Innovation	12/10/2018	12/10/2018	Quarterly	1000	0	1	11
State Forest	Dept. Finance, Services & Innovation	18/01/2018	18/01/2018	As required	1000	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	18/01/2018	30/09/2017	Annually	1000	0	0	0
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	As required	1000	1	1	1



Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features Onsite	No. Features within 100m	No. Features within Buffer
Botany Groundwater Management Zones	NSW Department of Primary Industries	15/03/2018	01/10/2005	As required	1000	0	0	0
Groundwater Boreholes	NSW Dept. of Primary Industries - Water NSW; Commonwealth of Australia (Bureau of Meteorology)	24/07/2018	23/07/2018	Annually	2000	0	0	8
Geological Units 1:250,000	NSW Dept. of Industry, Resources & Energy	20/08/2014		None planned	1000	1	-	3
Geological Structures 1:250,000	NSW Dept. of Industry, Resources & Energy	20/08/2014		None planned	1000	0	-	19
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000	0	0	0
Soil Landscapes	NSW Office of Environment & Heritage	12/08/2014		None planned	1000	1	-	3
Atlas of Australian Soils	CSIRO	19/05/2017	17/02/2011	As required	1000	1	1	1
Environmental Planning Instrument - Acid Sulfate Soils	NSW Department of Planning and Environment	23/10/2018	12/10/2018	As required	500	1	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000	1	1	3
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000	0	0	0
Dryland Salinity Potential of Western Sydney	NSW Office of Environment & Heritage	12/05/2017	01/01/2002	None planned	1000	-	-	-
Mining Subsidence Districts	Dept. Finance, Services & Innovation	13/07/2017	01/07/2017	As required	1000	1	1	1
SEPP 14 - Coastal Wetlands	NSW Planning and Environment	17/12/2015	24/10/2008	Annually	1000	0	0	1
SEPP 26 - Littoral Rainforest	NSW Planning and Environment	17/12/2015	05/02/1988	Annually	1000	0	0	0
SEPP 71 - Coastal Protection	NSW Planning and Environment	17/12/2015	01/08/2003	Annually	1000	1	1	1
SEPP Major Developments 2005	NSW Planning and Environment	09/03/2013	25/05/2005	Under Review	1000	0	0	0
SEPP Strategic Land Use Areas	NSW Planning and Environment	01/08/2017	28/01/2014	Annually	1000	0	0	0
EPI - Land Zoning	NSW Planning and Environment	23/10/2018	12/10/2018	Quarterly	1000	1	10	53
EPI - Minimum Lot Size	NSW Planning and Environment	23/10/2018	12/10/2018	Quarterly	0	1	-	-
EPI - Height of Buildings	NSW Planning and Environment	23/10/2018	12/10/2018	Quarterly	0	0	-	-
EPI - Floor Space Ratio	NSW Planning and Environment	23/10/2018	12/10/2018	Quarterly	0	0	-	-
EPI - Land Application	NSW Planning and Environment	23/10/2018	12/10/2018	Quarterly	0	1	-	-
EPI - Land Reservation Acquisition	NSW Planning and Environment	23/10/2018	12/10/2018	Quarterly	0	0	-	-
State Heritage Register - Curtilages	NSW Office of Environment & Heritage	18/10/2018	19/01/2018	Quarterly	1000	0	0	0
Environmental Planning Instrument - Heritage	NSW Department of Planning and Environment	10/09/2018	27/07/2018	Quarterly	1000	0	0	1
Bush Fire Prone Land	NSW Rural Fire Service	08/08/2018	31/07/2018	Quarterly	1000	2	3	3
Lower Hunter and Central Coast Regional Vegetation Survey	NSW Office of Environment & Heritage	28/02/2015	16/11/2009	As required	1000	6	9	32
RAMSAR Wetlands	Commonwealth of Australia Department of the Environment	08/10/2014	24/06/2011	As required	1000	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	2	2	4
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000	6	6	10
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	26/11/2018	26/11/2018	Daily	10000	-	-	-



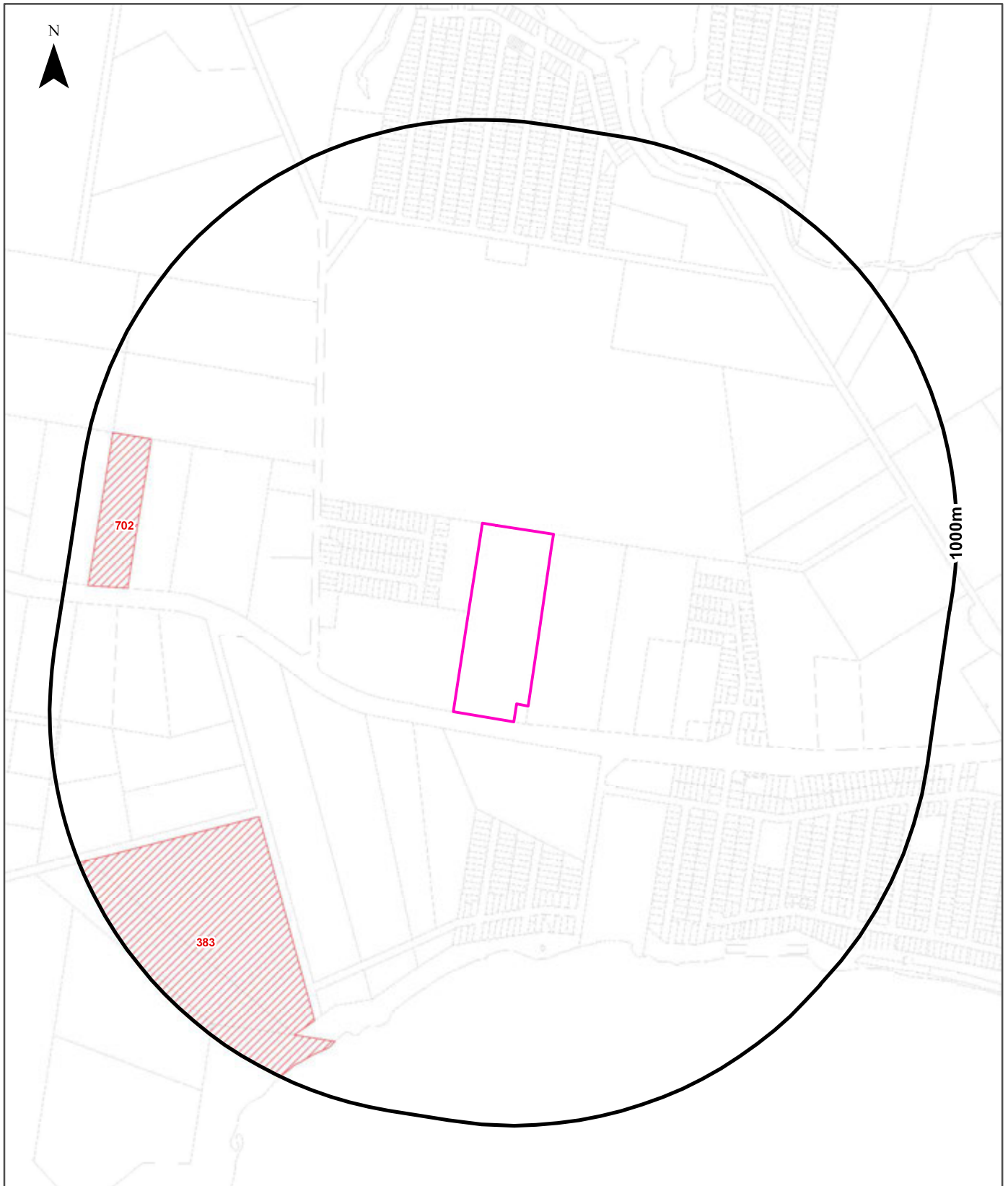
# Aerial Imagery 2018

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



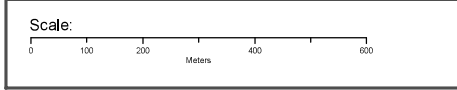
# Contaminated Land & Waste Management Facilities

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



**Legend**

Site Boundary	Contaminated Land List
Report Buffer	Former Gasworks
Property Boundary	Contaminated Land Record of Notice
	Waste Management Facilities



Data Sources: Property Boundaries & Topographic Data.  
© Department Finance, Services & Innovation 2018

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 27 November 2018



# Contaminated Land & Waste Management Facilities

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

## List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist (m)	Direction
383	Munmorah Power Station	(Central Coast Highway) Scenic Drive	Doyalson	Unclassified	Regulation under CLM Act not required	Current EPA List	Premise Match	546m	South West
702	Caltex Service Station	235 Pacific Highway	DOYALSON NORTH	Service Station	Regulation under CLM Act not required	Current EPA List	Premise Match	842m	West

The values within the EPA site management class in the table above, are given more detailed explanations in the table below:

EPA site management class	Explanation
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record of Notices.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record of Notices.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.

NSW EPA Contaminated Land List Data Source: Environment Protection Authority  
 © State of New South Wales through the Environment Protection Authority

# Contaminated Land & Waste Management Facilities

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

## Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
N/A	No records in buffer							

Contaminated Land Records of Notice Data Source: Environment Protection Authority  
© State of New South Wales through the Environment Protection Authority  
Terms of use and disclaimer for Contaminated Land: Record of Notices, please visit  
<http://www.epa.nsw.gov.au/clm/clmdisclaimer.htm>

## Former Gasworks

Former Gasworks within the dataset buffer:

Map Id	Location	Council	Further Info	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Environment Protection Authority  
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## National Waste Management Site Database

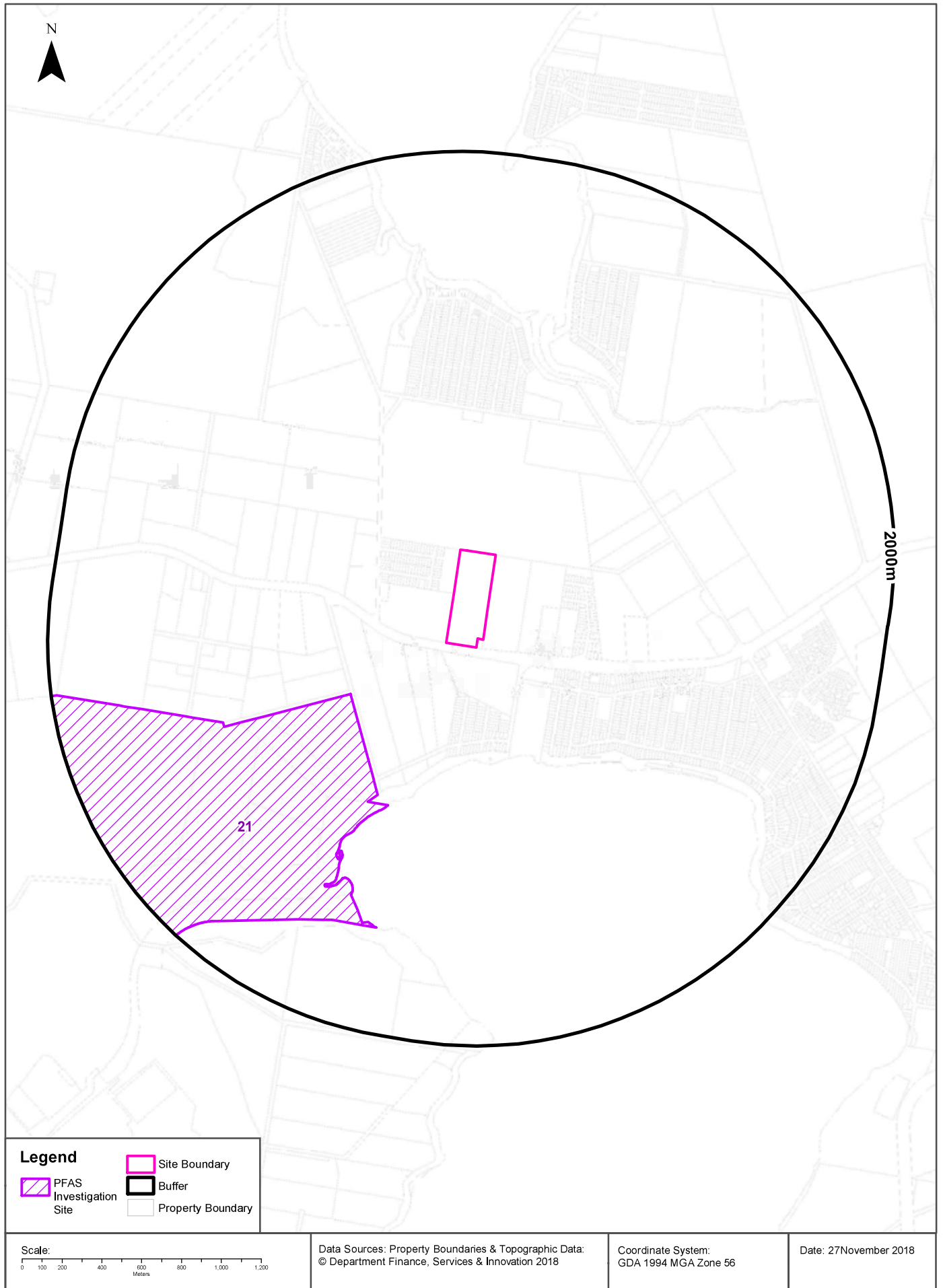
Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist (m)	Direction
N/A	No records in buffer											

Waste Management Facilities Data Source: Geoscience Australia  
Creative Commons 3.0 © Commonwealth of Australia <http://creativecommons.org/licenses/by/3.0/au/deed.en>

# EPA PFAS Investigation Program

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



# EPA PFAS Investigation Program

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

## EPA PFAS Investigation Program

Sites that are part of the EPA PFAS investigation program, within the dataset buffer:

<b>Id</b>	<b>Site</b>	<b>Address</b>	<b>Location Confidence</b>	<b>Distance</b>	<b>Direction</b>
21	Munmorah and Colongra Power Stations		General Area/ Suburb Match	546m	South West

EPA PFAS Investigation Program: Environment Protection Authority  
© State of New South Wales through the Environment Protection Authority

## EPA Other Sites with Contamination Issues

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### EPA Other Sites with Contamination Issues

This dataset contains other sites identified on the EPA website as having contamination issues. This dataset currently includes:

- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill

Sites within the dataset buffer:

Site Id	Site Name	Site Address	Dataset	Comments	Location Confidence	Distance	Direction
N/A	No records in buffer						

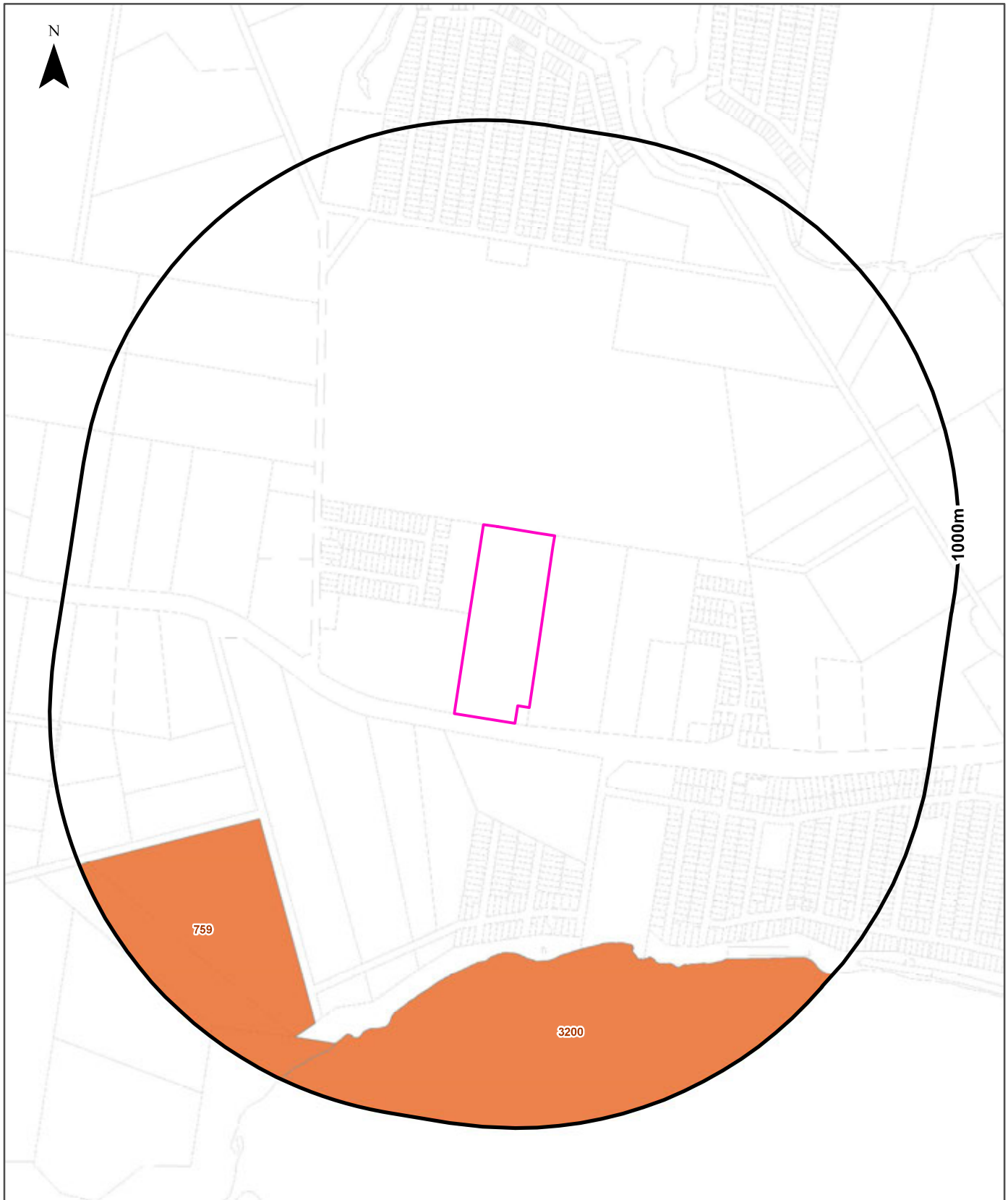
EPA Other Sites with Contamination Issues: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority



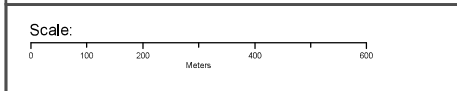
# Current EPA Licensed Activities

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



**Legend**

Site Boundary	Current Licensed Activities under POEO Act
Report Buffer	Current Licences related to Other Activities incl. Application of Herbicides to Waterways
Property Boundary	Current Licences related to Irrigated Agriculture



Data Sources: Property Boundaries & Topographic Data:  
© Department Finance, Services & Innovation 2018

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 27 November 2018

## EPA Activities

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

## Licensed Activities under the POEO Act 1997

Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

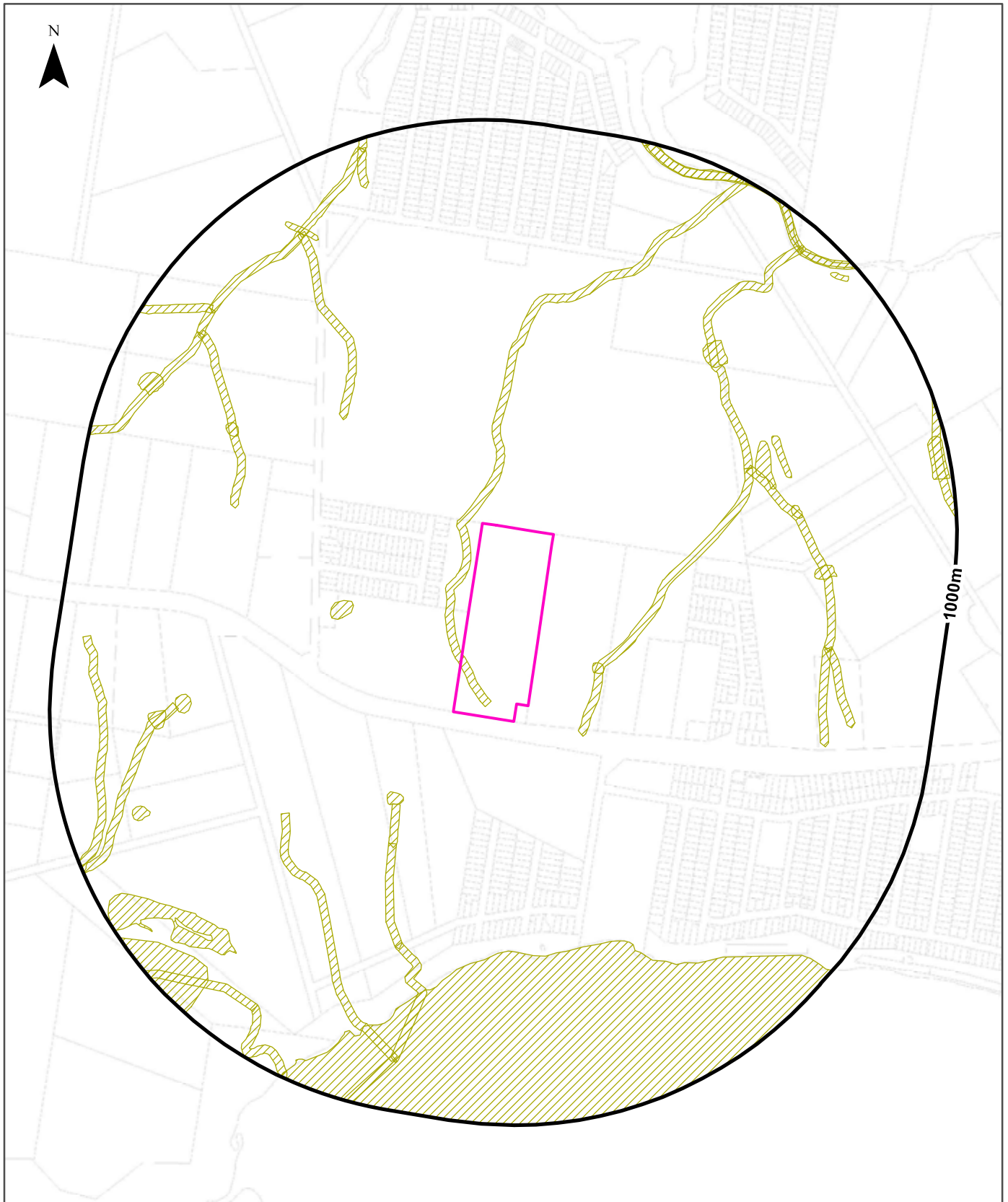
EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
759	GENERATOR PROPERTY MANAGEMENT PTY LIMITED	MUNMORAH POWER STATION	OFF SCENIC DRIVE	DOYALSON	Miscellaneous licensed discharge to waters (at any time)	Premise Match	546m	South West
3200	Central Coast Council		TUGGERAH LAKES AND THE TRIBUTARIES OF THE TUGGERAH LAKES, WYONG SHIRE, WYONG, NSW 2259	WYONG	Water-based extractive activity	Network of Features	566m	South

POEO Licence Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

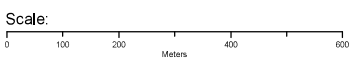
# Delicensed & Former Licensed EPA Activities

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



### Legend

- Site Boundary
- Report Buffer
- Property Boundary
- Delicensed Activities still Regulated by EPA
- Former Licensed/Regulated Activities (revoked or surrendered)
- Surrendered Licences related to Other Activities on Waterways incl. Application of Herbicides



Property Boundary Data Source:  
© Department Finance, Services & Innovation 2018

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 27 November 2018

## EPA Activities

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Delicensed Activities still regulated by the EPA

Delicensed activities still regulated by the EPA, within the dataset buffer:

Licence No	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
N/A	No records in buffer							

Delicensed Activities Data Source: Environment Protection Authority  
 © State of New South Wales through the Environment Protection Authority

### Former Licensed Activities under the POEO Act 1997, now revoked or surrendered

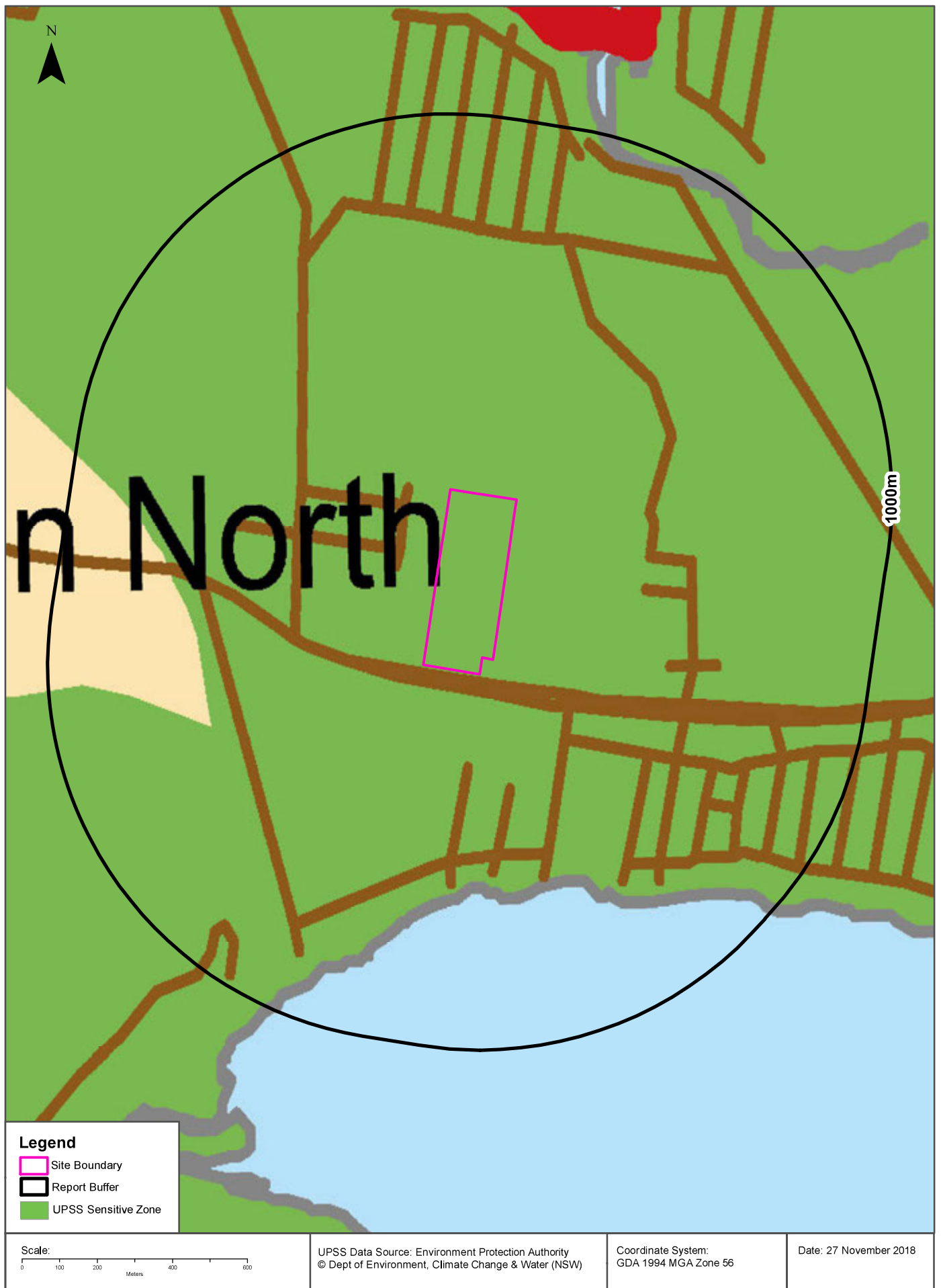
Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered		Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	Onsite

Former Licensed Activities Data Source: Environment Protection Authority  
 © State of New South Wales through the Environment Protection Authority

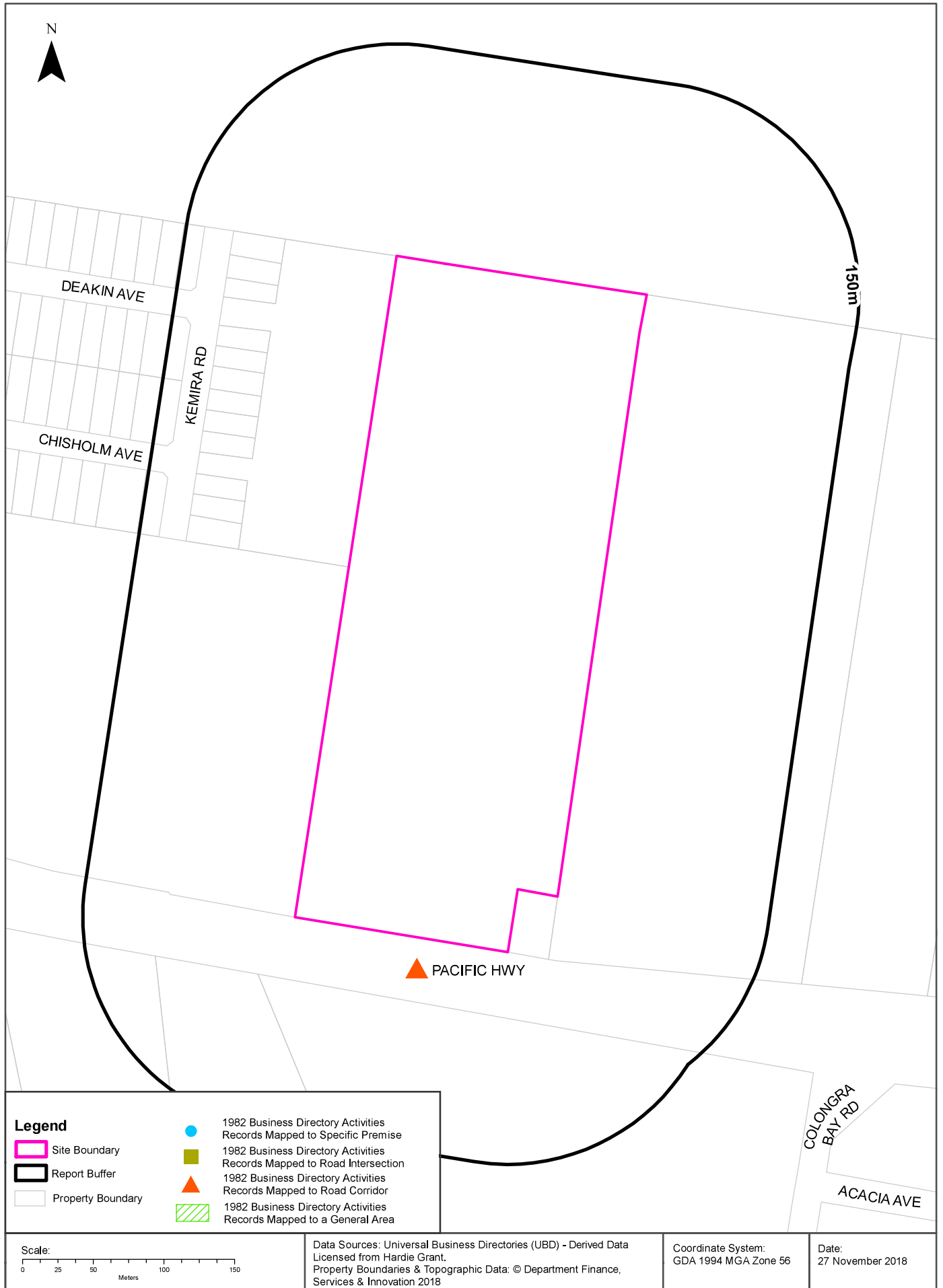
# UPSS Sensitive Zones

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



# 1982 Historical Business Directory Records

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



## Historical Business Directories

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### 1982 Business Directory Records Premise or Road Intersection Matches

Records from the 1982 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

### 1982 Business Directory Records Road or Area Matches

Records from the 1982 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
CONCRETE BLOCK &/OR BRICK MFRS. &/OR DISTS.	Mitchells Concrete Products Pty. Ltd. Pacific Highway, Lake Munmorah Newcastle	172336	Road Match	0m

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant



## Historical Business Directories

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### 1970 Business Directory Records Premise or Road Intersection Matches

Records from the 1970 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

### 1970 Business Directory Records Road or Area Matches

Records from the 1970 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer			

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

## Historical Business Directories

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### 1961 Business Directory Records Premise or Road Intersection Matches

Records from the 1961 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

### 1961 Business Directory Records Road or Area Matches

Records from the 1961 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer			

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

## Historical Business Directories

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### 1950 Business Directory Records Premise or Road Intersection Matches

Records from the 1950 UBD Business Directory, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer				

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

### 1950 Business Directory Records Road or Area Matches

Records from the 1950 UBD Business Directory, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer			

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

## Historical Business Directories

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Dry Cleaners, Motor Garages & Service Stations Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer:

Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Feature Point	Direction
N/A	No records in buffer					

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant



## Historical Business Directories

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Dry Cleaners, Motor Garages & Service Stations Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
MOTOR GARAGES AND SERVICE STATIONS.	BP Doyalson Service Station, 2 Pacific Highway., Doyalson North., Doyalson	123378	1982	Road Match	392m
MOTOR SERVICE STATIONS- PETROL, OIL, ETC.	Brownell, A. & B. & Son, Pacific Hghwy Doyalson	537688	1970	Road Match	392m

Business Directory Content Derived from Universal Business Directories (UBD) - Licensed from Hardie Grant

# Aerial Imagery 2010

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Aerial Imagery 2005

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Aerial Imagery 1994

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Aerial Imagery 1984

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Aerial Imagery 1976

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Aerial Imagery 1965

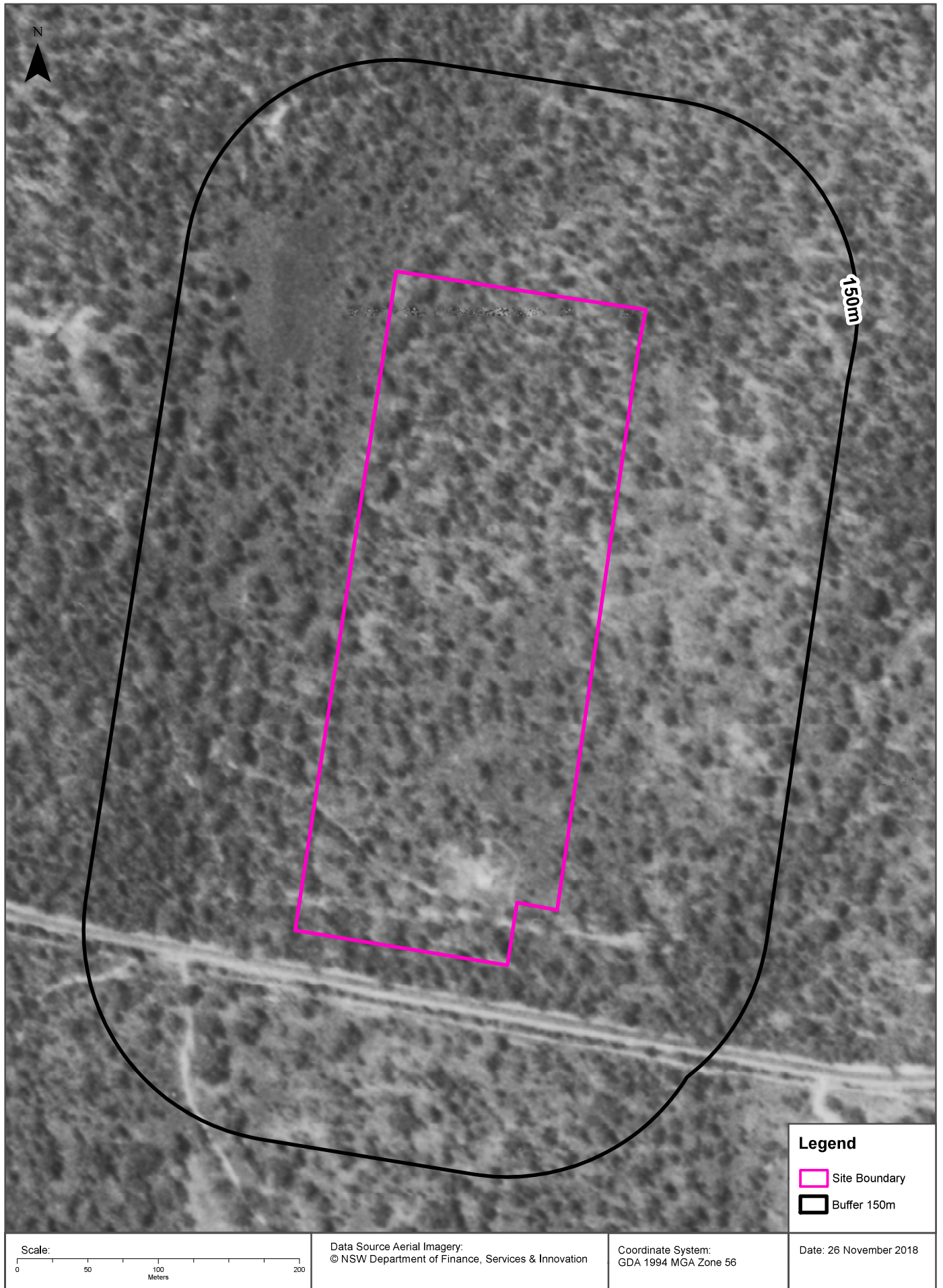
285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Aerial Imagery 1954

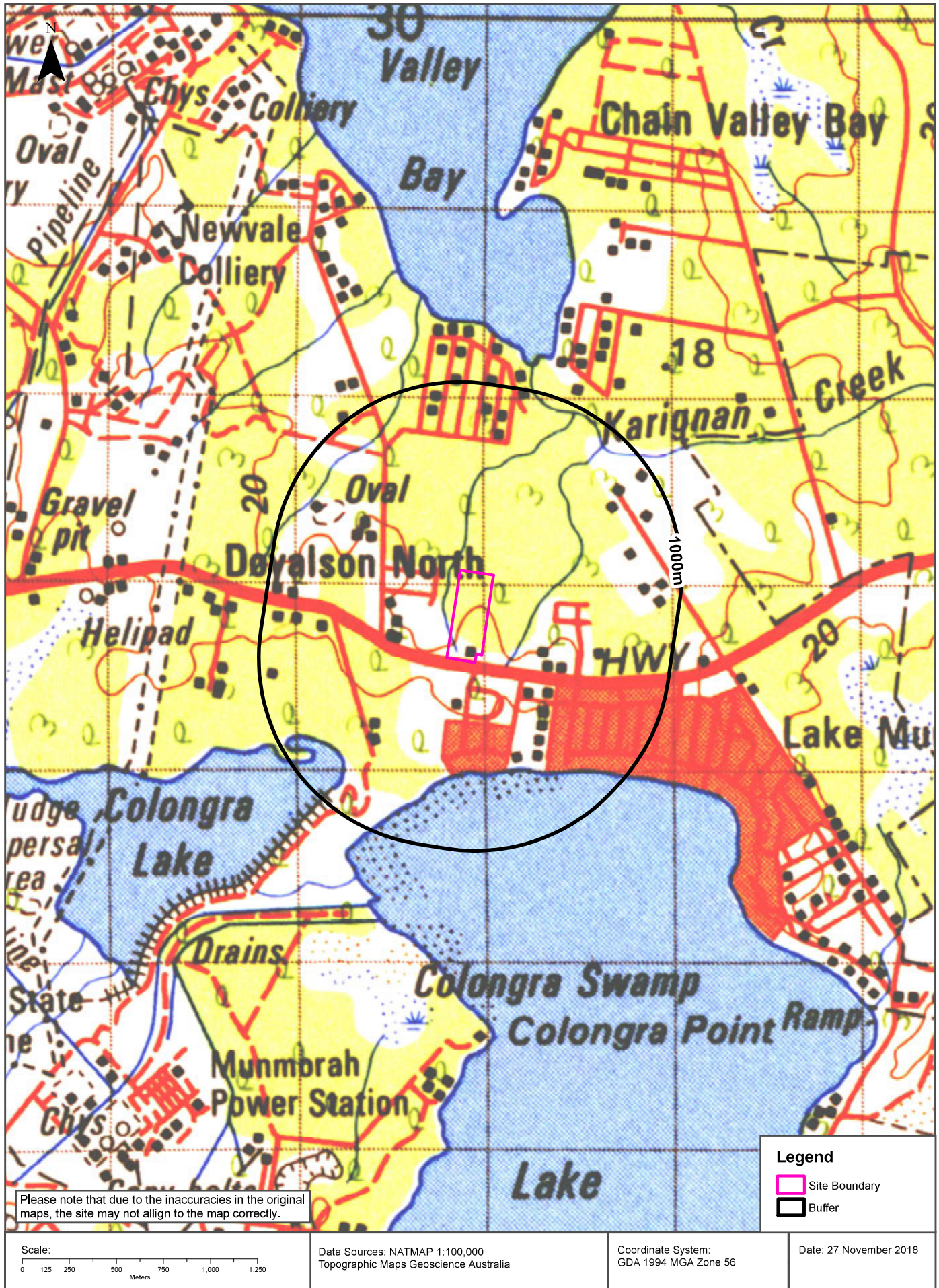
285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Historical Map 1976

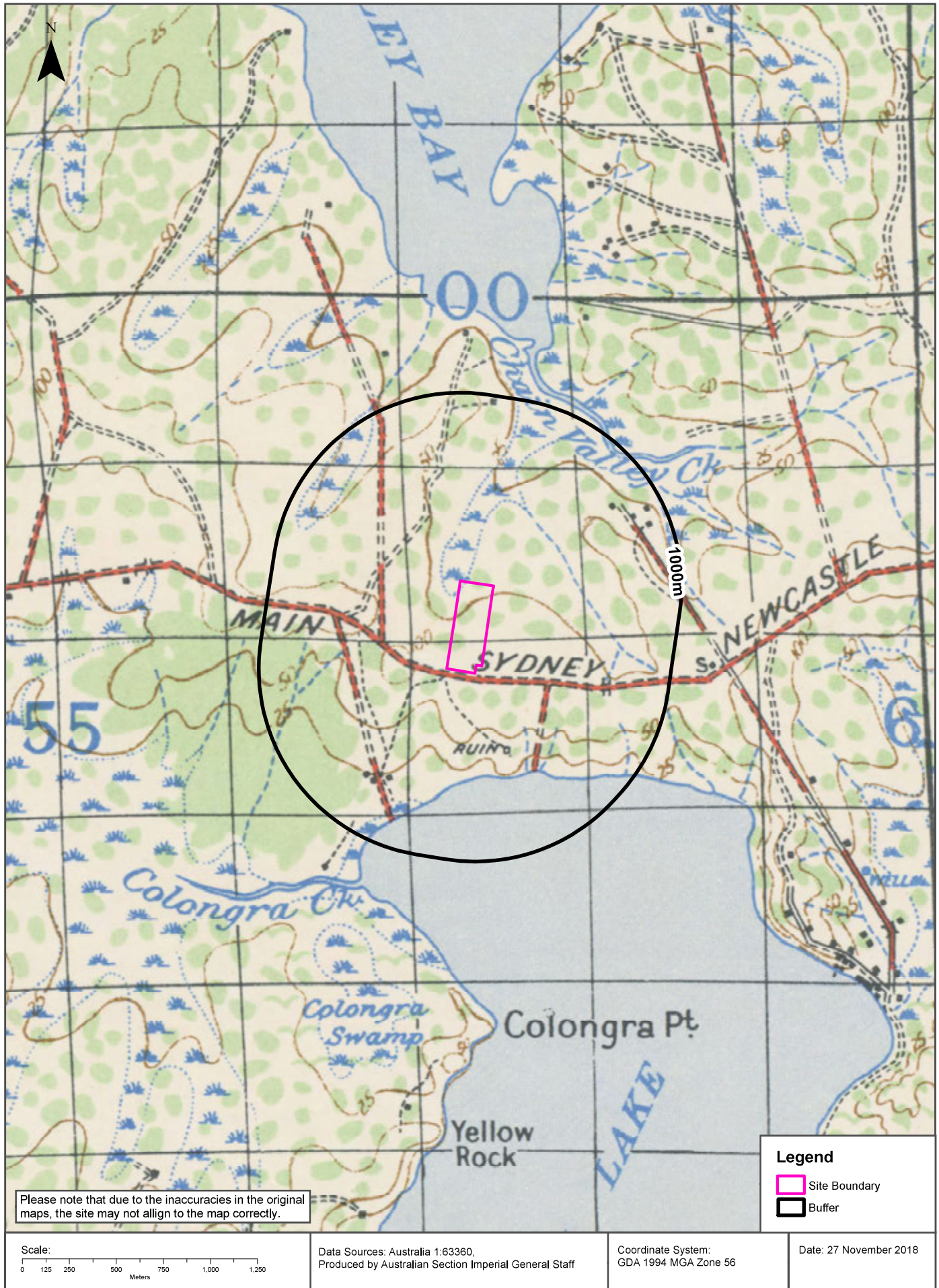
285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Historical Map 1942

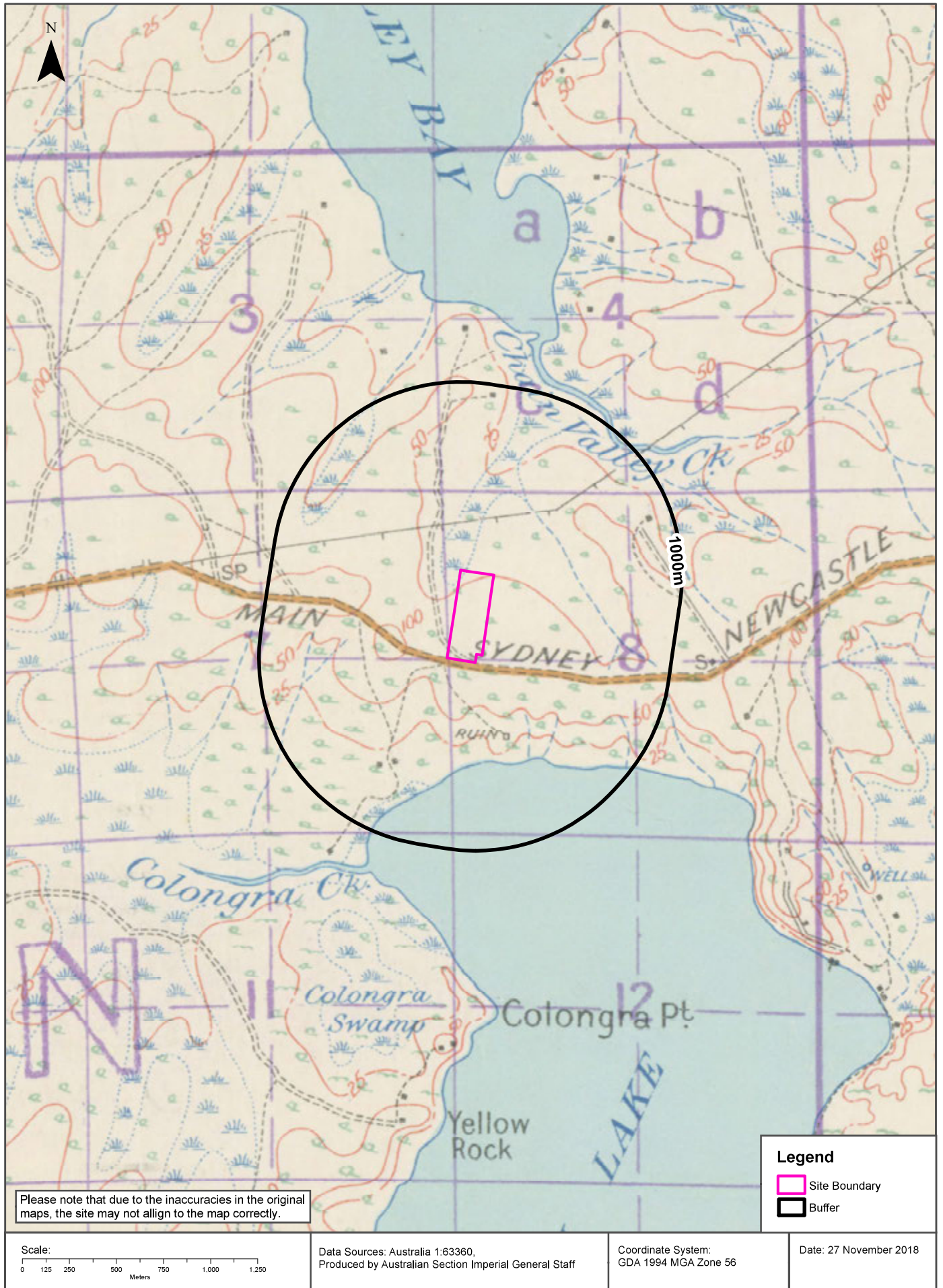
285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Historical Map 1928

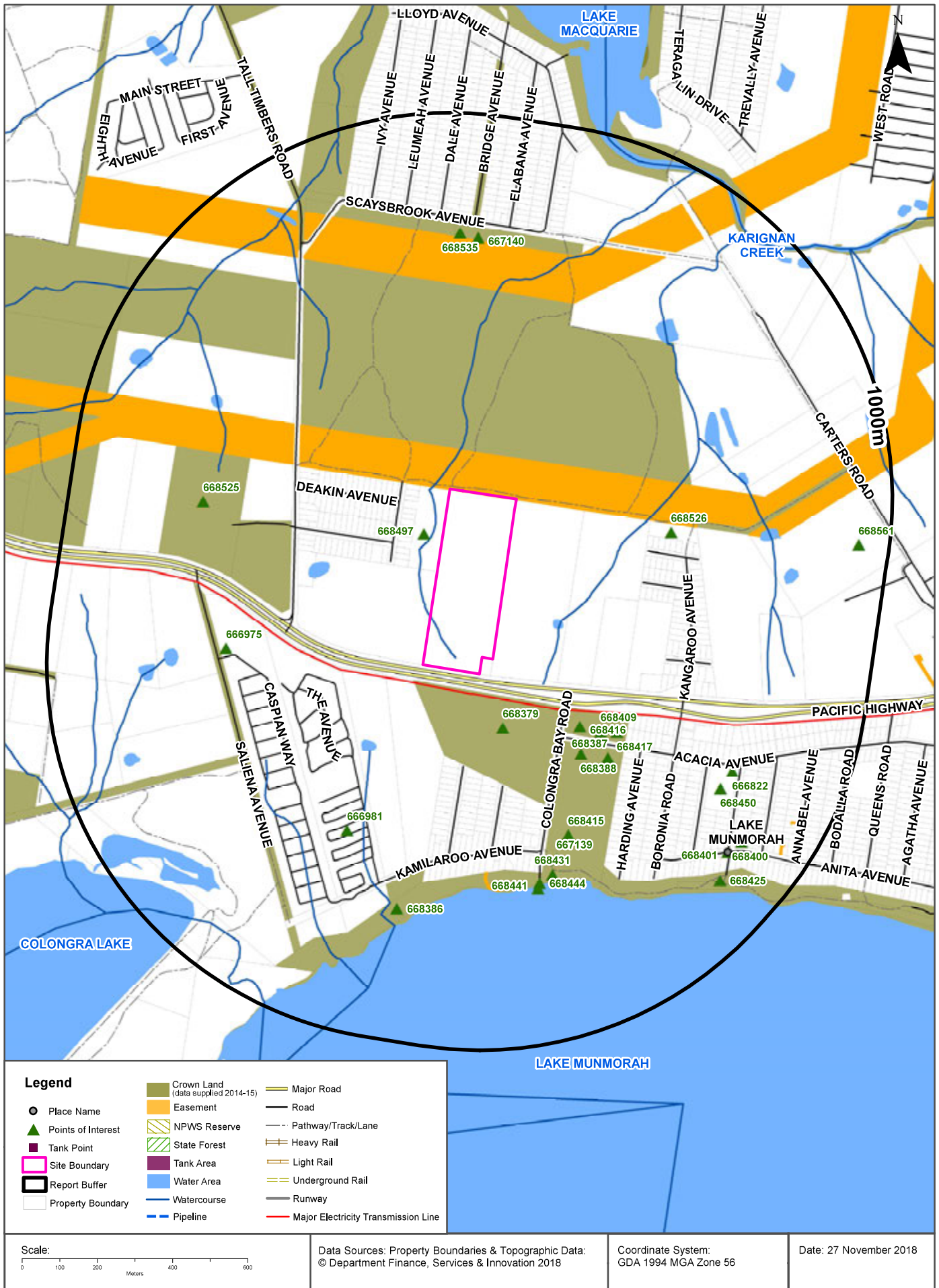
285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Topographic Features

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





## Topographic Features

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
668497	Park	Park	50m	North West
668379	Park	Park	156m	South
668416	Sports Field	BOWLING GREEN	292m	South East
668388	Sports Court	TENNIS COURTS	342m	South East
668409	Club	MUNMORAH UNITED BOWLING CLUB	345m	South East
668417	Sports Field	BOWLING GREEN	382m	South East
668387	Sports Court	NETBALL COURTS	402m	South East
668526	Park	JOEY RESERVE	420m	East
666981	Tourist Park / Home Village	LAKESIDE LEISURE VILLAGE	484m	South West
668415	Sports Field	MUNMORAH SPORTSGROUND	488m	South
666975	Tourist Park / Home Village	LAKE MUNMORAH RESIDENTIAL RESORT	526m	West
667139	Community Facility	LAKE MUNMORAH COLONGRA BAY COMMUNITY HALL	532m	South
668431	Park	MUNMORAH SUMMERLAND POINT LIONS PARK	566m	South
668444	Boat Ramp	Boat Ramp	578m	South
668441	Wharf	Wharf	591m	South
668525	Sports Field	GUMBUYAH OVAL	643m	West
668386	Picnic Area	Picnic Area	651m	South
667140	Community Facility	CHAIN VALLEY BAY COMMUNITY HALL	672m	North
668535	Sports Court	NETBALL COURT	681m	North
668450	Park	RFS PARK	695m	South East
666822	Firestation - Bush	LAKE MUNMORAH RFB	702m	South East
668401	Suburb	LAKE MUNMORAH	808m	South East
668400	Post Office	LAKE MUNMORAH POST OFFICE	820m	South East
668425	Park	MCCULLOCH RESERVE	842m	South East
668561	High School	ST BRIGID'S CATHOLIC COLLEGE	918m	East

Topographic Data Source: © Land and Property Information (2015)

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## Topographic Features

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Tanks (Areas)

What are the Tank Areas located within the dataset buffer?

Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
	No records in buffer					

### Tanks (Points)

What are the Tank Points located within the dataset buffer?

Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
	No records in buffer					

Tanks Data Source: © Land and Property Information (2015)

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## Major Easements

What Major Easements exist within the dataset buffer?

Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
120119209	Primary	Undefined		0m	North
120114795	Primary	Undefined		423m	North West
120115327	Primary	Undefined		467m	East
120113626	Primary	Undefined		527m	South
120118655	Primary	Undefined		544m	North East
120114732	Primary	Undefined		730m	North East
120115326	Primary	Undefined		737m	North West
120111438	Primary	Undefined		869m	North East
120111439	Primary	Undefined		879m	East
120118501	Primary	Undefined		903m	South East
145171819	Primary	Right of way	3.66	912m	South East

Easements Data Source: © Land and Property Information (2015)

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# Topographic Features

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

## State Forest

What State Forest exist within the dataset buffer?

State Forest Number	State Forest Name	Distance	Direction
N/A	No records in buffer		

State Forest Data Source: © Land and Property Information (2015)  
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## National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

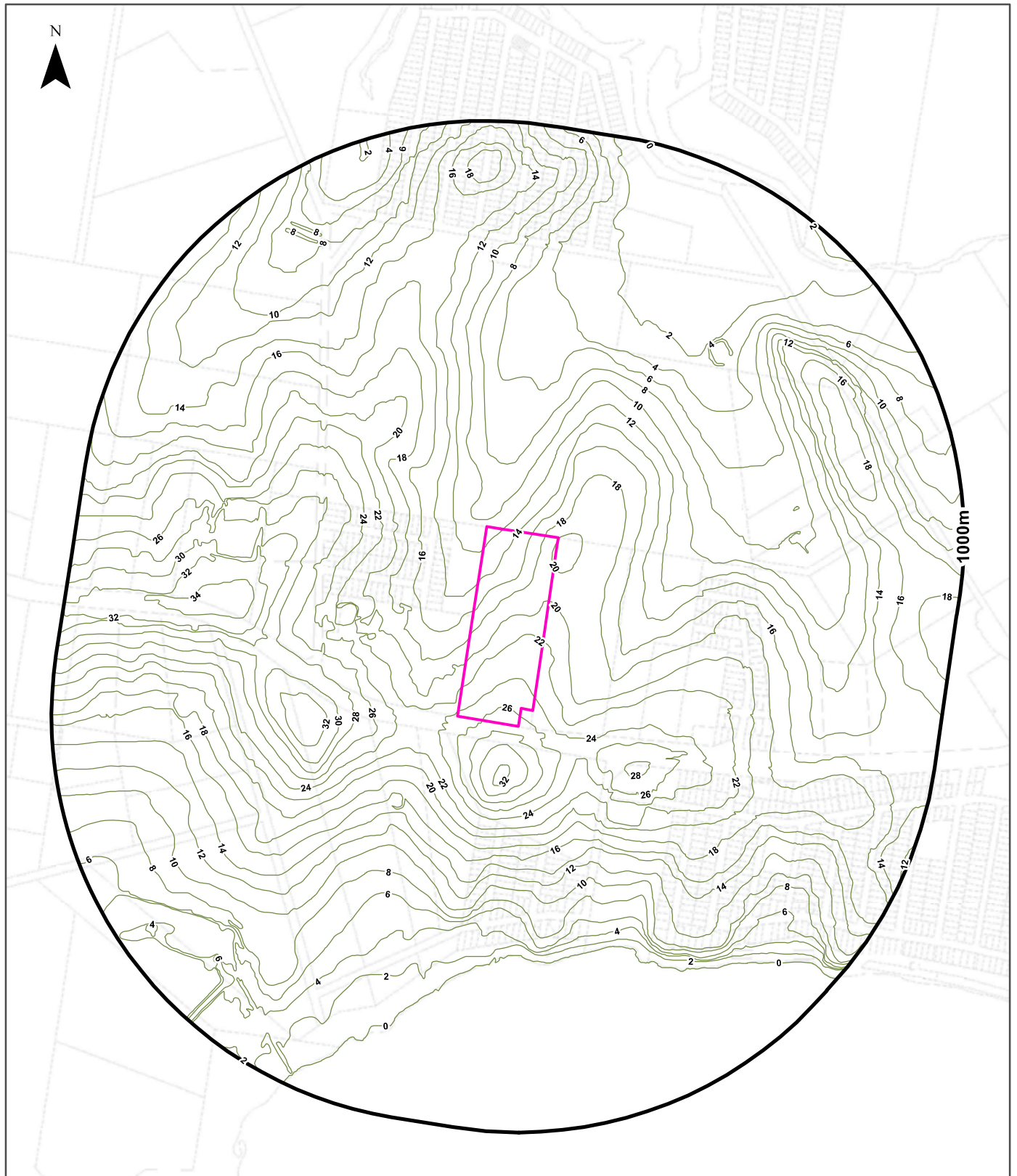
Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N/A	No records in buffer				

NPWS Data Source: © Land and Property Information (2015)  
Creative Commons 3.0 © Commonwealth of Australia <http://creativecommons.org/licenses/by/3.0/au/deed.en>



# Elevation Contours (m AHD)

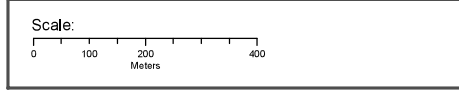
285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



**Legend**

- Elevation Contour (m AHD)
- Site Boundary
- Report Buffer
- Property Boundary

**Accuracy & Currency:** This contour data can be up to 0,4 of the contour interval out in height and must therefore not be used for any design or engineering works, but only as a general guide to topography. Gaps may occur along contour lines due to vertical topography, obscured topography in the source photography such as buildings, dense vegetation or dead ground, or the fact that original buildings have been replaced in the intervening thirty years since the original contour capture.



Data Sources: Property Boundaries & Topographic Data:  
© Department Finance, Services & Innovation 2018

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 27 November 2018

# Hydrogeology & Groundwater

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

## Hydrogeology

Description of aquifers on-site:

Description
Porous, extensive aquifers of low to moderate productivity

Description of aquifers within the dataset buffer:

Description
Porous, extensive aquifers of low to moderate productivity

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)  
Creative Commons 3.0 © Commonwealth of Australia <http://creativecommons.org/licenses/by/3.0/au/deed.en>

## Botany Groundwater Management Zones

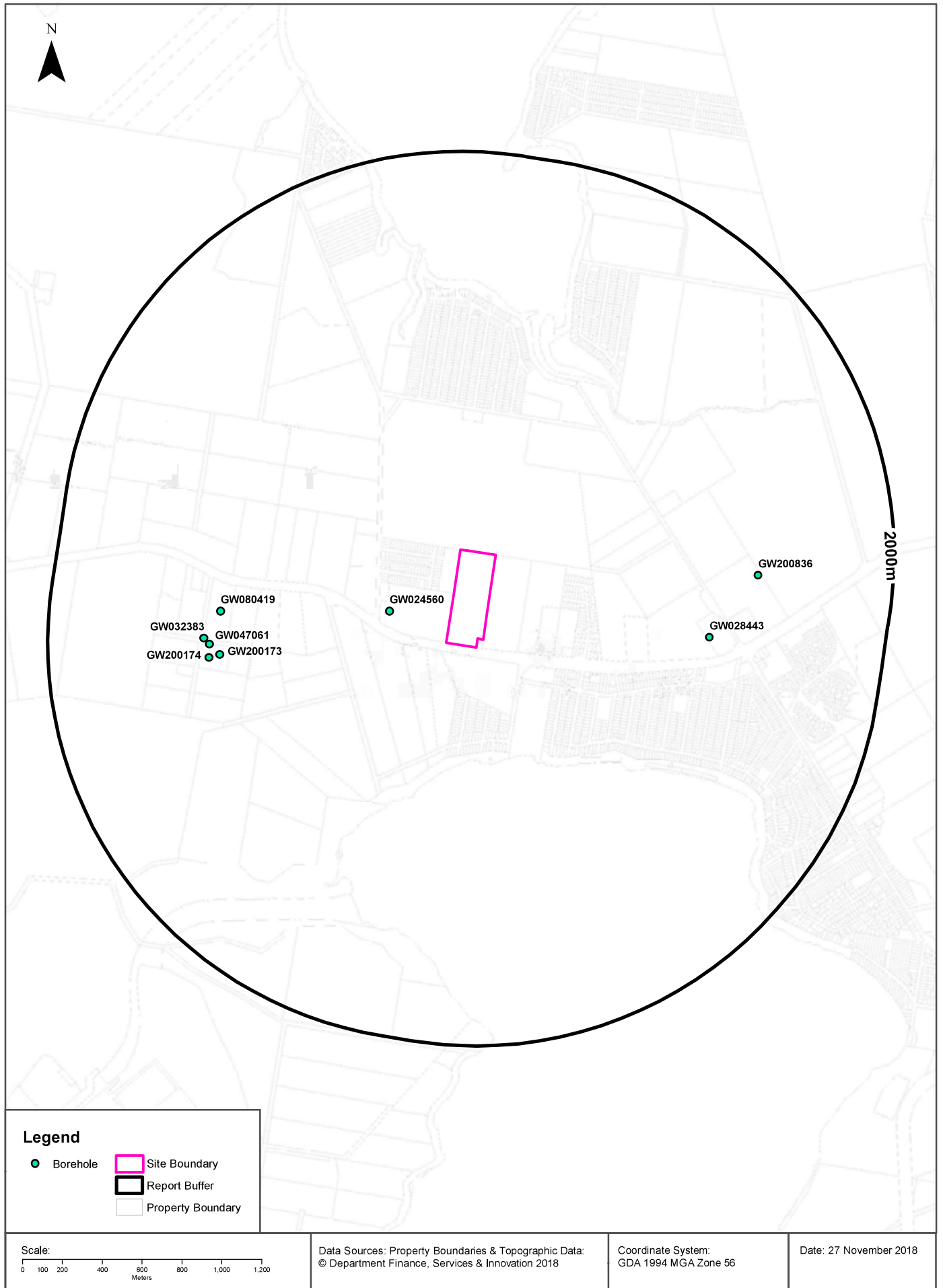
Groundwater management zones relating to the Botany Sand Beds aquifer within the dataset buffer:

Management Zone No.	Restriction	Distance	Direction
N/A	No records in buffer		

Botany Groundwater Management Zones Data Source : NSW Department of Primary Industries

# Groundwater Boreholes

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





# Hydrogeology & Groundwater

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

## Groundwater Boreholes

Boreholes within the dataset buffer:

GW No.	Licence No	Work Type	Owner Type	Authorised Purpose	Intended Purpose	Name	Complete Date	Final Depth (m)	Drilled Depth (m)	Salinity (mg/L)	SWL (m)	Yield (L/s)	Elev (AHD)	Dist	Dir
GW024 560	20BL014 878	Bore open thru rock	Private	Industrial	Industrial			15.20	15.20	Good				304m	West
GW028 443	20BL021 179	Bore open thru rock	Other Govt	Waste Disposal	Domestic		01/09/1967	14.60	14.60	Good				1125m	East
GW200 173	20BL168 715	Bore		Domestic, Stock			17/02/2003							1138m	West
GW080 419	20BL168 505	Bore		Domestic			13/11/2002	30.00	30.00	Good	6.00	5.000		1143m	West
GW047 061	20BL106 746	Bore	Private	Domestic, Irrigation, Stock	Horticulture		01/01/1975	7.30		0-500 ppm				1188m	West
GW200 174	20BL168 714	Bore		Domestic, Stock			17/02/2003							1192m	West
GW032 383	20BL024 651	Bore open thru rock	Private	Domestic, Stock	Domestic, Stock		01/05/1970	18.20	18.30	Good				1215m	West
GW200 836	20BL172 252	Bore	School	Test Bore	Test Bore		13/08/2009	210.00	210.00	375		0.200		1322m	East

Borehole Data Source : NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corporation for all bores prefixed with GW. All other bores © Commonwealth of Australia (Bureau of Meteorology) 2015. Creative Commons 3.0 © Commonwealth of Australia <http://creativecommons.org/licenses/by/3.0/au/deed.en>

# Hydrogeology & Groundwater

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

## Driller's Logs

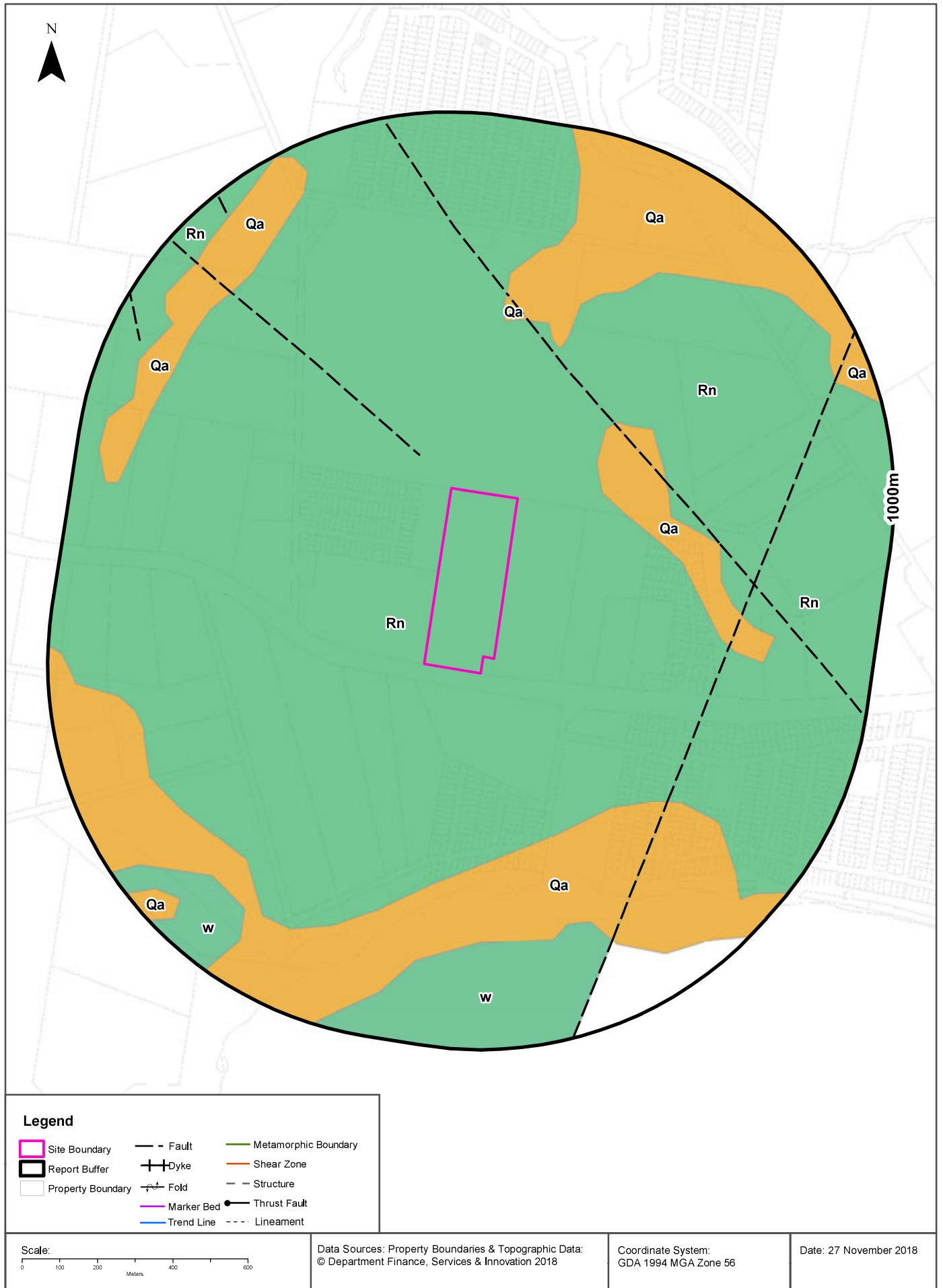
Drill log data relevant to the boreholes within the dataset buffer:

Groundwater No	Drillers Log	Distance	Direction
GW024560	0.00m-0.15m Soil 0.15m-1.67m Stones 1.67m-3.65m Clay 3.65m-7.31m Sandstone 7.31m-13.71m Conglomerate 13.71m-14.02m Clay Water Supply 14.02m-15.24m Conglomerate	304m	West
GW028443	0.00m-0.30m Soil 0.30m-3.96m Clay Stones 3.96m-7.01m Sandstone 7.01m-14.63m Conglomerate Water Supply	1125m	East
GW080419	0.00m-0.30m Top Soil 0.30m-1.30m Pebble 1.30m-30.00m Conclomerate	1143m	West
GW032383	0.00m-0.30m Soil 0.30m-1.37m Clay Gravel 1.37m-8.53m Clay 8.53m-10.66m Sandstone 10.66m-13.41m Conglomerate Loose Water Supply 13.41m-18.28m Conglomerate	1215m	West
GW200836	0.00m-2.00m Sandy Clay, yellow 2.00m-4.50m Clay, red/white 4.50m-9.50m Sandstone, yellow 9.50m-10.00m Sandstone, quartz 10.00m-28.50m Sandstone/Conglomerate 28.50m-28.80m Sandstone/Conglomerate, fractured 28.80m-56.00m Sandstone/Conglomerate 56.00m-58.00m Siltstone, red 58.00m-62.00m Sandstone/Conglomerate 62.00m-82.00m Siltstone, red/grey 82.00m-112.00m Sandstone/Conglomerate 112.00m-118.00m Sandstone, grey 118.00m-119.50m Coal 119.50m-121.00m Sandstone, grey 121.00m-136.00m Sandstone/Conglomerate 136.00m-138.50m Coal 138.50m-141.00m Siltstone, grey 141.00m-167.00m Sandstone/Conglomerate 167.00m-174.00m Coal 174.00m-205.00m Sandstone/Conglomerate 205.00m-208.00m Coal 208.00m-210.00m Sandstone/Conglomerate	1322m	East

Drill Log Data Source: NSW Department of Primary Industries - Office of Water / Water Administration Ministerial Corp  
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# Geology 1:250,000

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259





## Geology

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Geological Units

What are the Geological Units onsite?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Rn	Sandstone, interbedded sandstone and siltstone, claystone. conglomerate and sandstone (Widden Brook conglomerate)	Narrabeen Group	Narrabeen Group	Clifton Subgroup	Mesozoic			1:250,000

What are the Geological Units within the dataset buffer?

Symbol	Description	Unit Name	Group	Sub Group	Age	Dom Lith	Map Sheet	Dataset
Qa	Undifferentiated alluvial deposits; sand, silt, clay and gravel; some residual and colluvial deposits. Includes some channel, levee, lacustrine, floodplain and swamp deposits. May include some higher level Tertiary terraces	undifferentiated			Cainozoic			1:250,000
Rn	Sandstone, interbedded sandstone and siltstone, claystone. conglomerate and sandstone (Widden Brook conglomerate)	Narrabeen Group	Narrabeen Group	Clifton Subgroup	Mesozoic			1:250,000
w	Water				Cainozoic			1:250,000

### Geological Structures

What are the Geological Structures onsite?

Feature	Name	Description	Map Sheet	Dataset
No features				1:250,000

What are the Geological Structures within the dataset buffer?

Feature	Name	Description	Map Sheet	Dataset
Fault		Fault, Accurate	Bohena	1:250,000
Fault		Fault, Accurate	Bohena	1:250,000
Fault		Fault, Accurate	Bohena	1:250,000
Fault		Fault, Accurate	Bohena	1:250,000
Fault		Fault, Concealed	Bohena	1:250,000
Fault		Fault, Concealed	Bohena	1:250,000
Fault		Fault, Accurate	Bohena	1:250,000
Fault		Fault, Concealed	Bohena	1:250,000

Feature	Name	Description	Map Sheet	Dataset
Fault		Fault, Concealed	Bohena	1:250,000
Fault		Fault, Accurate	Bohena	1:250,000
Fault		Fault, Concealed	Bohena	1:250,000
Fault		Fault, Concealed	Bohena	1:250,000
Fault		Fault, Accurate	Bohena	1:250,000
Fault		Fault, Accurate	Bohena	1:250,000
Fault		Fault, Accurate	Bohena	1:250,000
Fault		Fault, Accurate	Bohena	1:250,000
Fault		Fault, Concealed	Bohena	1:250,000
Fault		Fault, Accurate	Bohena	1:250,000
Fault		Fault, Accurate	Bohena	1:250,000

Geological Data Source : NSW Department of Industry, Resources & Energy  
 © State of New South Wales through the NSW Department of Industry, Resources & Energy

# Naturally Occurring Asbestos Potential

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

## Naturally Occurring Asbestos Potential

Naturally Occurring Asbestos Potential within the dataset buffer:

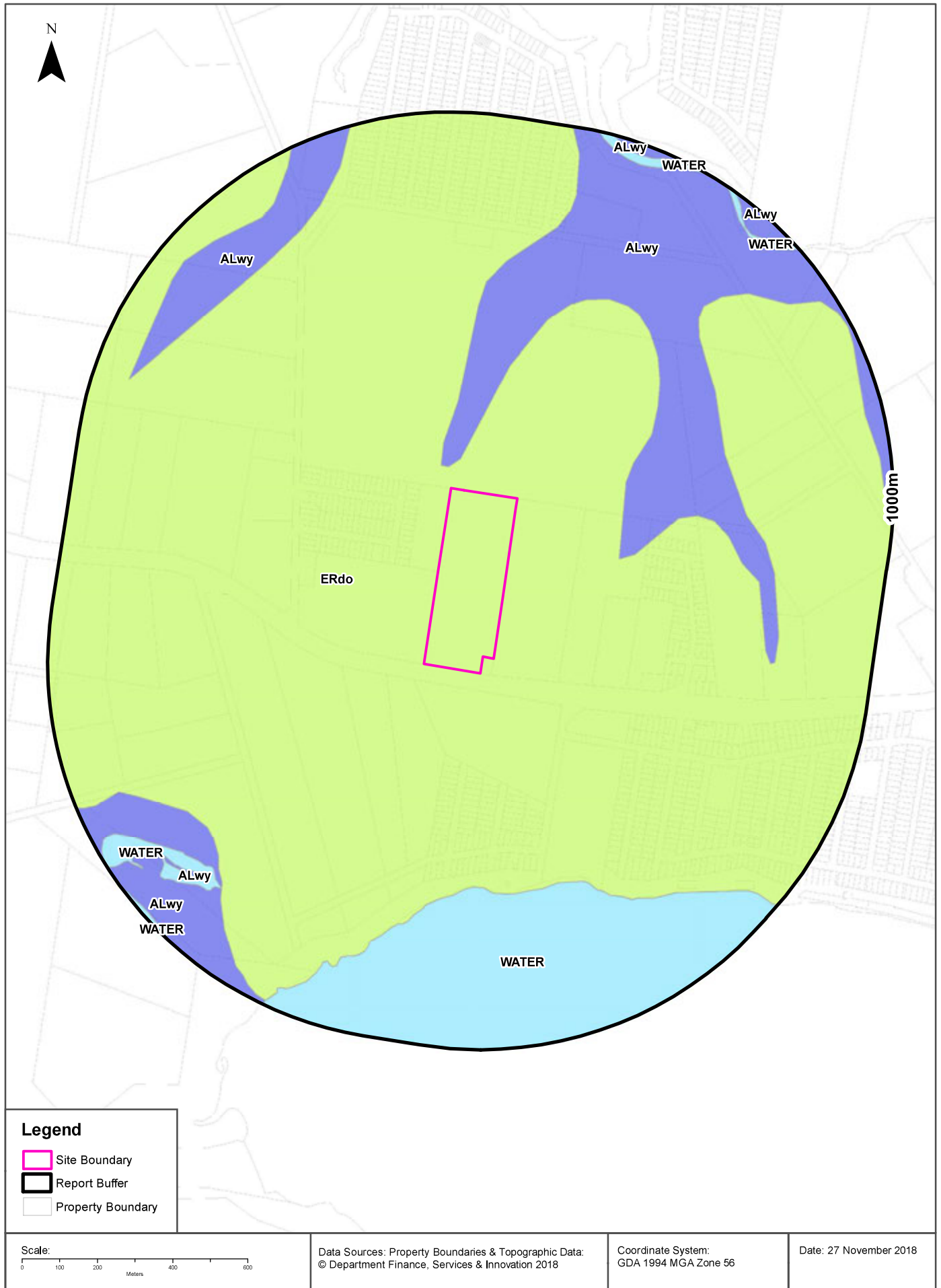
Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Mining Subsidence District Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy



# Soil Landscapes

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



## Soils

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Soil Landscapes

What are the onsite Soil Landscapes?

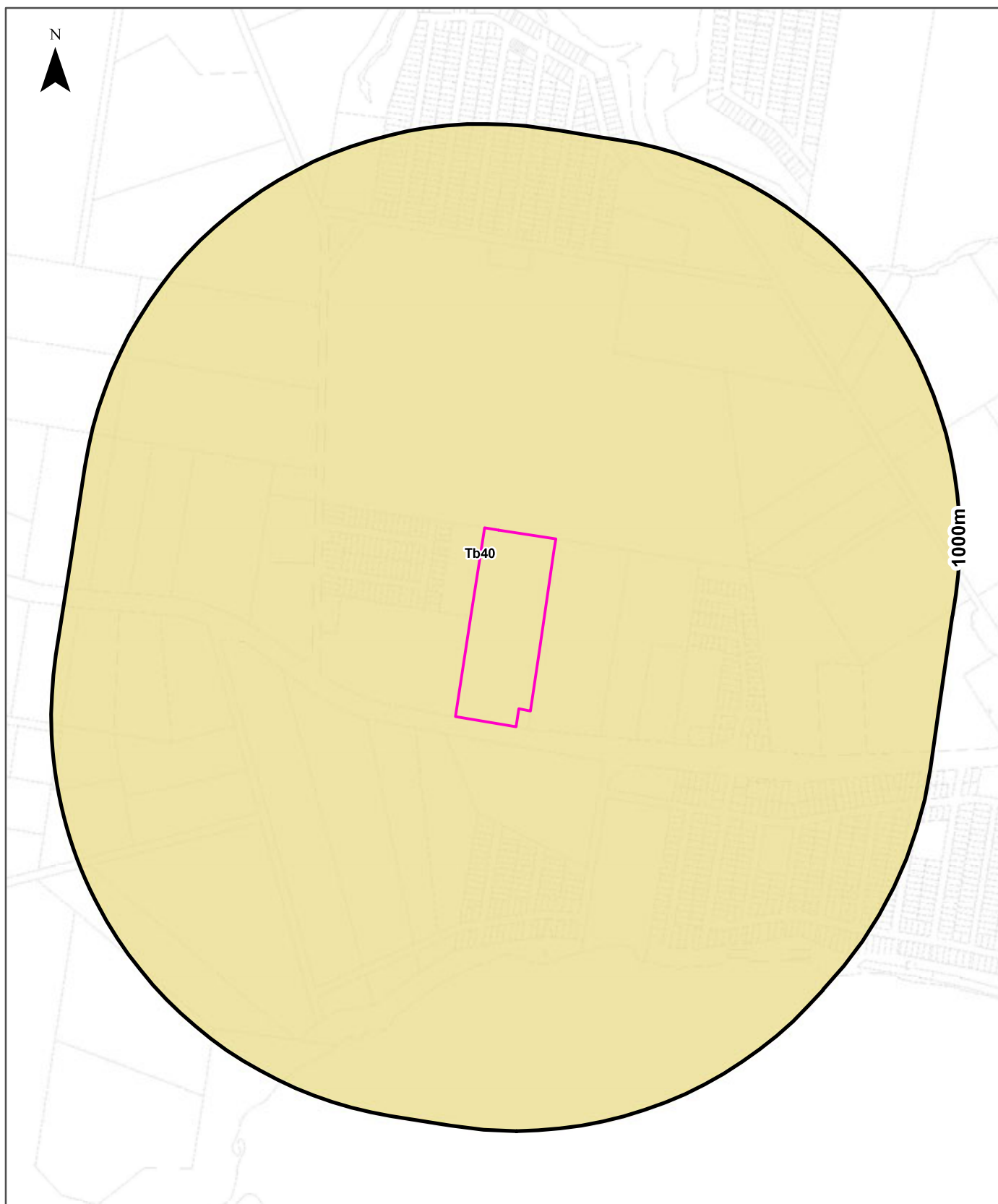
Soil Code	Name	Group	Process	Map Sheet	Scale
ERdo	DOYALSON		EROSIONAL	Gosford & Lake Macquarie	1:100,000

What are the Soil Landscapes within the dataset buffer?

Soil Code	Name	Group	Process	Map Sheet	Scale
ALwy	WYONG		ALLUVIAL	Gosford & Lake Macquarie	1:100,000
ERdo	DOYALSON		EROSIONAL	Gosford & Lake Macquarie	1:100,000
WATER	WATER		WATER	Gosford & Lake Macquarie	1:100,000

Soils Landscapes Data Source : NSW Office of Environment and Heritage

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<b>Legend</b> Site Boundary Report Buffer Property Boundary		<b>Australian Soil Classification Orders</b> <table border="0"> <tr> <td> Anthrosol</td> <td> Dermosol</td> <td> Kandosol</td> <td> Podosol</td> <td> Tenosol</td> <td> No Data</td> </tr> <tr> <td> Calcarosol</td> <td> Ferrosol</td> <td> Kurosol</td> <td> Rudosol</td> <td> Vertosol</td> <td></td> </tr> <tr> <td> Chromosol</td> <td> Hydrosol</td> <td> Organosol</td> <td> Sodosol</td> <td> Lake</td> <td></td> </tr> </table>						Anthrosol	Dermosol	Kandosol	Podosol	Tenosol	No Data	Calcarosol	Ferrosol	Kurosol	Rudosol	Vertosol		Chromosol	Hydrosol	Organosol	Sodosol	Lake	
Anthrosol	Dermosol	Kandosol	Podosol	Tenosol	No Data																				
Calcarosol	Ferrosol	Kurosol	Rudosol	Vertosol																					
Chromosol	Hydrosol	Organosol	Sodosol	Lake																					
<b>Scale:</b> 		Data Sources: Property Boundaries & Topographic Data. © Department Finance, Services & Innovation 2018		Coordinate System: GDA 1994 MGA Zone 56		Date: 27 November 2018																			



## Soils

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Atlas of Australian Soils

Soil mapping units and Australian Soil Classification orders within the dataset buffer:

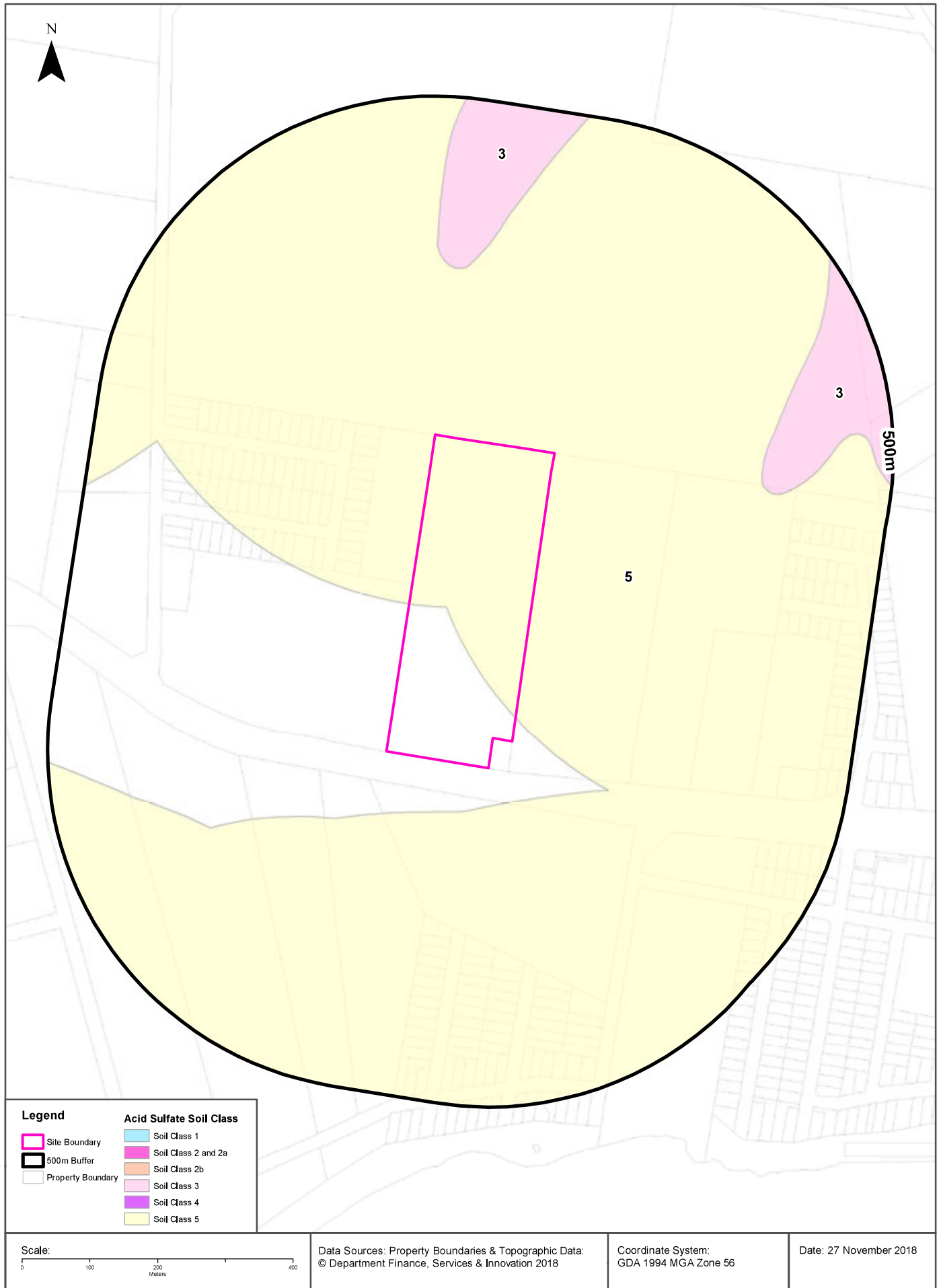
Map Unit Code	Soil Order	Map Unit Description	Distance
Tb40	Kurosol	Undulating to hilly areas with some steep slopes and cliffs, rock outcrops, and narrow terraced valleys: chief soils are hard acidic yellow mottled soils (Dy3.41) with some shallow soils such as (Um4.1) and (Uc4.1) on the steeper slopes. Associated are: (Gn2.2) soils and (Dd1) soils, both of which occur on slopes; undescribed soils in the valleys; and some (Dy5) and (Uc1 .2) soils along the coast. As mapped, small areas of units Gb10 and Cb28 are included.	0m

Atlas of Australian Soils Data Source: CSIRO

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# Acid Sulfate Soils

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



## Acid Sulfate Soils

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Environmental Planning Instrument - Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

Soil Class	Description	EPI
5	Works within 500 metres of adjacent Class 1, 2, 3, or 4 land that is below 5 metres AHD and by which the watertable is likely to be lowered below 1 metre AHD on adjacent Class 1, 2, 3 or 4 land, present an environmental risk	Wyong Local Environmental Plan 2013

If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	EPI	Distance	Direction
3	Works more than 1 metre below natural ground surface present an environmental risk; Works by which the watertable is likely to be lowered more than 1 metre below natural ground surface, present an environmental risk	Wyong Local Environmental Plan 2013	248m	North

Acid Sulfate Data Source Accessed 23/10/2018: NSW Crown Copyright - Planning and Environment  
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# Atlas of Australian Acid Sulfate Soils

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



<b>Legend</b>			
Site Boundary	<b>Probability of occurrence of Acid Sulfate Soils</b>		
Report Buffer	A. High (>70%)	C. Extremely Low (1-5%)	No Data
Property Boundary	B. Low (6-70%)	D. No Chance (0%)	
<b>Scale:</b> 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data. © Department Finance, Services & Innovation 2018	Coordinate System: GDA 1994 MGA Zone 56	Date: 27 November 2018



## Acid Sulfate Soils

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m
B	Low Probability of occurrence. 6-70% chance of occurrence.	248m
A	High Probability of occurrence. >70% chance of occurrence.	555m

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

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## Dryland Salinity

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

No

Is there Dryland Salinity - National Assessment data within the dataset buffer?

No

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
N/A	N/A	N/A	N/A	N/A

Dryland Salinity Data Source : National Land and Water Resources Audit

The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.

In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

### Dryland Salinity Potential of Western Sydney

Dryland Salinity Potential of Western Sydney within the dataset buffer?

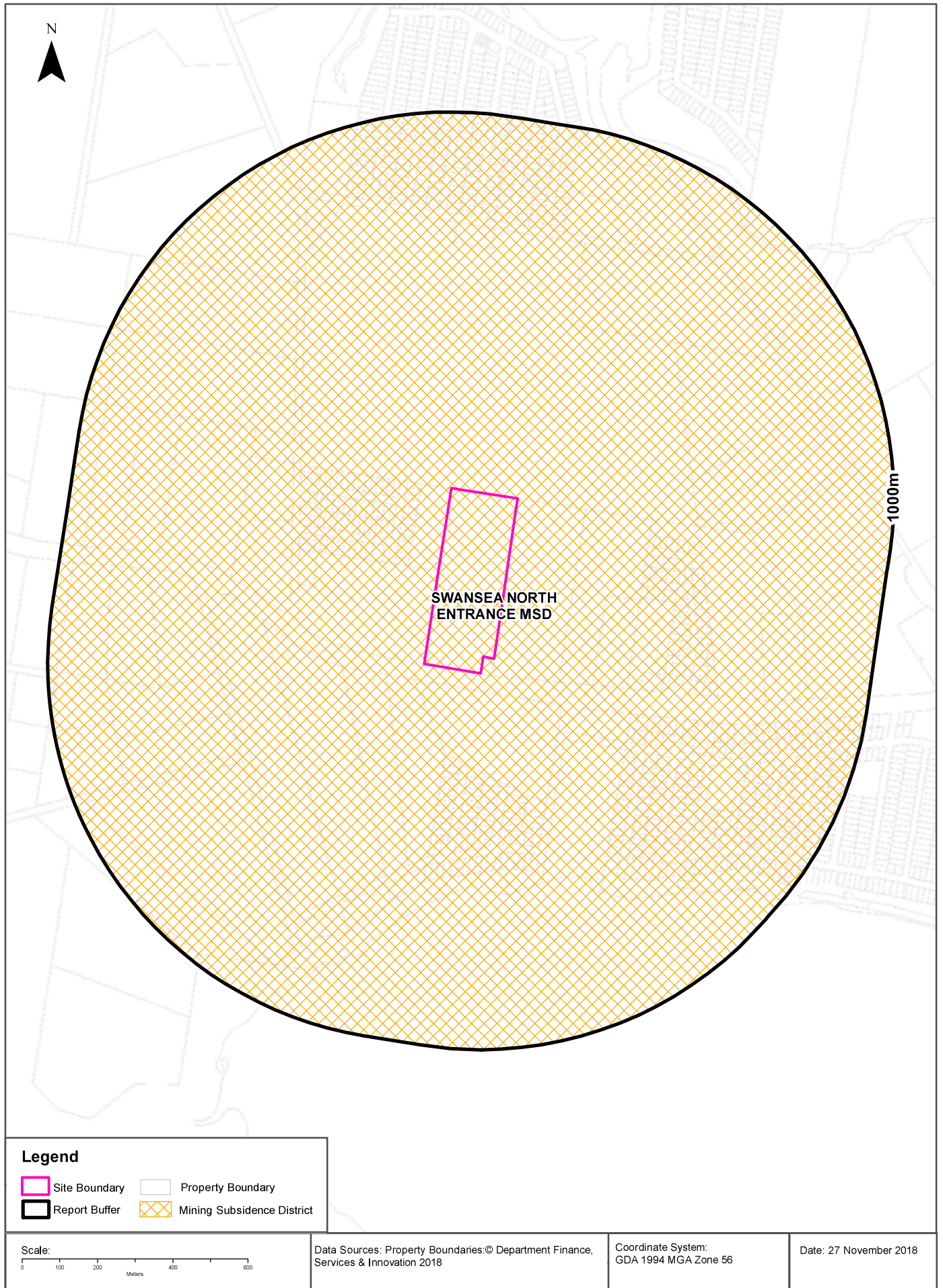
Feature Id	Classification	Description	Distance	Direction
N/A	Outside Data Coverage			

Dryland Salinity Potential of Western Sydney Data Source : NSW Office of Environment and Heritage

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# Mining Subsidence Districts

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



## Mining Subsidence Districts

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

## Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

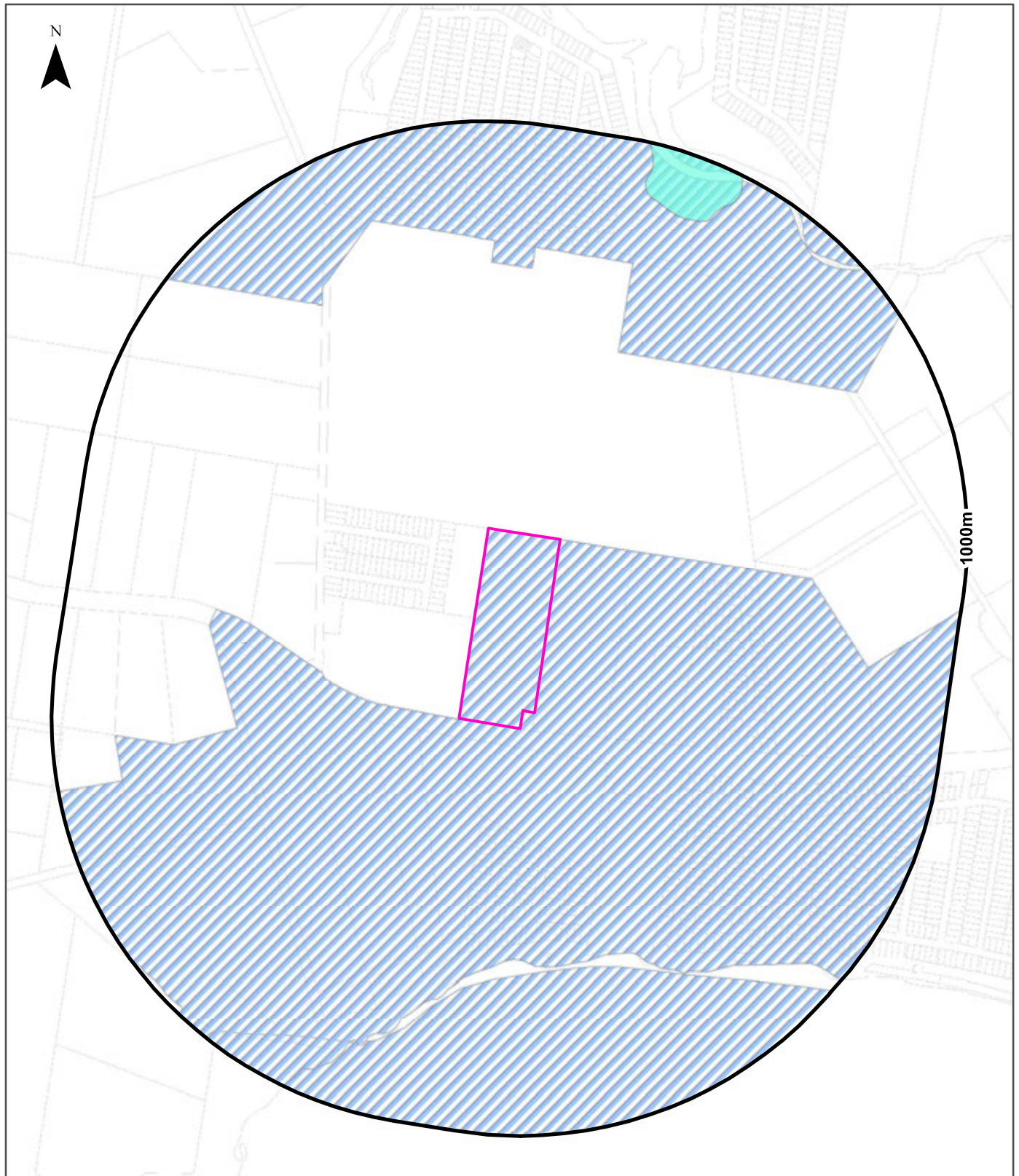
District	Distance	Direction
SWANSEA NORTH ENTRANCE	0m	Onsite

Mining Subsidence District Data Source: © Land and Property Information (2016)  
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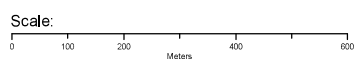
# State Environmental Planning Policy

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



## Legend

Site Boundary	SEPP 14 - Coastal Wetlands	Strategic Land Use - Future Residential Growth Areas
Report Buffer	SEPP 26 - Littoral Rainforests	Strategic Land Use - Additional Rural Village Land
Property Boundary	SEPP 71 - Coastal Protection	Strategic Land Use -Biophysical Strategic Agricultural Land
	SEPP Major Developments 2005	Strategic Land Use -Critical Industry Cluster (Equine)
		Strategic Land Use -Critical Industry Cluster (Viticulture)



Data Sources: Property Boundaries & Topographic Data:  
© Department Finance, Services & Innovation 2018

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 27 November 2018

## Environmental Zoning

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### State Environmental Planning Policy Protected Areas

Are there any State Environmental Planning Policy Protected Areas onsite or within the dataset buffer?

Dataset	Onsite	Within Site Buffer	Distance
SEPP14 - Coastal Wetlands	No	Yes	846m
SEPP26 - Littoral Rainforests	No	No	N/A
SEPP71 - Coastal Protection Zone	Yes - SEPP71 covers 99.82% of the site	Yes	0m

SEPP Protected Areas Data Source: NSW Department of Planning & Environment  
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### State Environmental Planning Policy Major Developments (2005)

State Environmental Planning Policy Major Developments within the dataset buffer:

Map Id	Feature	Effective Date	Distance	Direction
N/A	No records within buffer			

SEPP Major Development Data Source: NSW Department of Planning & Environment  
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### State Environmental Planning Policy Strategic Land Use Areas

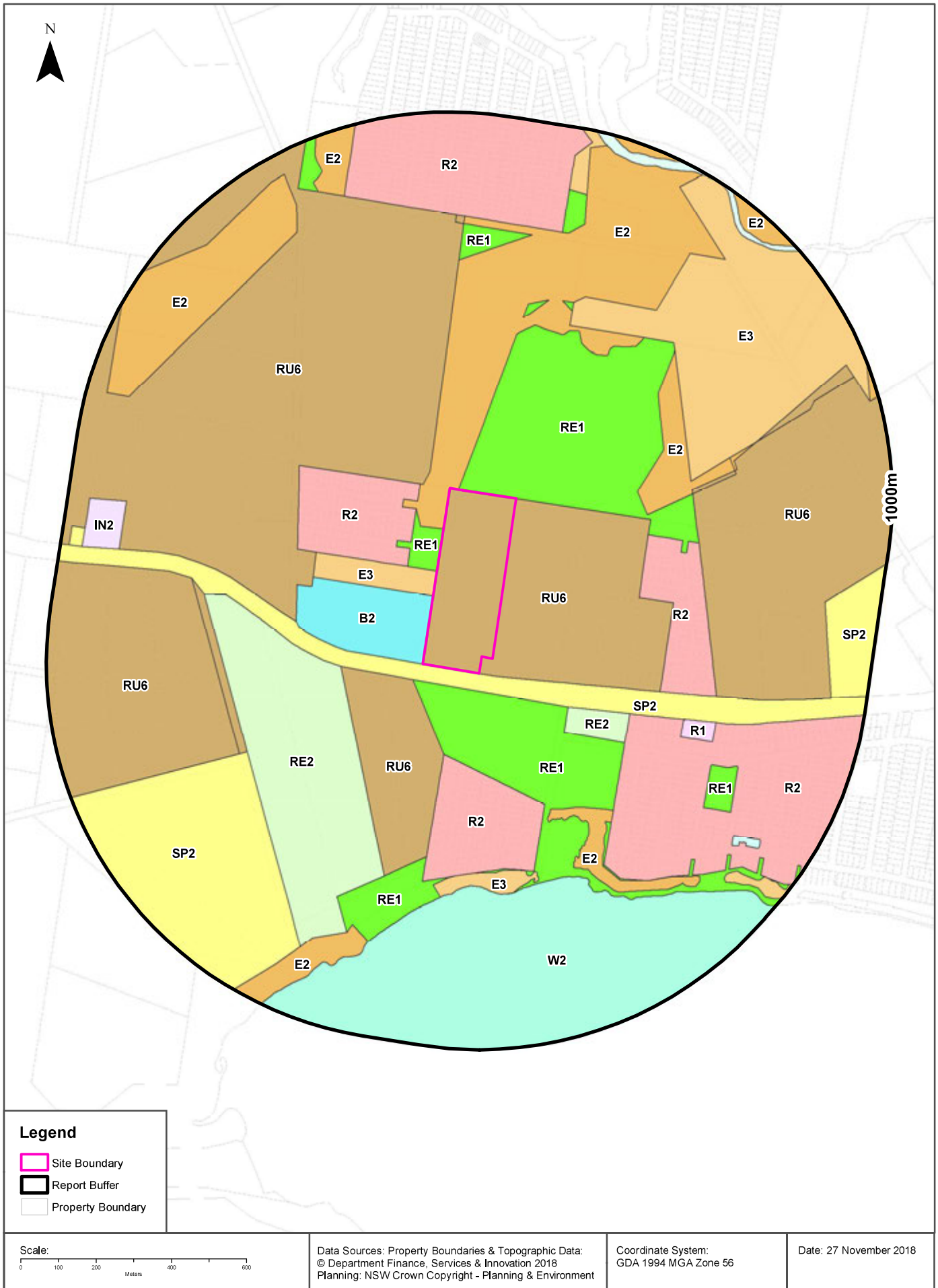
State Environmental Planning Policy Strategic Land Use Areas onsite or within the dataset buffer:

Strategic Land Use	SEPPNo	Effective Date	Amendment	Amendment Year	Distance	Direction
No records within buffer						

SEPP Strategic Land Use Data Source: NSW Department of Planning & Environment  
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# EPI Planning Zones

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



# Environmental Planning Instrument

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

## Land Zoning

What Environmental Planning Instrument Land Zones exist within the dataset buffer?

Zone	Description	Purpose	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RU6	Transition		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		0m	Onsite
B2	Local Centre		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		0m	West
E2	Environmental Conservation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		0m	North
E3	Environmental Management		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		0m	West
RE1	Public Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		0m	North East
SP2	Infrastructure	Road & Traffic Facility	Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		0m	West
RE1	Public Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		44m	South East
RU6	Transition		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		48m	South
RU6	Transition		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		67m	North West
R2	Low Density Residential		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		79m	North West
RE2	Private Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		214m	South West
R2	Low Density Residential		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		228m	South
RE2	Private Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		238m	South East
E2	Environmental Conservation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		322m	North East
R2	Low Density Residential		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		361m	East
R2	Low Density Residential		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		392m	South East
E2	Environmental Conservation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		408m	South East
E3	Environmental Management		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		466m	North East
RU6	Transition		Wyong Local Environmental Plan 2013	03/02/2017	03/02/2017	17/08/2018	Amendment No 24	467m	East
RU6	Transition		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		468m	East
RE1	Public Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		479m	North
RE1	Public Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		504m	South
RU6	Transition		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		510m	West
RE1	Public Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		521m	North
SP2	Infrastructure	Electricity Generating Works	Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		521m	South West
E3	Environmental Management		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		528m	South
R1	General Residential		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		532m	South East



Zone	Description	Purpose	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RU6	Transition		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		532m	West
W2	Recreational Waterways		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		566m	South
E2	Environmental Conservation		Wyong Local Environmental Plan 2013	03/02/2017	03/02/2017	17/08/2018	Amendment No 24	577m	North East
E3	Environmental Management		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		591m	South East
RE1	Public Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		607m	North
RE1	Public Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		645m	South East
RU6	Transition		Wyong Local Environmental Plan 2013	03/02/2017	03/02/2017	17/08/2018	Amendment No 24	654m	North East
RU6	Transition		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		705m	North
E2	Environmental Conservation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		715m	South West
R2	Low Density Residential		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		718m	North
RE1	Public Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		718m	North
E2	Environmental Conservation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		770m	North West
B1	Neighbourhood Centre		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		793m	South East
E2	Environmental Conservation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		826m	North
E3	Environmental Management		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		829m	North
IN2	Light Industrial		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		843m	West
E3	Environmental Management		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		845m	South East
SP2	Infrastructure	Educational Establishment	Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		852m	East
RE1	Public Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		862m	North
W1	Natural Waterways		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		922m	North East
RE1	Public Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		935m	South East
E2	Environmental Conservation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		936m	North East
SP2	Infrastructure	Telecommunications Network	Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		940m	West
E2	Environmental Conservation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		974m	East
RE1	Public Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		979m	South East
RE1	Public Recreation		Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	17/08/2018		994m	South East

Environmental Planning Instrument Data Source: NSW Crown Copyright - Planning & Environment  
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## Environmental Planning Instrument

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Minimum Lot Size

What are the onsite Environmental Planning Instrument Minimum Lot Sizes?

Symbol	Minimum Lot Size	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
AB2	40 ha	Wyong Local Environmental Plan 2013	12/12/2013	12/12/2013	17/08/2018		100

### Maximum Height of Buildings

What are the onsite Environmental Planning Instrument Maximum Height of Buildings?

Symbol	Maximum Height of Building	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
No Data							

### Floor Space Ratio

What are the onsite Environmental Planning Instrument Floor Space Ratios?

Symbol	Floor Space Ratio	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
No Data							

### Land Application

What are the onsite Environmental Planning Instrument Land Applications?

Application Type	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Percentage of Site Area
Included	Wyong Local Environmental Plan 2013	18/11/2015	18/11/2015	18/11/2015	State Environmental Planning Policy Amendment (Wyong) 2015	100

### Land Reservation Acquisition

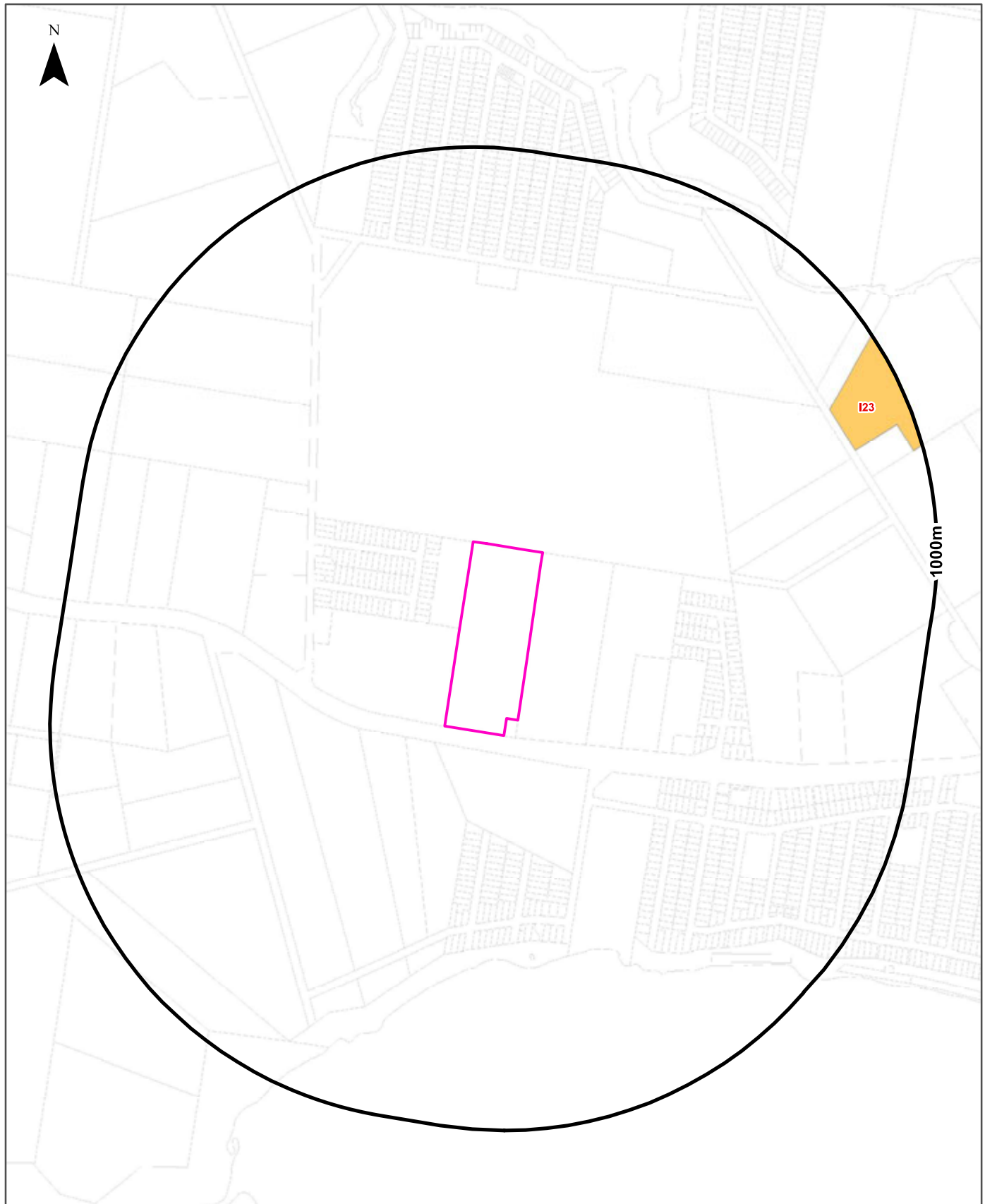
What are the onsite Environmental Planning Instrument Land Reservation Acquisitions?

Reservation	LEP or SEPP	Published Date	Commenced Date	Currency Date	Amendment	Comments	Percentage of Site Area
No Data							

Environmental Planning Instrument Data Source: NSW Crown Copyright - Planning & Environment  
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# Heritage Items

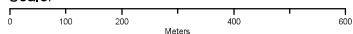
285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



## Legend

- Site Boundary
- State Heritage Items
- Property Boundary
- Report Buffer
- Local Heritage Items

## Scale:



Data Sources: Property Boundaries & Topographic Data:  
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Heritage - NSW Crown Copyright - Planning & Environment

Coordinate System:  
GDA 1994 MGA Zone 56

Date: 27 November 2018

## Heritage

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### State Heritage Register - Curtilages

What are the State Heritage Register Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: NSW Crown Copyright - Office of Environment & Heritage  
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### Environmental Planning Instrument - Heritage

What are the EPI Heritage Items located within the dataset buffer?

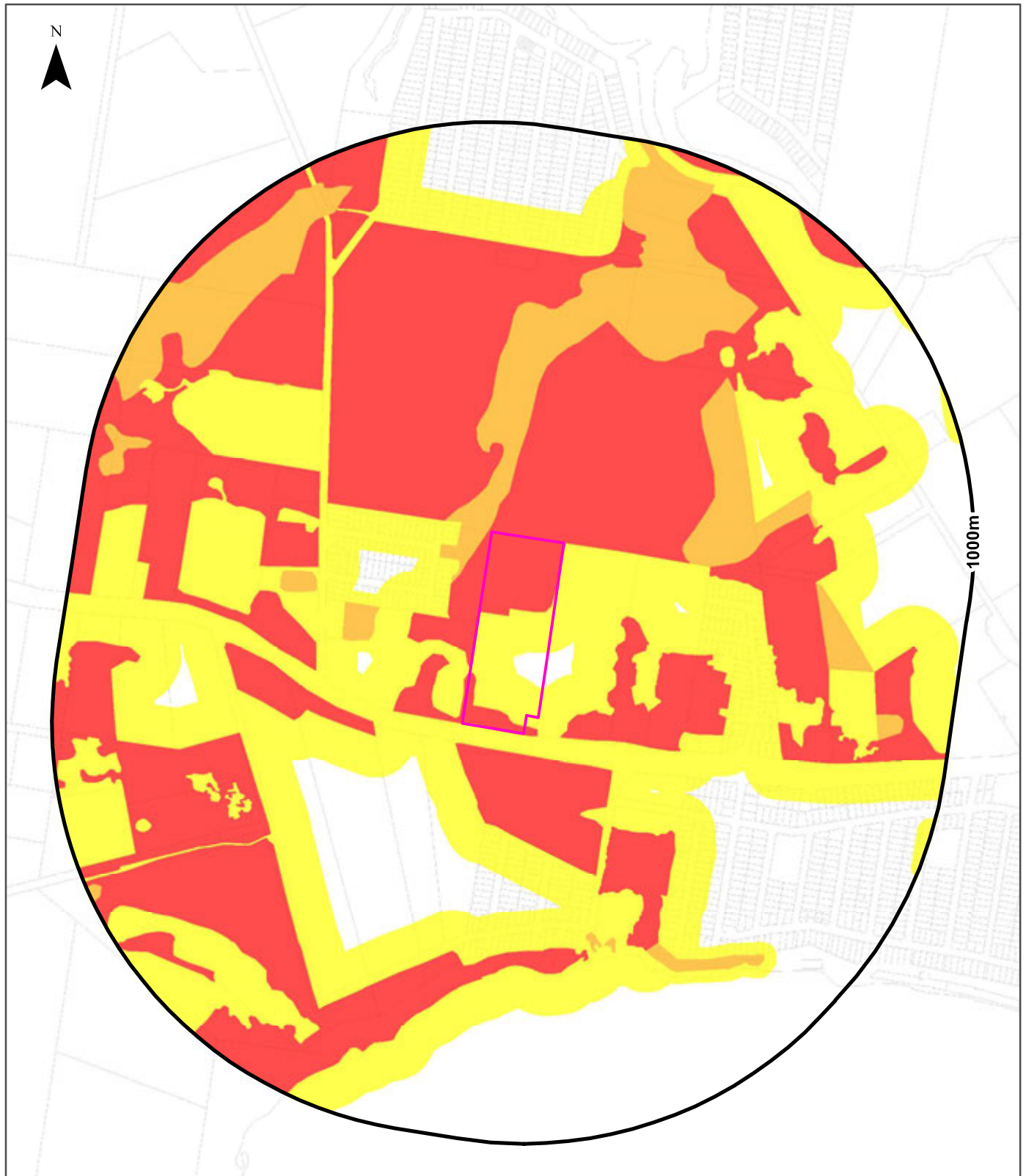
Map Id	Name	Classification	Significance	EPI	Published Date	Commenced Date	Currency Date	Distance	Direction
I23	Farm homestead complex	Item - General	Local	Wyong Local Environmental Plan 2013	23/12/2013	23/12/2013	03/02/2017	811m	North East

Heritage Data Source: NSW Crown Copyright - Planning & Environment  
Creative Commons 4.0 © Commonwealth of Australia <https://creativecommons.org/licenses/by/4.0/>

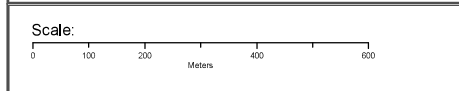


# Natural Hazards - Bush Fire Prone Land

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



Legend	
Site Boundary	Vegetation Category 1
Report Buffer	Vegetation Category 2
Property Boundary	Vegetation Category 3
	Vegetation Buffer



Data Sources: Bush Fire Prone Land: © NSW Rural Fire Service 2018, Property Boundaries: © Department Finance, Services & Innovation 2018

Coordinate System: GDA 1994 MGA Zone 56

Date: 27 November 2018

## Natural Hazards

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Bush Fire Prone Land

What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
Vegetation Buffer	0m	Onsite
Vegetation Category 1	0m	Onsite
Vegetation Category 2	7m	North

NSW Bush Fire Prone Land - © NSW Rural Fire Service under Creative Commons 4.0 International Licence



## Ecological Constraints

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Lower Hunter and Central Coast Regional Vegetation Survey

What vegetation from the Lower Hunter and Central Coast Regional Survey exists within the dataset buffer?

Map id	Unit Desc	Canopy Code	Canopy Cover	Species	Distance	Direction
31	Coastal Plains Scribbly Gum Woodland	OF	Mid Dense (Open Forest) 50- <100% cover	E. haemostoma / C. gummifera / E. capitellata / A. inopina	0m	Onsite
31	Coastal Plains Scribbly Gum Woodland	WO	Sparse (Woodland) 20- <50% cover	E. haemostoma / C. gummifera / E. capitellata / A. inopina	0m	Onsite
30	Coastal Plains Smooth-barked Apple Woodland	WO	Sparse (Woodland) 20- <50% cover	A. costata / C. gummifera / E. capitellata / E. umbra	0m	Onsite
42	Riparian Melaleuca Swamp Woodland	WO	Sparse (Woodland) 20- <50% cover	Melaleuca sieberi / E. robusta	0m	Onsite
42	Riparian Melaleuca Swamp Woodland	OF	Mid Dense (Open Forest) 50- <100% cover	Melaleuca sieberi / E. robusta	0m	Onsite
30	Coastal Plains Smooth-barked Apple Woodland	OF	Mid Dense (Open Forest) 50- <100% cover	A. costata / C. gummifera / E. capitellata / E. umbra	0m	Onsite
31	Coastal Plains Scribbly Gum Woodland	OW	Very Sparse (Open Woodland) 10-20% cover	E. haemostoma / C. gummifera / E. capitellata / A. inopina	1m	East
30	Coastal Plains Smooth-barked Apple Woodland	OW	Very Sparse (Open Woodland) 10-20% cover	A. costata / C. gummifera / E. capitellata / E. umbra	4m	North East
42a	Melaleuca Scrub	OF	Mid Dense (Open Forest) 50- <100% cover	Melaleuca sieberi / Gahnia clarkei	88m	North
42	Riparian Melaleuca Swamp Woodland	OW	Very Sparse (Open Woodland) 10-20% cover	Melaleuca sieberi / E. robusta	120m	East
42a	Melaleuca Scrub	OW	Very Sparse (Open Woodland) 10-20% cover	Melaleuca sieberi / Gahnia clarkei	218m	East
37	Swamp Mahogany - Paperbark Forest	OW	Very Sparse (Open Woodland) 10-20% cover	Melaleuca quinquinervia / E. robusta / C. glauca	301m	East
37	Swamp Mahogany - Paperbark Forest	OF	Mid Dense (Open Forest) 50- <100% cover	Melaleuca quinquinervia / E. robusta / C. glauca	343m	East
41	Swamp Oak Sedge Forest	OF	Mid Dense (Open Forest) 50- <100% cover	Casuarina glauca / Melaleuca linariifolia / Carex appressa	443m	North East
11	Coastal Sheltered Apple - Peppermint Forest	OF	Mid Dense (Open Forest) 50- <100% cover	A. costata / E. piperita	492m	South East
Water	Water	OF	Mid Dense (Open Forest) 50- <100% cover	Water	540m	North East
40	Swamp Oak Rushland Forest	OF	Mid Dense (Open Forest) 50- <100% cover	C. glauca / Melaleuca ericifolia / Baumea juncea	548m	South
43	Wyong Paperbark Swamp Forest	OF	Mid Dense (Open Forest) 50- <100% cover	Melaleuca nodosa / C. maculata	765m	South West
42a	Melaleuca Scrub	S	Scrub	Melaleuca sieberi / Gahnia clarkei	769m	North
31	Coastal Plains Scribbly Gum Woodland	W	Wetland	E. haemostoma / C. gummifera / E. capitellata / A. inopina	775m	South West
30	Coastal Plains Smooth-barked Apple Woodland	S	Scrub	A. costata / C. gummifera / E. capitellata / E. umbra	784m	North



Map id	Unit Desc	Canopy Code	Canopy Cover	Species	Distance	Direction
42	Riparian Melaleuca Swamp Woodland	W	Wetland	Melaleuca sieberi / E. robusta	787m	South West
42	Riparian Melaleuca Swamp Woodland	S	Scrub	Melaleuca sieberi / E. robusta	805m	North
40	Swamp Oak Rushland Forest	W	Wetland	C. glauca / Melaleuca ericifolia / Baumea juncea	829m	South West
43	Wyong Paperbark Swamp Forest	S	Scrub	Melaleuca nodosa / C. maculata	849m	North
43	Wyong Paperbark Swamp Forest	WO	Sparse (Woodland) 20-<50% cover	Melaleuca nodosa / C. maculata	850m	West
37	Swamp Mahogany - Paperbark Forest	W	Wetland	Melaleuca quinquinervia / E. robusta / C. glauca	851m	North East
40a	Rushland	W	Wetland	Phragmites australis	853m	North
47a	Saltmarsh	W	Wetland	Sarcocornia quinqueflora subsp quinqueflora / Sporobolus virginicus	909m	North
38	Redgum Rough Barked Apple Forest	OF	Mid Dense (Open Forest) 50-<100% cover	E. tereticronis / A. floribunda / E. resinifera subsp resinifera	923m	South West
38	Redgum Rough Barked Apple Forest	W	Wetland	E. tereticronis / A. floribunda / E. resinifera subsp resinifera	964m	North East
38	Redgum Rough Barked Apple Forest	S	Scrub	E. tereticronis / A. floribunda / E. resinifera subsp resinifera	998m	North East

Lower Hunter and Central Coast Regional Vegetation Survey: NSW Office of Environment and Heritage

## RAMSAR Wetlands

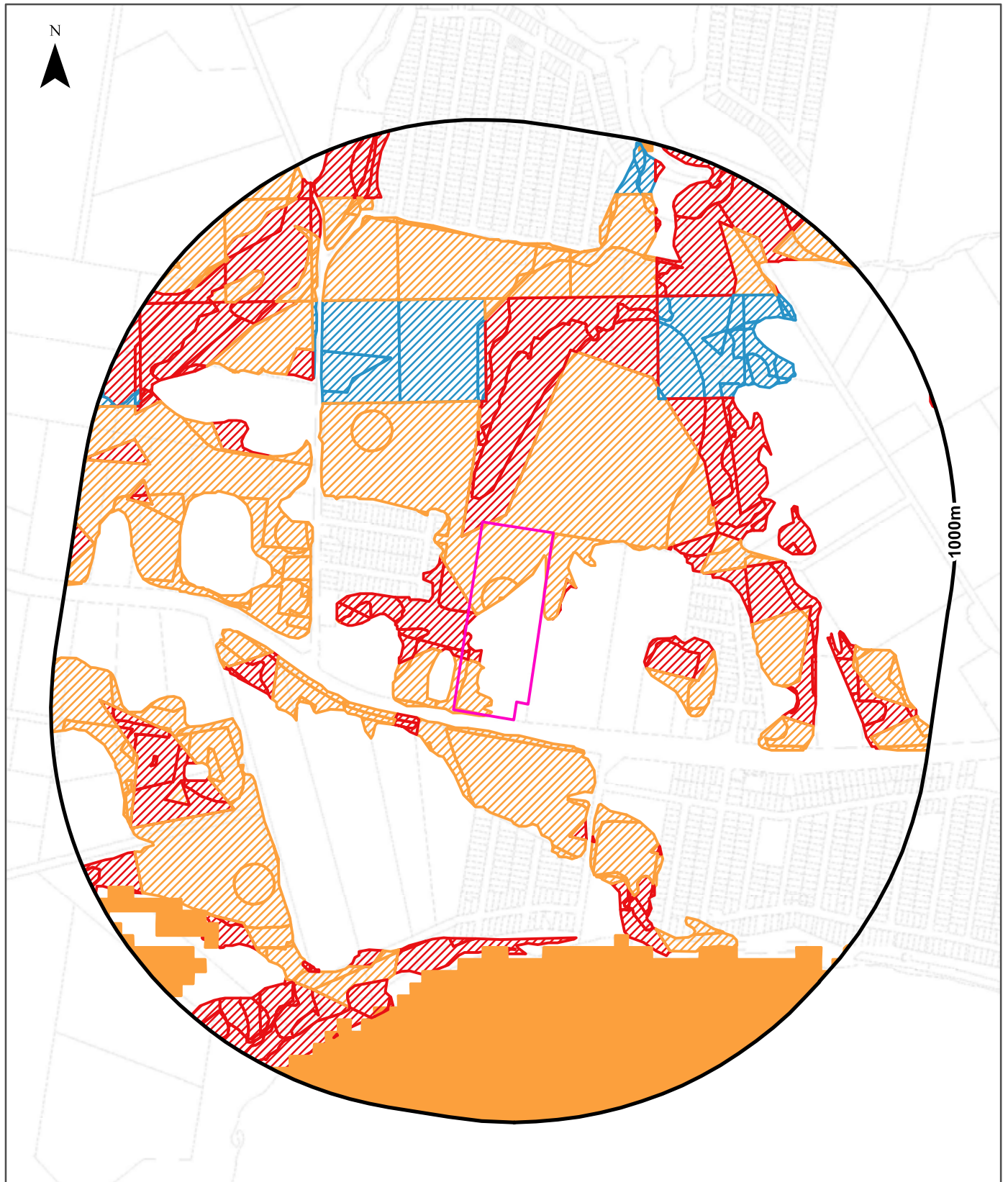
What RAMSAR Wetland areas exist within the dataset buffer?

Map Id	RAMSAR Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

RAMSAR Wetlands Data Source: © Commonwealth of Australia - Department of Environment

# Ecological Constraints - Groundwater Dependent Ecosystems Atlas

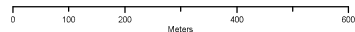
285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



## Legend

Site Boundary	High potential GDE - from national assessment	Low potential GDE - from national assessment
Report Buffer	High potential GDE - from regional studies	Low potential GDE - from regional studies
Property Boundaries	Moderate potential GDE - from national assessment	Known GDE - from regional studies
	Moderate potential GDE - from regional studies	Unclassified potential GDE - from national assessment
		Unclassified potential GDE - from regional studies

Scale:



Data Sources: Property Boundaries & Topographic Data:  
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Coordinate System:  
GDA 1994 MGA Zone 56

Date: 27 November 2018

# Ecological Constraints

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

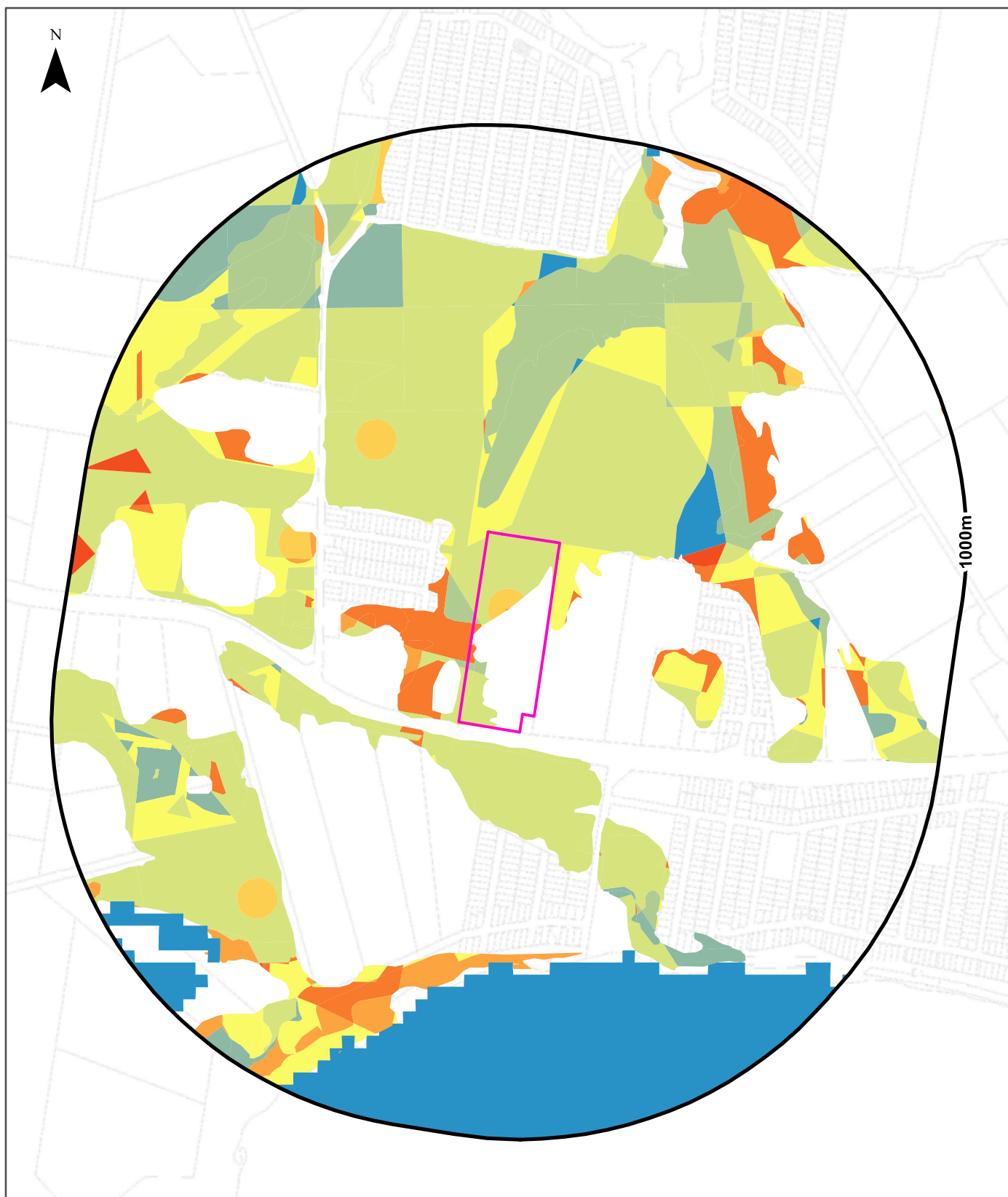
## Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial	High potential GDE - from regional studies	Deeply dissected sandstone plateaus.	Vegetation		0m
Terrestrial	Moderate potential GDE - from regional studies	Deeply dissected sandstone plateaus.	Vegetation		0m
Terrestrial	Low potential GDE - from regional studies	Deeply dissected sandstone plateaus.	Vegetation		299m
Aquatic	Moderate potential GDE - from national assessment	Deeply dissected sandstone plateaus.	Wetland		565m

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology  
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# Ecological Constraints - Inflow Dependent Ecosystems Likelihood

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259



## Legend

Site Boundary	NULL	4	8
Report Buffer	1 (Low)	5	9
Property Boundaries	2	6	10 (High)
	3	7	

Scale:



Data Sources: Property Boundaries & Topographic Data:  
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Coordinate System:  
GDA 1994 MGA Zone 56

Date: 27 November 2018



## Ecological Constraints

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance
Terrestrial	2	Deeply dissected sandstone plateaus.	Vegetation		0m
Terrestrial	3	Deeply dissected sandstone plateaus.	Vegetation		0m
Terrestrial	4	Deeply dissected sandstone plateaus.	Vegetation		0m
Terrestrial	5	Deeply dissected sandstone plateaus.	Vegetation		0m
Terrestrial	6	Deeply dissected sandstone plateaus.	Vegetation		0m
Terrestrial	7	Deeply dissected sandstone plateaus.	Vegetation		0m
Terrestrial	10	Deeply dissected sandstone plateaus.	Vegetation		282m
Terrestrial	1	Deeply dissected sandstone plateaus.	Vegetation		287m
Terrestrial	8	Deeply dissected sandstone plateaus.	Vegetation		385m
Aquatic	10	Deeply dissected sandstone plateaus.	Wetland		565m

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology  
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## Ecological Constraints

285 - 305 Pacific Highway, Lake Munmorah, NSW 2259

### NSW BioNet Atlas

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	<i>Crinia tinnula</i>	Wallum Froglet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Amphibia	<i>Litoria aurea</i>	Green and Golden Bell Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	<i>Actitis hypoleucos</i>	Common Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Anthochaera phrygia</i>	Regent Honeyeater	Critically Endangered	Not Sensitive	Critically Endangered	
Animalia	Aves	<i>Apus pacificus</i>	Fork-tailed Swift	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Ardea ibis</i>	Cattle Egret	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	<i>Ardenna carneipes</i>	Flesh-footed Shearwater	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	<i>Ardenna grisea</i>	Sooty Shearwater	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	<i>Ardenna pacificus</i>	Wedge-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	<i>Ardenna tenuirostris</i>	Short-tailed Shearwater	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Calidris canutus</i>	Red Knot	Not Listed	Not Sensitive	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Calidris ferruginea</i>	Curlew Sandpiper	Endangered	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Calidris ruficollis</i>	Red-necked Stint	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Calidris tenuirostris</i>	Great Knot	Vulnerable	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	Vulnerable	Category 3	Not Listed	
Animalia	Aves	<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	Vulnerable	Category 2	Not Listed	
Animalia	Aves	<i>Charadrius mongolus</i>	Lesser Sandplover	Vulnerable	Not Sensitive	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Charadrius veredus</i>	Oriental Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	<i>Chthonicola sagittata</i>	Speckled Warbler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	<i>Daphoenositta chrysoptera</i>	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	<i>Egretta sacra</i>	Eastern Reef Egret	Not Listed	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	<i>Epthianura albifrons</i>	White-fronted Chat	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Falco subniger	Black Falcon	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Gelochelidon nilotica	Gull-billed Tern	Not Listed	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Geophaps scripta scripta	Squatter Pigeon (southern subspecies)	Critically Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haematopus fuliginosus	Sooty Oystercatcher	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haematopus longirostris	Pied Oystercatcher	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Hydroprogne caspia	Caspian Tern	Not Listed	Not Sensitive	Not Listed	CAMBA;JAMBA
Animalia	Aves	Ixobrychus flavicollis	Black Bittern	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Latham discolor	Swift Parrot	Endangered	Category 3	Critically Endangered	
Animalia	Aves	Limicola falcinellus	Broad-billed Sandpiper	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Limosa lapponica	Bar-tailed Godwit	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Limosa limosa	Black-tailed Godwit	Vulnerable	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Macronectes giganteus	Southern Giant Petrel	Endangered	Not Sensitive	Endangered	
Animalia	Aves	Merops ornatus	Rainbow Bee-eater	Not Listed	Not Sensitive	Not Listed	JAMBA
Animalia	Aves	Neophema pulchella	Turquoise Parrot	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox connivens	Barking Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Ninox strenua	Powerful Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Numenius madagascariensis	Eastern Curlew	Not Listed	Not Sensitive	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Numenius phaeopus	Whimbrel	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pandion cristatus	Eastern Osprey	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Plegadis falcinellus	Glossy Ibis	Not Listed	Not Sensitive	Not Listed	CAMBA
Animalia	Aves	Pluvialis fulva	Pacific Golden Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pluvialis squatarola	Grey Plover	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Pterodroma leucoptera leucoptera	Gould's Petrel	Vulnerable	Not Sensitive	Endangered	
Animalia	Aves	Ptilinopus regina	Rose-crowned Fruit-Dove	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ptilinopus superbus	Superb Fruit-Dove	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	<i>Puffinus assimilis</i>	Little Shearwater	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	<i>Stagonopleura guttata</i>	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	<i>Stercorarius parasiticus</i>	Arctic Jaeger	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	<i>Sterna hirundo</i>	Common Tern	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Sternula albifrons</i>	Little Tern	Endangered	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Thalassarche melanophris</i>	Black-browed Albatross	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Aves	<i>Tringa brevipes</i>	Grey-tailed Tattler	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Tringa nebularia</i>	Common Greenshank	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Tringa stagnatilis</i>	Marsh Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Turnix maculosus</i>	Red-backed Button-quail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	<i>Tyto novaehollandiae</i>	Masked Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	<i>Tyto tenebricosa</i>	Sooty Owl	Vulnerable	Category 3	Not Listed	
Animalia	Insecta	<i>Petalura gigantea</i>	Giant Dragonfly	Endangered	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Arctocephalus forsteri</i>	New Zealand Fur-seal	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Arctocephalus pusillus doriferus</i>	Australian Fur-seal	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	<i>Eubalaena australis</i>	Southern Right Whale	Endangered	Not Sensitive	Endangered	
Animalia	Mammalia	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Megaptera novaeangliae</i>	Humpback Whale	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	<i>Miniopterus australis</i>	Little Bentwing-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Myotis macropus</i>	Southern Myotis	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Petaurus norfolcensis</i>	Squirrel Glider	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Phascolarctos cinereus</i>	Koala	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	<i>Physeter macrocephalus</i>	Sperm Whale	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Pseudomys gracilicaudatus</i>	Eastern Chestnut Mouse	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Pseudomys novaehollandiae</i>	New Holland Mouse	Not Listed	Not Sensitive	Vulnerable	
Animalia	Mammalia	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Mammalia	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	<i>Vespadelus troungtoni</i>	Eastern Cave Bat	Vulnerable	Not Sensitive	Not Listed	



Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Reptilia	<i>Caretta caretta</i>	Loggerhead Turtle	Endangered	Not Sensitive	Endangered	
Animalia	Reptilia	<i>Chelonia mydas</i>	Green Turtle	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	<i>Eretmochelys imbricata</i>	Hawksbill Turtle	Not Listed	Not Sensitive	Vulnerable	
Animalia	Reptilia	<i>Hoplocephalus stephensii</i>	Stephens' Banded Snake	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	<i>Acacia bynoeana</i>	Bynoe's Wattle	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	<i>Angophora inopina</i>	Charmhaven Apple	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	<i>Caladenia porphyrea</i>		Not Listed	Category 2	Not Listed	
Plantae	Flora	<i>Caladenia tessellata</i>	Thick Lip Spider Orchid	Endangered	Category 2	Vulnerable	
Plantae	Flora	<i>Callistemon linearifolius</i>	Netted Bottle Brush	Vulnerable	Category 3	Not Listed	
Plantae	Flora	<i>Chamaesyce psammogeton</i>	Sand Spurge	Endangered	Not Sensitive	Not Listed	
Plantae	Flora	<i>Clematis fawcettii</i>	Northern Clematis	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	<i>Corunastylis</i> sp. Charmhaven (NSW896673)		Critically Endangered	Category 2	Critically Endangered	
Plantae	Flora	<i>Corybas dowlingii</i>	Red Helmet Orchid	Endangered	Category 2	Not Listed	
Plantae	Flora	<i>Cryptostylis hunteriana</i>	Leafless Tongue Orchid	Vulnerable	Category 2	Vulnerable	
Plantae	Flora	<i>Cymbidium canaliculatum</i>	Tiger Orchid	Not Listed	Category 2	Not Listed	
Plantae	Flora	<i>Diuris praecox</i>	Rough Doubletail	Vulnerable	Category 2	Vulnerable	
Plantae	Flora	<i>Eucalyptus camfieldii</i>	Camfield's Stringybark	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	<i>Eucalyptus parramattensis</i> subsp. <i>decadens</i>		Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	<i>Eucalyptus parramattensis</i> subsp. <i>parramattensis</i>		Endangered Population	Not Sensitive	Not Listed	
Plantae	Flora	<i>Genoplesium insigne</i>	Variable Midge Orchid	Critically Endangered	Category 2	Critically Endangered	
Plantae	Flora	<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower Grevillea	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	<i>Macadamia integrifolia</i>	Macadamia Nut	Not Listed	Not Sensitive	Vulnerable	
Plantae	Flora	<i>Melaleuca biconvexa</i>	Biconvex Paperbark	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	<i>Pterostylis pulchella</i>	Waterfall Greenhood	Vulnerable	Category 2	Vulnerable	
Plantae	Flora	<i>Pultenaea maritima</i>	Coast Headland Pea	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	<i>Rutidosia heterogama</i>	Heath Wrinklewort	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	<i>Tetradlea juncea</i>	Black-eyed Susan	Vulnerable	Not Sensitive	Vulnerable	

Data does not include NSW category 1 sensitive species.

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Data obtained 27/11/2018

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# **Appendix B – Photographs**





## Appendix B – Site Photographs



Photograph 1. Block 285 looking north at the main residence, garage and shipping container.



Photograph 2. Block 285 looking north east at the shed to rear of main residence.



Photograph 3. Block 285 looking south east towards the dam.



Photograph 4. Block 285 looking north along paddock towards open eucalypt with an area of possible fill in background



Photograph 5. Block 285 showing minor black plastic and cloth in area of potential fill.



Photograph 6. Block 285 looking south along western boundary.





## Appendix B – Site Photographs



Photograph 7. Block 295 looking south east towards the Chainsaw and mower repair workshop .



Photograph 8. Block 295 north wall of chainsaw and mower repair workshop showing batteries etc on the ground



Photograph 9. Block 295 leak beneath back hoe located next to the workshop



Photograph 10. Block 295 looking south from the workshop of the mulch piles



Photograph 11. Block 295 looking north east at building waste fill piles located in the north west corner of the block. Note concrete and plastic roof sheeting.



Photograph 12. Block 295 looking south at the building waste fill piles located in the north west corner of the block. Note concrete in foreground.





## Appendix B – Site Photographs



Photograph 13. Block 295 looking south from the north east of the block at various fill piles consisting of scrap timber / furniture / logs.



Photograph 14. Block 295 looking south at the central west of the block looking at scrap steel



Photograph 15. Block 295 looking south at the main residence



Photograph 16. Block 295 looking west from north of the main residence scrap vehicle and old boat.



Photograph 17. Block 305 looking north along eastern boundary toward original dwelling on site. Note recent concrete pour for drainage works.



Photograph 18. Block 305 looking south at drainage path





## Appendix B – Site Photographs



Photograph 19. Block 305 looking north down central section of block.



Photograph 20. Block 305 looking east across dam toward dog kennels



Photograph 21. Block 305 looking towards swamp area in north east corner of site.



Photograph 22. Block 305 showing possible oil on water surface in swamp area in the north east corner.



Photograph 23. Block 305 looking towards the south east from the north west corner of the block



Photograph 24. Block 305 looking east, buildings from left to right include workshop, main residence (background), cattery, relocatable building.





## Appendix B – Site Photographs



Photograph 25. .Block 305 eastern side of workshop



Photograph 26. Block 285 view looking north towards the phone towers buildings located at the south east corner of the block

GHD

Suite 10 Zenith Building  
6 Reliance Drive Tuggerah NSW 2259  
T: 61 2 4350 4100 F: 61 2 4350 4101 E: centralcoastmail@ghd.com

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