REPORT TO

NSW HEALTH INFRASTRUCTURE

ON

SURFACE AND GROUNDWATER IMPACT ASSESSMENT (SGIA)

FOR

PROPOSED SHARED PATHWAY DEVELOPMENT

AT

WINDSOR ROAD, ROUSE HILL, NSW

Date: 18 September 2025
Ref: E37757Brpt-SGIA-SP

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E37757Brpt-SGIA-SP Draft	Draft Report	12 September 2025
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Executive Summary

NSW Health Infrastructure ('the client') commissioned JK Environments (JKE) to undertake a Surface and Groundwater Impact Assessment (SGIA) for the proposed shared pathway development at the corner of Rouse Hill Drive and Windsor Road, Rouse Hill, NSW. The site location is shown on Figures 1 and 2 and the SGIA was confined to the shared pathway site boundaries shown on Figure 2a attached in the appendices.

Our geotechnical division, JK Geotechnics (JKG) were commissioned to undertake a geotechnical investigation for the site in conjunction with this SGIA. The results of the geotechnical investigation are presented in a separate report (Ref: 37756LFrpt3).

JKE were also commissioned to undertake a Detailed Site Contamination Investigation (DSI) for the proposed shared pathway. The results of the DSI are presented in a separate report (Ref: E37757Brpt-DSI-SP). This report should be read in conjunction with the above reports. A number of investigations have been previously undertaken across the main hospital site. A summary of key information relevant to this report is included in Section 2.

We understand a shared pathway is proposed to provide a connection between the Main Hospital site and the corner of Windsor Road and Rouse Hill Drive. We expect the shared pathway will be constructed at/or close to existing grade and therefore minimal cut and fill earthworks are expected.

The primary aim of the SGIA is to assess the potential for impacts on surface and groundwater conditions associated with the proposed shared pathway development and to identify any mitigation measures required to be implemented during the development. The SGIA also includes a review of Potential Acid Sulfate Soil (PASS) and dryland salinity conditions associated with the proposed development.

The scope of work included the following:

- Review of previous investigation reports prepared for the site by JKG and JKE (see Section 2);
- Review of surface and groundwater conditions including: hydrology; hydrogeology; receiving water bodies; occurrence of groundwater; groundwater quality; groundwater dependent ecosystems (GDE); inflow dependent ecosystems (IDE);
- Review of drainage lines, downstream groundwater users and watercourses in the immediate vicinity of the site;
- Review of surface water and groundwater conditions at the site including: surface water flow; groundwater flow; groundwater permeability; groundwater quality; groundwater contamination conditions; and other parameters;
- Review of PASS and dryland salinity conditions at the site;
- Preparation of this report identifying the surface and groundwater conditions at the site and potential impacts associated with the proposed development; and
- Identify mitigation measures to be implemented during the proposed development.

The SGIA identified that a Salinity Management Plan (SMP) and Acid Sulfate Soil Management Plan (ASSMP) were not considered necessary for the shared pathway. The soil conditions were moderately aggressive to steel foundations as discussed in Section 7. The SGIA identified mitigation measures summarised in Section 7.6. The measures include the following:

- Preparation and implementation of a Construction and Environmental Management Plan (CEMP) prior to the commencement of development works; and
- In the event of excavations, groundwater seepage entering the excavations will require treatment prior to off-site disposal to stormwater. Council approval must be obtained prior to disposal to stormwater.

JKE consider that the report objectives outlined in Section 1.2 have been addressed. The conclusions and recommendations should be read in conjunction with the limitations presented in the body of this report.

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Attachments

Abbreviations

Australian Drinking Water Guidelines	**ADWG**
Area of Environmental Concern	**AEC**
Australian Height Datum	**AHD**
Acid Sulfate Soil	**ASS**
Below Ground Level	**BGL**
Benzene, Toluene, Ethylbenzene, Xylene	**BTEX**
Chain of Custody	**COC**
Development Application	**DA**
Environment Protection Authority	**EPA**
International Organisation of Standardisation	**ISO**
JK Environments	**JKE**
JK Geotechnics	**JKG**
Lab Control Spike	**LCS**
Light Non-Aqueous Phase Liquid	**LNAPL**
Map Grid of Australia	**MGA**
National Association of Testing Authorities	**NATA**
National Environmental Protection Measure	**NEPM**
Organochlorine Pesticides	**OCP**
Organophosphate Pesticides	**OPP**
Planning Secretary's Environmental Assessment Requirements	**SEARs**
Polycyclic Aromatic Hydrocarbons	**PAH**
Potential ASS	**PASS**
Photo-ionisation Detector	**PID**
Protection of the Environment Operations	**POEO**
Practical Quantitation Limit	**PQL**
Quality Assurance	**QA**
Quality Control	**QC**
Relative Percentage Difference	**RPD**
Review of Environmental Factors	**REF**
Site Assessment Criteria	**SAC**
Sampling, Analysis and Quality Plan	**SAQP**
Standing Water Level	**SWL**
Standard Sampling Procedure	**SSP**
State Significant Development Application	**SSDA**
Surface and Groundwater Impact Assessment	**SGIA**
Trip Blank	**TB**
Total Recoverable Hydrocarbons	**TRH**
Trip Spike	**TS**
United States Environmental Protection Agency	**USEPA**
Underground Storage Tank	**UST**
Volatile Organic Compounds	**VOC**
Work Health and Safety	**WHS**

Units

Litres	**L**
Metres BGL	**mBGL**
Metres	**m**
Micrograms per litre	**µg/L**

1 INTRODUCTION

NSW Health Infrastructure ('the client') commissioned JK Environments (JKE) to undertake a Surface and Groundwater Impact Assessment (SGIA) for the proposed shared pathway development at the corner of Rouse Hill Drive and Windsor Road, Rouse Hill, NSW. The site location is shown on Figures 1 and 2 and the SGIA was confined to the shared pathway site boundaries shown on Figure 2a attached in the appendices.

Our geotechnical division, JK Geotechnics (JKG) were commissioned to undertake a geotechnical investigation for the site in conjunction with this SGIA. The results of the geotechnical investigation are presented in a separate report (Ref: 37756LFrpt3)[1].

JKE were also commissioned to undertake a Detailed Site Contamination Investigation (DSI) for the proposed shared pathway development. The results of the DSI are presented in a separate report (Ref: E37757Brpt-DSI -SP) [2]. This report should be read in conjunction with the above reports.

A number of investigations have been previously undertaken across the main hospital site. A summary of key information relevant to this report is included in Section 2.

1.1 Proposed Landuse

We understand a shared pathway is proposed to provide a connection between the Main Hospital site and the corner of Windsor Road and Rouse Hill Drive. We expect the shared pathway will be constructed at/or close to existing grade and therefore minimal cut and fill earthworks are expected.

Works will also be carried out at the main hospital site, DPHI site and along Commercial Road comprising of new concrete islands and road widening to facilitate. JKE and JKG were engaged to investigate these areas and the results of the investigation are presented in separate reports.

1.2 Aims and Objectives

The primary aim of the SGIA is to assess the potential for impacts on surface and groundwater conditions associated with the proposed shared pathway development and to identify any mitigation measures required to be implemented during the development.

The SGIA also includes a review of Potential Acid Sulfate Soil (PASS) and dryland salinity conditions associated with the proposed development.

[1] JKG, (2025). *Report to Health Infrastructure on Geotechnical Investigation for Proposed Shared Pathway at Commercial Road, Rouse Hill, NSW.* (referred to as JKG report)

[2] JKE, (2025). *Report to NSW Health Infrastructure on Detailed Site Investigation (DSI) for Proposed Shared Pathway Development at Windsor Road, Rouse Hill, NSW.* (referred to as JKE DSI report)

1.3 Scope of Work

The investigation was undertaken generally in accordance with a Consultancy Agreement (CA) HI25251 between the client and JKG/JKE dated 10 July 2025.

The scope of work included the following:

- Review of previous investigation reports prepared for the site by JKG and JKE (see Section 2);
- Review of surface and groundwater conditions including: hydrology; hydrogeology; receiving water bodies; occurrence of groundwater; groundwater quality; groundwater dependent ecosystems (GDE); inflow dependent ecosystems (IDE);
- Review of drainage lines, downstream groundwater users and watercourses in the immediate vicinity of the site;
- Review of surface water and groundwater conditions at the site including: surface water flow; groundwater flow; groundwater permeability; groundwater quality; groundwater contamination conditions; and other parameters;
- Review of PASS and dryland salinity conditions at the site;
- Preparation of this report identifying the surface and groundwater conditions at the site and potential impacts associated with the proposed development; and
- Identify mitigation measures to be implemented during the proposed development.

The report has been prepared with reference to the following guidelines:

- NSW Department of Planning and Environment Guidelines for Groundwater Documentation for SSD/SSI Projects – Technical guideline (2022);
- Water Management Act 2000;
- NSW Aquifer Interference Policy (NSW Office of Water, 2012);
- NSW DPIE Minimum requirements for building site groundwater investigations and reporting (2022)[3];
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018)[4];
- Australian Drinking Water Guidelines 2011 (updated 2021)[5];
- National Acid Sulfate Soil Guidance (2018) documents and the Acid Sulfate Soil Management Advisory Committee (ASSMAC) Acid Sulfate Soil Manual (1998)[6];
- Site Investigations for Urban Salinity (2002)[7]
- Salinity Code of Practice (2004)[8]
- Managing Urban Stormwater – Soil and Construction (4th ed.) (2004)[9]
- Salinity Potential in Western Sydney Map (2002)[10]

[3] NSW DPIE, (2022). *Minimum requirements for building site groundwater investigations and reporting.* (Referred to as DPIE 2022).

[4] Australian and New Zealand Governments (ANZG), (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia (referred to as ANZG 2018)

[5] National Health and Medical Research Council (NHMRC), (2021). *National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011* (referred to as ADWG 2011)

[6] Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). *Acid Sulfate Soils Manual* (ASS Manual 1998)

[7] Department of Land and Water Conservation (DLWC), (2002). *Site Investigations for Urban Salinity,* (referred to as DLWC 2002)

[8] Western Sydney Regional Organisation of Councils (WSROC) and Department of Infrastructure, Planning and Natural Resources (DIPNR), (2003 amended 2004). *Western Sydney Salinity Code of Practice* (referred to as Salinity Code of Practice)

[9] NSW Government/Landcom, (2004). *Managing Urban Stormwater – Soil and Construction*, (4th ed.) (referred to as Blue Book)

[10] DIPNR, (2002). *1:100,000 Map – Salinity Potential in Western Sydney*, (referred to as Salinity Potential Map)

- Piling – Design and Installation AS2159-2009 (2009)[11]
- Industry Guide T56: Residential Slabs and Footings in Saline Environments (2018)[12]; and
- Other guidelines outline in this report.

[11] Standards Australia, (2009). *Piling – Design and Installation, AS2159-2009* (referred to as AS2159-2009)

[12] Cement, Concrete and Aggregates Australia (CCAA), (2018). Industry Guide *T56: Residential Slabs and Footings in Saline Environments* (referred to as CCAA 2018)

2 SITE INFORMATION

2.1 Summary of Previous Investigations

Table 2-1: Summary of Previous Investigations

Historical Assessments (circa 2000 to 2006)	Environmental Investigation Services (EIS, now JKE) has previously undertaken various stages of assessment across a larger area of the Rouse Hill precinct that incorporated the shared pathway site[13]. The assessments included a review of a Geotechnique Stage 1 Preliminary Environmental Site Assessment[14] and soil and groundwater sampling across an approximately 100 hectare portion of land (the wider site). The shared pathway site was located in the north-west section of the wider site in close proximity to the Rouse Hill Town Centre. The Stage 1 preliminary assessment undertaken by Geotechnique Pty Ltd included a review of historical records, limited soil sampling and laboratory chemical analysis. The Phase 2 assessment included soil sampling from 401 locations in 2003 and an additional 20 locations in 2006. Four of the locations from 2003 & 2006 were within the shared pathway site (C312, ET7, BH134 and HD5). At the time of the Phase 2 assessment the site was part of a larger golf course. No dams or other excavated areas were located within the shared pathway site. The sampling locations within the shared pathway site typically encountered topsoil or fill to depths of approximately 0.2m to 0.4m below ground level (BGL), underlain by natural silty clay soil. The topsoil/fill was typically silty clay and contained traces of roots and ironstone gravel. Laboratory analysis included analysis of heavy metals (arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel and zinc), polycyclic aromatic hydrocarbons (PAHs), total recoverable hydrocarbons (TRH), organochlorine pesticides (OCPs) and polychlorinated biphenyls (PCBs). The majority of samples were analysed for a selection of the contaminants listed, rather than the full suite. The report indicated that all results were within the most sensitive health-based land use criteria (residential with accessible soil), based on the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC Guidelines). The Phase 2 assessment concluded that the wider site was relatively clean from a contamination viewpoint and was not considered to require remediation. The minor levels of contamination that were encountered across the wider site were associated with rubbish and waste and the process of rubbish and waste removal was anticipated to effectively remove all of these materials. The rubbish and waste at the wider site included variable asbestos containing material (ACM) in the form of sheeting and pipework. The ACM was in a bound form in a cement matrix and analysis of soil in the waste and rubbish areas did not detect free asbestos fibres. Removal of the rubbish and waste from the wider site was recommended prior to any construction activity. We note that no rubbish areas were located on the shared pathway site.
Rehabilitation and Early Validation Works	Rubbish and a buried asbestos pipeline removal were undertaken in 2006 and EIS completed inspections and prepared a validation report[15] for the works across the Rouse Hill Regional and Town Centre (RHTC) sites. No rubbish was located on the shared pathway site.

[13] EIS, (2003). *Report to Lend lease GPT (Rouse Hill) Pty Ltd Supplementary Phase 2 Environmental Site Assessment for Proposed Rouse Hill Regional Centre at Cnr Windsor and Commercial Roads, Rouse Hill, NSW* (ref: E17777F-RPT and E17777F-RPT3, dated September 2003 and November 2006) (referred to as Phase 2 assessment)

[14] Geotechnique, (2000). *Stage 1 Preliminary Environmental Site Assessment, Geotechnique Pty Ltd for the Department of Urban Affairs and Planning* (Ref: 3073/1-AA dated 15 March 2000) (referred to as Stage 1)

[15] EIS, (2006). *Report to Bovis Lend Lease on Validation of Site Rehabilitation for Proposed Rouse Hill Town Centre at Windsor Road, Rouse Hill, NSW* (ref: E17777FVAL, dated July 2006)

(circa 2006 – 2007)	Based on the scope of work completed, the site was considered suitable for the proposed mixed residential and commercial land use. A Site Audit Statement (SAS) was issued for the proposed development by Mr Ross McFarland, a NSW EPA accredited site auditor (now with AECOM).
Sampling Analysis Quality Plan (SAQP) (JKE and JKG, 2025[16])	JKE and JKG were commissioned to prepare a SAQP for the investigation of the DPHI, Commercial Road and shared pathway sites in 2025. The SAQP included recommendations for additional soil and groundwater investigation works including the following: • Geotechnical investigation along DPHI, Commercial Road and Shared pathway; • Contamination investigation of soil and groundwater conditions along DPHI, Commercial Road and Shared pathway; • Investigation of dryland salinity and ASS conditions along DPHI, Commercial Road and Shared pathway; • Surface and groundwater impacted assessment (SGIA) along DPHI, Commercial Road and Shared pathway; and • Identify the need for mitigation measures based on the results of the above additional investigations. The additional sampling requirements outlined in the SAQP have been incorporated within this report as discussed in the below sections.

2.2 Site Identification and Description

Table 2-2: Site Identification

Current Site Owner (certificate of title):	Department of Planning, Housing and Infrastructure (DPHI)
Site Address:	Corner of Rouse Hill Drive and Windsor Road, Rouse Hill, NSW
Lot & Deposited Plan:	Lot 227 DP1249147 and central portion of Lot 229 DP1249147
Current Land Use:	Vacant
Proposed Land Use:	New shared pathway
Local Government Area:	The Hills Shire Council
Current Zoning:	MU1 – Mixed use R3 – Medium Density Residential SP2 – Infrastructure
Site Area (m^2) (approx.):	1,700
RL (AHD in m) (approx.):	50-52

[16] JKE, (2025). *Report to NSW Health Infrastructure on Sampling Analysis and Quality Plan for Data Gap Investigation (DGI) for Proposed Rouse Hill Hospital at corner of Commercial and Windsor Roads, Rouse Hill, NSW* (Ref: E35128Brpt5-Rev1-SAQP) dated 11 July 2025 (referred to as JKE SAQP).

Geographical Location (decimal degrees) (approx.):	Latitude: -33.689898 Longitude: 150.922460
Site Figures:	Appendix A

2.3 Site Location, Topography and Regional Setting

The site is located in a predominantly commercial area of Rouse Hill, with some remnants of former residential and rural land use to the west, to the south-east of the intersection of Windsor Road and Commercial Road as shown on Figure 1. The shared pathway site is located approximately 550m to the west of Caddies Creek.

The regional topography is characterised by gently undulating areas that typically fall towards local creeks and gullies. The topography on the shared pathway site is lowest to the east and north-east, with a vegetated bank in the eastern portion.

2.4 Site Inspection

A walkover inspection of the site was undertaken by JKE on 24 July 2025. The inspection was limited to accessible areas of the site and was focussed on assessing the site conditions relevant to the SGIA, PASS and salinity-related factors only. Selected site photographs obtained during the inspection are attached in the appendices.

At the time of the inspection, the shared pathway site was vacant and heavily vegetated. The north-eastern and eastern portion of the site was located at a lower elevation and appeared to be previously linked to a disused asphaltic concrete (AC) roadway to the north-east and east of the site. No buildings were present on the shared pathway site, and a pedestrian footpath and crossing were noted to the south, and a footing of the overhead Sydney Metro bridge was located to the south-east.

The shared pathway site was fenced along the north-eastern boundary with chain link fencing, and was bounded by a bus terminal and bus lane to the north and west, and by a pedestrian footpath and crossing to the south. Exposed soil was noted along the western boundary of the site. There was no evidence of soil erosion observed during the inspection.

Cut and fill were likely used to install the stormwater trench noted in the central portion of the shared pathway site. The north-eastern portion of the site was at a lower elevation at the base of a vegetated bank.

Surface water would be expected to flow to the north-east at the base of the bank in this portion of the shared pathway site. A large stormwater trench was noted in the central area of the site, which would also collect stormwater.

Sensitive environments such as wetlands, ponds, creeks or extensive areas of natural vegetation were not identified on the shared pathway site or in the immediate surrounds.

The majority of the shared pathway site was vegetated with grass, weeds and trees. There were no signs of plants stress of dieback observed along the western boundary adjacent to the bus lane.

Surface water bodies were not identified at the site at the time of the inspection.

2.5 Surrounding Land Use

During the site inspection, JKE observed the following land uses in the immediate surrounds:

- North – a bus terminal and vacant land (the main hospital site), and Endeavour Energy Substation beyond the hospital;
- South – junction of Windsor Road, Rouse Hill Drive, and Schofields Road, and a bus lane;
- East – vacant land with a disused AC road; and
- West – a bus lane and Windsor Road.

2.6 Regional Geology and Soil Landscape

Regional geological information was reviewed for the investigation. The information was sourced from the Lotsearch report attached in the appendices. The report indicates that the shared pathway site is underlain by Ashfield Shale of the Wianamatta Group, which typically consists of black to dark grey shale and laminite.

A review of the soil landscape information presented in the Lotsearch report indicates that the shared pathway site is located within the Blacktown soil landscape. Blacktown soils are characterised by moderate erodibility with some higher local occurrences, low dispersivity and localised areas of moderate salinity.

2.7 Dryland Salinity Potential

The shared pathway site is located within the area of Western Sydney included in the Salinity Potential Map prepared by the Department of Infrastructure, Planning and Natural Resources (DIPNR). Based upon interpretation from the geological formations and soil groups presented on the map, the site is located in a region of moderate salinity potential.

The moderate classification is attributed to scattered areas of scalding and indicator vegetation, in areas where concentrations have not been mapped. Saline areas may occur in this zone, which have not been identified or may occur if risk factors change adversely.

2.8 Acid Sulfate Soil (ASS) Risk and Management

The shared pathway site is not located in an ASS risk area according to the risk maps prepared by the Department of Land and Water Conservation.

2.9 Summary of Site History

A review of historical information presented in the provided reports (discussed in Section **Error! Reference source not found.**) and the historical aerial photographs presented in the Lotsearch report was undertaken for the DSI. The review identified the following:

- Prior to the 1970s, the shared pathway site was predominantly vacant, parts occupied by a low lying gully and grassed, likely used for agricultural (grazing) purposes;
- The shared pathway site and surrounds were utilised as a golf course from at least 1970 to circa 2004;
- The shared pathway formed part of a temporary car park associated with the development of the town centre circa 2014; and
- The bus terminal and interchange which forms part of the shared pathway site was constructed between 2014 and 2025.

3 CONCEPTUAL SITE MODEL – HYDROLOGICAL CONDITIONS

3.1 Surface Water Conditions

Surface water drainage across the shared pathway site is expected to flow towards the south/south-east in sympathy with the overall topography of the site. JKE note that the site contains a large stormwater trench in the central area of the site, which would also collect stormwater.

A review of the historical aerial photographs presented in the Lotsearch report indicate that the formed part of a low lying gully which drained into a former man-made dam located on the former golf course. The gully appears to have been filled circa 2014 when the wider area was subject to development associated with the town centre. Several small man-made dams were historically located on the wider site and surrounding area between 1950s to 1990s, and were utilised for irrigation purposes on the former golf course. They were drained and backfilled prior to the development of the site and wider surrounds associated with the Rouse Hill Town Centre and Regional Centre precincts.

Surface water bodies were not identified at the shared pathway site during the inspection. The site is located approximately 550m to the west of Caddies Creek.

3.2 Local Meteorology

Key meteorological data for Baulkham Hills Eucalyptus Ct weather station 67109 available on the Bureau of Meteorology (BOM)[17] website has been reviewed for the SGIA and JKE note the following for 2025:

- The highest mean rainfall occurs in May, with a total of 172.5mm;
- The lowest mean rainfall occurs in June, with a total of 9.5mm; and
- In the weeks leading up to the field work, approximately 87.5mm of rainfall was recorded in July 2025. The historical mean rainfall for July is around 49.7mm.

Heavy rainfall was recorded in the lead-up to, and during the SGIA investigation. The heavy rainfall is likely to influence the standing water levels (SWL) and groundwater quality recorded in the monitoring wells.

3.3 Hydrogeology

Information reviewed for the SGIA indicates that the regional aquifer on-site and in the areas immediately surrounding the site includes porous, extensive aquifers of low to moderate productivity.

Subsurface conditions at the site are expected to consist of low to moderate permeability (residual) soils overlying shallow bedrock. Abstraction and use of groundwater at the site or in the immediate surrounds is not considered to be viable under these conditions. The use of groundwater is not proposed as part of the development. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur.

[17] **https://www.bom.gov.au/climate/data/stations/** (visited on 25 August 2025)

Considering the local topography and surrounding land features, JKE anticipate groundwater to flow towards the south-east. The closest surface water body is Caddies Creek located approximately 550m to the east of the site. The creek flows further to the north and north-east and joins Cattai Creek which then flows further to the north to join Hawkesbury River.

3.4 Registered Groundwater Bores

A review of groundwater bore records available on the Water NSW online database was undertaken for the SGIA. The information was obtained from the Lotsearch report. There was a total of eight registered bores within the report buffer of 2,000m. In summary:

- The nearest registered bore was located approximately 245m from the shared pathway site. This was utilised for monitoring purposes;
- The majority of the bores were registered for monitoring purposes;
- There were no nearby bores (i.e. within 1,000m) registered for domestic or irrigation uses; and
- The drillers log information from the closest registered bores typically identified fill residual clays underlain by shallow siltstone and/or sandstone bedrock. Standing water levels (SWLs) in the bores within 500m from the site ranged from approximately 4.5mBGL to 20mBGL.

None of the bores registered for beneficial use were located in close proximity (all bores were >1000m from the site) and therefore none of the bores were considered likely to be impacted by the proposed development at the shared pathway site.

Based on this information, adverse impact on existing groundwater users, is not expected during the development works.

3.5 Other Users and Receiving Water Bodies

Receiving water bodies were not identified at the shared pathway site. Surface water is anticipated to run into the stormwater trench located in the central section of the site. The closest receiving water body in the vicinity of the site is Caddies Creek located approximately 550m to the east of the site.

The SGIA did not identify any tanks (areas or points) in the immediate vicinity of the site.

3.6 Groundwater Dependent Ecosystems (GDE)

No areas with the potential for GDEs were mapped on site. Areas with ‘high’ and ‘moderate’ potential for GDE were mapped approximately 290m to 410m north-east from the shared pathway site. Considering the distance and cross-gradient direction from the site, the proposed development is considered unlikely to impact on the GDE.

3.7 Inflow Dependent Ecosystems (IDE)

No areas with potential for IDEs were mapped on site. Areas with 'moderate to high' likelihood for IDE were mapped approximately 290m to 410m north-east from the shared pathway site. Considering the distance and cross-gradient direction from the site, the proposed development is considered unlikely to impact on the IDE.

3.8 Ramsar Wetlands

The site and immediate surrounds are not listed under the Ramsar Wetlands register.

3.9 Ecological Sensitive Areas

A review of the ecological sensitivity areas identified Grassy Woodlands of the Cumberland Shale Plains located on the hospital site to the east of the shared pathway site. The proposed development on shared pathway site is not likely to impact the off-site location.

3.10 Groundwater Occurrence

Due to site access constraints associated with the use of the shared pathway site as a T-way, a drilling rig could not be used for the SGIA. The investigation was completed using hand tools and due to obstructions in the fill, adequate depth could not be achieved for the installation of groundwater monitoring wells for the SGIA. However, this is not considered to be a constraint as groundwater conditions at the wider hospital site has been assessed by JKE and a summary of the conditions are outlined below.

As part of the SGIA for the DPHI site and the main hospital site, a total of nine groundwater monitoring wells were installed in the following boreholes for monitoring the groundwater conditions. The well locations are shown on Figure 2 attached in the appendices:

- Main Hospital Site – BH1 (MW1), BH4 (MW4), BH6 (MW6), BH102 (MW102), BH103 (MW103) and BH109 (MW109); and
- DPHI Site - BH201 (MW201), BH203 (MW203) and BH204 (MW204)

The wells were positioned to establish baseline information on groundwater conditions. Considering the topography and the location of the nearest down-gradient water body, the monitoring wells were placed across the site to establish site coverage.

The monitoring wells were typically installed as per the following methodology:

- 50mm diameter Class 18 PVC (machine slotted screen) was installed in the lower section of the well to intersect groundwater;
- 50mm diameter Class 18 PVC casing was installed in the upper section of the well (screw fixed);
- A 2mm sand filter pack was used around the screen section for groundwater infiltration;
- A hydrated bentonite seal/plug was used on top of the sand pack to seal the well; and
- A concrete plug was installed at the surface to limit the inflow of surface water, with approximate 1m stick up and enviro-cap to seal the well top.

The monitoring well installation details are summarised in the table below. The well heights were based on the DGPS information. The RLs in AHD are provided in the table below.

Table 3-1: Groundwater Monitoring Well Installation Details

Borehole / Well Number	Reduced Level of Ground Surface (mAHD)[1]	Installation Depth (mBGL)[2]	Slotted Screen Interval (mBGL)	Material in screened section (refer to logs for detailed description)	Sample collected for Quality Testing
BH/MW1	57.01	7.3	2.8 – 7.3	Siltstone	Yes
BH/MW4	53.96	7.24	2.76 – 7.24	Siltstone	Yes
BH/MW6	50.23	8.87	2.87 – 8.87	Siltstone	Yes
BH/MW102	50.11	8.53	3.0 – 8.53	Siltstone	Yes
BH/MW103	55.05	8.0	3.0 – 8.0	Siltstone	Yes
BH/MW109	51.08	8.0	3.0 - 8.0	Siltstone	Yes
BH/MW201	58.60	1.8	0.5-1.8	Silty clay and Siltstone	Yes
BH/MW203	56.81	2.2	0.7-2.2	Siltstone	Well was Dry
BH/MW204	55.40	2.0	0.8-2	Siltstone	Well was Dry

Notes:

1 – mAHD obtained from the DGPS with an accuracy of ± 50mm

2 – mBGL: metre below ground level

Groundwater measurements were made on subsequent visits. A summary of the SWL is outlined in the table below:

Table 3-2: Summary of Groundwater Levels observed by JKE

Monitoring Well	Surface Level (mAHD)	Standing Water Level Depth (mBGL)			
		22 July 2025	29 July 2025	4 August 2025	-
MW1	57.01	6.89	6.40	-	
MW4	53.96	3.21	3.25	-	
MW6	50.23	3.87	3.86	-	
MW102	50.11	1.55	1.53	-	
MW103	55.05	6.08	6.23	-	
MW109	51.08	4.14	3.95	-	
BH/MW201	58.60	-	Dry	0.6	-
BH/MW203	56.81	-	Dry	Dry	-
BH/MW204	55.40	-	Dry	Dry	-

Long term monitoring of groundwater conditions was undertaken at the main hospital site where there is proposed excavations for the development.

4 INVESTIGATION PROCEDURE

4.1 Dryland Salinity and ASS Soil Sampling

The soil sampling plan and methodology adopted for this investigation is outlined in the table below:

Table 4-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	The SGIA included soil sampling from eight boreholes BH301 to BH308 placed over the site as shown on Figure 2a. This density is greater than four sampling points per hectare (the area of the site is approximately 0.17 hectares) and meets the requirements recommended in the DLWC 2002 document for 'moderately intensive construction'. The density was considered adequate to identify large areas of salinity and ASS impacted soils at the site. Soil sampling for the SGIA was confined to the depth of approximately 0.75m below ground level (BGL). This was considered adequate as the proposed shared pathway does not include any excavations.
Set-out and Sampling Methods	Fieldwork for the SGIA was undertaken on 5 August 2025. Sampling locations were set out using a DGPS unit with an accuracy of approximately ±50mm. Locations were cleared for underground services prior to drilling. The sample locations were drilled using hand tolls. Soil samples were collected from the fill and natural profiles encountered during the investigation based on distinct change in lithology or field observations. All samples were recorded on the borehole logs attached in the appendices.
Sample Collection	Samples were placed in plastic bags and sealed using twist ties. Samples for ASS testing were placed in plastic bags and sealed with plastic ties with minimal headspace. Sampling personnel used disposable nitrile gloves during sampling activities. The samples were labelled with the job number, sampling location, sampling depth and date. On completion of the fieldwork, the samples were delivered in the insulated sample container to a NATA registered laboratory for analysis under standard COC procedures. The ASS samples were preserved by immediate storage in an insulated sample container with ice and frozen upon return to the JKE office. Field sampling protocols adopted for this assessment are summarised in the appendices.

4.2 Laboratory Analysis

Soil samples were Analysed by Envirolab Services (NATA Accreditation Number – 2901). Reference should be made to the laboratory reports attached in the appendices for further information regarding the laboratory methods used.

4.2.1 Dryland Soil Salinity Samples

Selected soil samples for dryland salinity assessment were analysed for the following:

- EC, pH, resistivity;
- Texture and ECe;

- Sulphate and Chloride; and
- Cation Exchange Capacity (CEC).

4.2.2 ASS Soil Samples

Selected soil samples were analysed for ASS field tests (including pH_F and pH_{FOX}) and using the chromium reducible sulfur (S_{CR}) acid base accounting analytical methods. All tests/analysis were performed at the laboratory and JKE did not carry out the testing in the field due to time and WHS constraints.

5 SCREENING CRITERIA

Reference should be made to the report tables attached in the appendices for the specific criteria used for the SGIA. The screening criteria is also referred to as the Site Assessment Criteria (SAC) in this SGIA.

5.1 Dryland Salinity Screening Criteria

5.1.1 Soil Salinity and Plant Growth

The electrical conductivity (EC) of a 1:5 soil:water extract is commonly used as an indicator of soil salinity conditions as the reading is directly related to the electrolyte (salt) concentration of the extract. In order to compare the laboratory data with published salinity classes, the results are converted to equivalent saturated paste (ECe) using texture adjustment values presented in DLWC 2002.

The following table provides a summary of plant response with reference to salinity:

Table 5-1: Plant Response to Soil Salinity

ECe (dS/m)	Salinity Class	Plant Response[1]
<2	Non-saline	Salinity effects mostly negligible
2-4	Slightly saline	Yields of very sensitive crops may be affected
4-8	Moderately saline	Yield of many crops affected
8-16	Very saline	Only tolerant crops yield satisfactorily
>16	Highly saline	Only a few very tolerant crops yield satisfactorily

Note:

1 - Plant Response to Salinity Class has been adopted from DLWC 2002

5.1.2 Soil pH and Plant Growth

Soil pH is a measure of the acidity or alkalinity of the soils and values have been assessed as an indicator of soil fertility with respect to plant growth. The optimal pH for plant growth is between 5.5 and 7. Beyond this range, effective revegetation of exposed soil following disturbance is increasingly difficult and the potential for erosion is considered to increase.

Highly alkaline soils are commonly associated with saline and sodic soil conditions and can limit the ability of plants to take up water and nutrients. Highly acidic soils exhibit aluminium toxicity toward plants and can limit the ability of plants to take up other essential nutrients including molybdenum.

Interpretation of soil pH with respect to plant growth is undertaken using the ratings published in Bruce and Rayment (1982)[18] presented below:

[18] Bruce, R.C. and Rayment, G.E., (1982). *Analytical Methods and Interpretations used by the Agricultural Chemistry Branch for Soil and Land Use Surveys,* (referred to as Bruce and Rayment 1982)

Table 5-2: Plant Response to Soil pH

pH	Rating
<4.5	Extremely acidic
4.5-5.0	Very strongly acidic
5.1-5.5	Strongly acidic
5.6 – 7.3	Optimal plant growth
7.4-7.8	Mildly alkaline
7.9-8.4	Moderately alkaline
8.5-9.0	Strongly alkaline
>9.1	Very strongly alkaline

5.1.3 Cation Exchange Capacity (CEC) in Soil

The ability of soils to attract, retain and exchange cations (positively charged ions) is estimated by the calculated CEC value. CEC represents the major controlling factor in stability of clay soil structure, nutrient availability for plant growth, soil pH and the reaction of the soil to chemical applications (fertilisers, conditioners etc.).

High CEC soils have a greater capacity to retain nutrients, however, deficient soils require greater applications of nutrients to correct imbalances. Low CEC soils have a reduced capacity to retain nutrients and may result in leaching of nutrients from the soil in the event of excess nutrient applications.

Metson (1961)[19] developed a set of ratings for effective CEC and the most abundant cations. These are summarised below (values are in meq/100g):

Table 5-3: CEC Rating

Rating	eCEC	Exch Na	Exch K	Exch Ca	Exch Mg
Very low	<6	0-0.1	0-0.2	0-2	0-0.3
Low	6-12	0.1-0.3	0.2-0.3	2-5	0.3-1
Moderate	12-25	0.3-0.7	0.3-0.7	5-10	1-3
High	25-40	0.7-2	0.7-2	10-20	3-8
Very high	>40	>2	>2	>20	>8

5.1.4 Ratio of Exchangeable Calcium to Magnesium

To maintain soil structure there should be a ratio of around 4:1 to 6:1 calcium to magnesium for a balanced soil (Eckert 1987)[20]. At ratios of less than 4:1 calcium is considered to be deficient, whilst at ratios of greater than 6:1 are considered to be magnesium deficient.

5.1.5 Exchangeable Sodium Percentage or Sodicity (ESP%)

Exchangeable sodium is an important soil stability and salinity parameter. Excessive exchangeable sodium leads to unstable soils, increased runoff, potential salinity, dispersivity and water logging problems.

[19] Metson, A.J, (1961). *Methods of Chemical Analysis for Soil Survey Samples* (referred to as Metson 1961)

[20] Eckert, D.J, (1987) *.Soil Test Interpretation: Basic Cation Saturation Ratios and Sufficiency Levels* (referred to as Eckert 1987)

Normally the sodium content is expressed as a percentage of the CEC as other cations counteract the negative effects of sodium (known as ESP% and termed sodicity). The effect of the exchangeable sodium (exchangeable sodium percentage, ESP) varies with other soil factors such as the type of clay, the relative quantity of magnesium and the quantity of organic matter. However, Charman & Murphy (2000[21]) indicate that a soil is generally considered sodic if the ESP exceeds 6% and extremely sodic if the ESP exceeds 15%.

5.1.6 Groundwater Salinity

EC values in groundwater are dependent on numerous factors and can vary with changes in temperature and pH conditions. Suttar (1990[22]) has classed water into different types based on EC values as outlined in the table below.

Table 5-4: EC Ranges in Water

Water Type	EC (µS/cm)
Deionised Water	0.5 – 3
Pure Rainwater	<15
Freshwater Rivers	0 – 800
Marginal River Water	800 – 1600
Brackish Water	1600 – 4800
Saline Water	>4800
Seawater	51,500
Industrial Waters	100 – 10,000

5.1.7 Recommendations for Concrete Slabs and Footings in Saline Soils

In the absence of endorsed recommendations for buildings in saline environments, reference is made to the CCAA 2018. The guide provides recommendations on the minimum concrete grade/strength required for slabs and footings in saline soils. Reference should be made to the CCAA 2018 publication for further information:

Table 5-5: Minimum Concrete Grade for Slabs and Footings in Saline Soils

ECe (dS/m)	Salinity Class	Concrete Grade[1]
<2	Non-saline	N20
2-4	Slightly saline	N20
4-8	Moderately saline	N25
8-16	Very saline	N32
>16	Highly saline	≥N40

Note:

1 - Concrete Grade for Salinity Class has been adopted from CCAA 2018

[21] Charman, P.E.V and Murphy, B.W (eds), (2000).*Soils: Their Management and Properties,* (referred to as Charman and Murphy 2000)

[22] Suttar, S., (1990). *Ribbons of Blue Handbook, Scitech*, Victoria (referred to as Suttar 1990)

5.1.8 Recommendations for Durability with Reference to AS2159-2009

In designing for durability, reference should be made to the requirements listed in the AS2159-2009. The exposure classification for concrete and steel piles and foundations is outlined in the following tables.

Table 5-6: Exposure Classification for Concrete Piles

Exposure Conditions				**Exposure Classification**	
Sulphate (expressed as SO_4)		pH	Chlorides in Groundwater (ppm)	Soil Conditions A[1]	Soil Conditions B[2]
In Soil (ppm)	In Groundwater (ppm)				
<5,000	<1,000	>5.5	<6,000	Mild	Non-aggressive
5,000-10,000	1,000-3,000	4.5-5.5	6,000-12,000	Moderate	Mild
10,000-20,000	3,000-10,000	4-4.5	12,000-30,000	Severe	Moderate
>20,000	>10,000	<4	>30,000	Very severe	Severe

Notes:

1 - High permeability soils (e.g. sands and gravels) which are in groundwater

2 – Low permeability soils (e.g. silts and clays) or all soils above groundwater

Table 5-7: Exposure Classification for Steel Piles

Exposure Conditions				**Exposure Classifications**	
pH	**Chlorides**		**Resistivity (ohm.cm)**	**Soil Conditions A[1]**	**Soil Conditions B[2]**
	In Soil (ppm)	**In Groundwater (ppm)**			
>5	<5,000	<1,000	>5,000	Non-aggressive	Non-aggressive
4-5	5,000-20,000	1,000-10,000	2,000-5,000	Mild	Non-aggressive
3-4	20,000-50,000	10,000-20,000	1,000-2,000	Moderate	Mild
<3	>50,000	>20,000	<1,000	Severe	Moderate

Notes:

1 - High permeability soils (e.g. sands and gravels) which are in groundwater

2 – Low permeability soils (e.g. silts and clays) or all soils above groundwater

5.2 Acid Sulfate Soil (ASS) Screening Criteria

5.2.1 ASS Investigation Requirements

The National Acid Sulfate Soil Guidance (2018) requires sampling to a depth of 1m beyond the depth of disturbance (including the depth of any groundwater disturbance). A summary of the sampling densities and analysis requirements outlined in the *National Acid Sulfate Soil Guidance: National acid sulfate soils sampling and identification methods manual* (2018) is provided in the following tables:

Table 5-8: Minimum Soil Sampling Densities for ASS Investigations

Type of disturbance	Extent of site	Sample point frequency
Small volumes (≤ 1000 m^3) – prior to disturbance	Volume of disturbance (m^3) < 250 251–500 501–1000	Number of boreholes 2 3 4
Large volumes (> 1000 m^3) – prior to disturbance	Project area (ha) <1 1-2 2-3 3-4 >4	Number of boreholes 4 6 8 10 10 plus 2 per additional hectare
Linear	Width and volume Minor[1] Major[2]	Intervals (m) 100 50
Existing stockpiles & verification testing	Volume (m^3) <250 251-500 1,000 >1,000	Number of samples 2 3 4 4 plus 1 per additional 500m^3

[1] Minor Linear Disturbance – for example underground services, narrow shallow drains (less than 1 m below ground level).
[2] Major Linear Disturbance – for example roads, railways, canals, deep sewer, wide drains, deep drains and dredging projects[#].
[#] Further guidance is provided in the Guidelines for the dredging of acid sulfate soil sediments and associated dredge spoil management (Simpson et al. 2017).

Table 5-9: Minimum Number of Soil Samples to be Submitted for Laboratory Analysis (small-scale disturbance)

Volume of disturbed soils	Maximum disturbance depth			
	< 1 m	1–2 m	2-3 m	3-4 m
≤ 250m^3	3	4	5	6
251–500m^3	4	5	6	7
500–1,000m^3	5	6	7	8

Note: Small scale is considered less than or equal to 1,000 m^3 and does not involve dewatering or groundwater pumping (excluding linear disturbances). Number of samples to be analysed per total volume of soil to be disturbed, not per borehole. Depth of disturbance to be measured from ground surface. Borehole depth must be at least 1 m below maximum proposed depth of disturbance.

The investigation component of this assessment was designed as a preliminary investigation and does not meet the minimum sampling density and analysis frequency. The low sampling density is considered reasonable given the proposed land use does not include any excavations.

5.2.2 ASS Action Criteria

The action criteria presented in the *National Acid Sulfate Soil Guidance: National acid sulfate soils sampling and identification methods manual* (2018) are summarised in the following table:

Table 5-10: ASS Action Criteria Based on Soil Texture and Volume of Material Being Disturbed

Type of material		**Net Acidity**			
Texture range* (NCST 2009)	Approximate clay content (%)	1–1000 t materials disturbed		> 1000 t materials disturbed	
		% S-equiv. (oven-dried basis)	mol H^+/t (oven-dried basis)	% S-equiv. (oven-dried basis)	mol H^+/t (oven-dried basis)
Fine - light medium to heavy clays	>40	≥0.10	≥62	≥0.03	≥18
Medium - clayey sand to light clays	5–40	≥0.06	≥36	≥0.03	≥18
Coarse and Peats - sands to loamy sands	<5	≥0.03	≥18	≥0.03	≥18

* If bulk density values are not available for the conversion of cubic meters to tonnes of soil, then default bulk densities, based on the soil texture, may be used.

The action criteria for 'medium' was used for the assessment of PASS.

5.2.3 ASS Field Tests

The soil field tests commonly used for investigations for ASS materials include field pH (pH_F) and field pH peroxide (pH_{FOX}) tests. The pH_F test can help identify Actual ASS. While a pH_F of less than or equal to pH 4 is indicative of the presence of Actual ASS, it is not conclusive of the presence of ASS on its own, as naturally occurring, non ASS soils such as many organic soils (for example peats) and heavily leached soils may also have pH_F less than or equal to pH 4. To identify an Actual ASS other evidence must be presented that indicates the low pH_F has been mainly caused by the oxidation of reduced inorganic sulfur. Such information includes the presence of jarosite in the soil layer/horizon, or the location of other Actual ASS or PASS materials within the sampling location or in the nearby vicinity.

The difference between the pH_F and the pH_{FOX} is helpful in the preliminary identification of PASS. Combined, the pH_F and pH_{FOX} results can be a useful aid with soil sample selection for laboratory analysis. Additional Information in relation to interpretation of the pH field tests is provided in the appendices.

6 RESULTS

6.1 Dryland Salinity Screening Results

The laboratory results are compared to the relevant SAC in the attached report tables. Interpretation of the results against the SAC is provided in the following table.

Table 6-1: Interpretation of Laboratory Results

Parameter	Notes
Soil Salinity and Plant Growth	The EC results ranged from 90 µS/cm to 1900 µS/cm. A relatively high EC results of 1900 µS/cm was detected in fill soil sample BH305 (0-0.1m). The ECe results generally ranged from <2dS/m to 17dS/m. The majority of the samples were classed as non-saline to slightly saline. The fill soil sample BH305 (0-0.1m) was classed as highly saline.
Soil pH and Plant Growth	The soil pH results ranged from 7.1 to 9.2 and are classed as within optimal range for plant growth and to strongly alkaline. The majority of the surficial soils were generally within the optimum range for plant growth. The proposed shared pathway landuse does not include any landscaping.
CEC in Soil	The CEC values ranged from 16 meq/100g to 34 meq/100g in the moderate to high range. The majority of the samples were within the high range which is not typical of the soil formation encountered at the site.
Ratio of Calcium to Magnesium	The results indicate that the soils have more calcium than magnesium. Lime and gypsum can be used to stabilise the soil which will improve soil structure for both engineering and fertility purposes.
ESP%	The ESP% values of the samples ranged from 0.3% to 1.2%. All of the ESP results were below the 5% threshold and were classed as non-sodic.
Concrete Slabs and Footings in Saline Soils (CCAA 2018)	The proposed landuse does not include excavations. Excavations to a depth of approximately 0.75mBGL are anticipated to expose soils generally classed as slightly to highly saline. The CCAA 2018 recommended concrete grade for slabs and footings in highly saline soils is ≥N40. The results should be assessed by the project design team as applicable for the proposed development. Reference should also be made to AS2159-2009 for minimum concrete strengths and reinforcement cover for concrete piles/foundations.
Soil Conditions for Exposure Classification (AS2159-2009)	The boreholes drilled for the investigation have indicated that the subsurface conditions at the site generally comprise of low permeability soils (i.e. silts and clays). Based on this, the exposure classification outlined under 'Soil Conditions B' has been adopted for the assessment.
Exposure Classification for Concrete Piles/Foundations (AS2159-2009)	The soil pH and sulphate results indicate that the soils are non-aggressive towards buried concrete. The results should be assessed by the project design team as applicable for the proposed development.

Parameter	Notes
Exposure Classification for Steel Piles/Foundations (AS2159-2009)	The soil resistivity, pH and chloride results indicate that the soils are moderately aggressive towards buried steel. The results should be assessed by the project design team as applicable for the proposed development.

6.2 ASS Screening Results

The soil laboratory results were assessed against the action criteria adopted for the assessment. The results are presented in the attached report tables and are summarised below.

Table 6-2: Summary of Results

Results	Comments
pH_F	The pH_F results ranged from 7.9 to 8.6. None of the results were below pH 4 indicating that actual ASS (AASS) was not present in the samples analysed.
pH_{FOX} reaction rates	The pH_{FOX} results ranged from 5.2 to 7.6 with the majority of the reaction rates being of low. Two samples recorded volcanic reactions.
Net Acidity % S-equiv.	Based on the review of the field testing, five representative samples were chosen for additional SCR testing. The net acidity results ranged from 0.008%w/wS to 0.024%w/wS. All of the results were below the action criterion of 0.06%w/wS.
Net Acidity mol H^+/t	The net acidity results of the samples ranged from 5mol H+/t to 15mol H+/t. All of the results were below the action criterion of 36mol H^+/t.
S_{CR}%	All of the S_{CR}% results were less than 0.02%S_{CR}. These results indicated that the soils did not contain significant oxidisable sulfur concentrations.
Liming Rate	The liming rate required for neutralisation ranged from <0.75 kg$CaCO_3$/tonne to 1.1 kg$CaCO_3$/tonne.

6.3 Assessment of Data Quality

For the purpose of the assessment, JKE have undertaken a preliminary assessment of the data quality against the following Data Quality Indicators (DQIs): precision, accuracy, representativeness, completeness and comparability. Reference should be made to the JKE DSI report for additional information.

7 DISCUSSION AND RECOMMENDATIONS

7.1 Dryland Salinity Conditions

The assessment identified the following salinity conditions at the site:

- The soils are generally classed as slight to highly saline; and
- The soils are moderately aggressive towards buried steel, based on the resistivity results.

Based on the above results, JKE is of the opinion that a Salinity Management Plan (SMP) is not required for the proposed shared pathway. The proposed landuse does not include any excavations and will mainly include only light structures associated with the construction of the pathway.

The aggressivity results of the soils outlined in this report should be reviewed and incorporated into the design of any proposed structures by the project team (civil and structural).

In the event that the proposed landuse includes excavation, crushing and re-use of excavated soil on site as part of the development, we recommend that the salinity/aggressivity conditions be checked so that the findings can be considered in the context of the earthworks and the built form of the development.

7.2 ASS Conditions

The results of the field tests and other laboratory results did not identify acidic conditions greater than the action criteria. As such, and considering the information reviewed for this assessment (risk maps, subsurface conditions etc), PASS or AASS conditions that would be expected to pose a risk to the environment if disturbed during the proposed development works described in Section 1.1 of this report have not been identified. On this basis an ASSMP is not considered necessary for the proposed development.

7.3 Surface Water Conditions

The SGIA included a review of the surface water conditions. Natural surface water bodies such as creeks, dams, lakes and/or ponds were not identified onsite or in the immediate surrounds.

A review of the site and regional topography indicates that the site is located approximately 550m to the west of Caddies Creek. Considering the site is currently unoccupied, there is potential for surface water infiltration to occur which may impact on the groundwater levels. It is noted that the underlying soils and rock are of low permeability and that excess surface water flow would be expected to eventuate into the stormwater collection system.

Considering the above information, the proposed shared pathway is not likely to have an impact on Caddies Creek.

A Construction and Environmental Management Plan (CEMP) should be prepared for the proposed landuse with details of stormwater control and discharge, erosion and sediment controls to be implemented during development works.

7.4 Groundwater Conditions

The SGIA did not include an assessment of groundwater conditions at the shared pathway site due to access restrictions associated with the existing T-way and the use of hand tools to complete the boreholes. However, JKE has assessed the groundwater conditions at the DPHI site and the main hospital site and the conditions at the shared pathway site is likely to be similar to the other sites.

The assessment of the DPHI and main hospital sites has identified the following groundwater conditions:

- The SWL in MW201 at the DPHI site was relatively shallow (0.6mBGL) and is considered to be perched seepage mainly from the surface. Heavy rainfall was observed prior to and during the field work undertaken for the SGIA;
- JKE note that the groundwater at the adjacent main hospital site was encountered at depths ranging from approximately 1.53mBGL to 6.89mBGL indicating that the actual depth to groundwater at the DPHI site is likely to be lower than what was recorded during the investigation. We also note that the other two monitoring wells were dry;
- The proposed shared pathway does not include any excavations. In the event of excavations, the seepage water will require treatment prior to disposal to stormwater. Council approval must be obtained for disposal into the stormwater;
- The SGIA did not identify any GDE, IDE and/or wetlands in the vicinity of the shared pathway site that would be impacted by the proposed DPHI landuse;
- A review of the ecological sensitivity areas did not identify any native vegetation on the shared pathway site. An area mapped as containing Grassy Woodlands of the Cumberland Shale Plains located on the hospital site to the east of the shared pathway. The proposed shared pathway landuse is not likely to impact the off-site location; and
- The SGIA indicated that groundwater over the majority of the wider sites was impacted by selected metals (cadmium, copper, zinc) and PFOS. The heavy metal and PFOS elevations can be attributed to regional background concentrations and the underlying geology at the site (i.e. weathered siltstone bedrock). Microbial detections indicate that there could be potential influence from the surface.

7.5 Surface Water Dewatering During Construction

Should a detention basin be considered for use during the construction phase for the proposed development, the construction contractor must confirm that the basin has been constructed correctly and is of the appropriate volume capacity to serve the intended purpose. The surface water quality should be monitored during the construction phase of the project.

Turbidity and pH are parameters that can fluctuate depending on site conditions and activities such as excavation during construction/enabling works. If required (i.e. if the turbidity is greater than 50NTU or the pH is outside the range of 6.5 and 8.5) the pH can be adjusted by dosing, and the and the turbidity can be adjusted by use of a flocculent. The relevant consent authorities should be contacted to clarify the requirements to obtain disposal approval to stormwater, if this option is to be considered.

In the event unexpected conditions are encountered during construction/enabling works that may pose a contamination risk, all works should stop and an environmental consultant should be engaged to inspect the site and address the issue.

7.6 Mitigation Measures

Mitigation measures identified in the SGIA are outlined in the table below:

Table 7-1: Mitigation Measures Relating to SGIA Findings

Mitigation Number / Name	Aspect / Section	Mitigation Measure	Reason for Mitigation Measure
Construction and Environmental Management Plan (CEMP)	Pre-construction and during construction	Preparation and implementation of CEMP	Prior to the commencement of any construction work, a CEMP is to be prepared and must include: - Details of stormwater control and discharge; - Any other specific environmental construction; - Terms of Approval/mitigation measures detailed in the consent conditions; - Technical document and management plans relevant to construction soil and water management; and - Erosion and Sediment Control Plan. The site and all construction works are to be managed and carried out in accordance with: the CEMP and all of its associated plans, protocols and procedures, which are required to the satisfaction of the terms of approval /mitigation measures and any other licences, permits, approvals and land owners consents as required under any other legislation.
Groundwater Treatment prior to off-site disposal	During construction	Design and implementation of a Treatment Plan (contingency)	The SGIA has identified that the groundwater over the wider area (including DPHI and main hospital sites) has been impacted by selected metals, PFOS and microbes. These impacts were considered to be associated with regional conditions and no site specific areas of environmental concern (AEC) were identified. At this stage, there is no proposed excavations requiring dewatering for the shared pathway. In the event the development includes shallow trenching for installation of services and/or foundations, any seepage water encountered will require treatment prior to stormwater disposal. Council approval is required for disposal of treated groundwater into the stormwater system.

7.7 Evaluation of Environmental Impacts

It is considered that potential risks associated with the surface and groundwater at the site can be adequately managed through the above recommend mitigation measures.

8 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Surface and groundwater conditions may vary, especially after climatic changes and wet/dry periods;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- JKE have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or landuse. JKE should be contacted immediately in such circumstances;
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose;
- Copyright in this report is the property of JKE. JKE has used a degree of care, skill and diligence normally exercised by consulting professionals in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report;
- If the client, or any person, provides a copy of this report to any third party, such third party must not rely on this report except with the express written consent of JKE; and
- Any third party who seeks to rely on this report without the express written consent of JKE does so entirely at their own risk and to the fullest extent permitted by law, JKE accepts no liability whatsoever, in respect of any loss or damage suffered by any such third party.

Important Information about this Report

These notes have been prepared by JKE to assist with the assessment and interpretation of this report.

The Report is based on a Unique Set of Project Specific Factors
This report has been prepared in response to specific project requirements as stated in the JKE proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- The proposed land use is altered;
- The defined subject site is increased or sub-divided;
- The proposed development details including size, configuration, location, orientation of the structures or landscaped areas are modified;
- The proposed development levels are altered, eg addition of basement levels; or
- Ownership of the site changes.

JKE/J&K will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the assessment. If the subject site is sold, ownership of the assessment report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the assessment was undertaken. No person should apply an assessment for any purpose other than that originally intended without first conferring with the consultant.

Changes in Subsurface Conditions
Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (e.g. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an assessment report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

This Report is based on Professional Interpretations of Factual Data
Site assessments identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Assessment Limitations
Although information provided by a site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

Misinterpretation of Site Assessments by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an assessment report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

Logs Should not be Separated from the Assessment Report

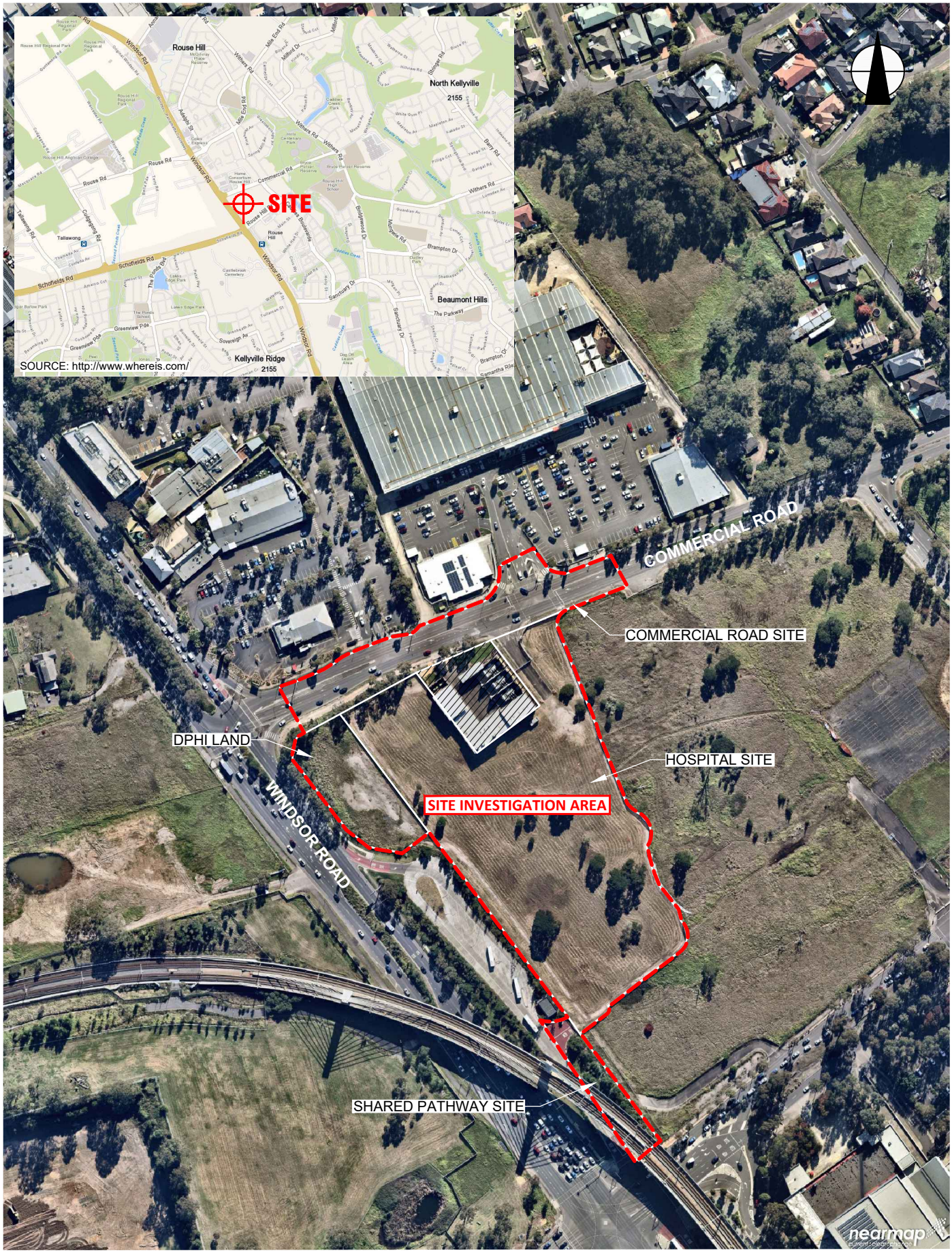
Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the assessment. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

Read Responsibility Clauses Closely

Because an environmental site assessment is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.

Appendix A: Report Figures



AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

This plan should be read in conjunction with the Environmental report.

Title: **SITE INVESTIGATION AREA**

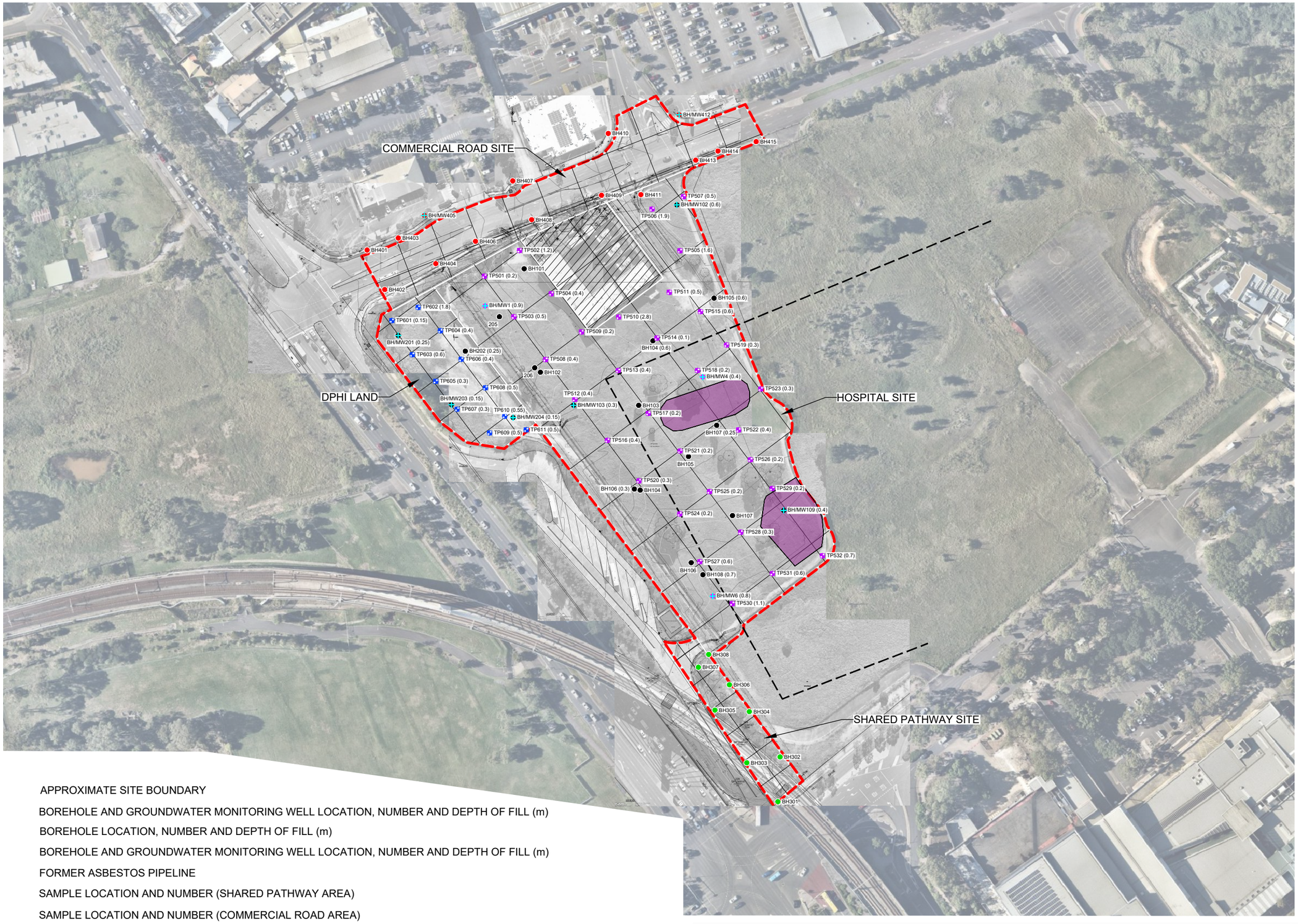
Location: CNR WINDSOR AND COMMERCIAL ROAD, ROUSE HILL, NSW

Project No: E37757B

Figure No: 1

JKEnvironments

PLOT DATE: 29/08/2025 4:07:40 PM DWG FILE: K:\SC EIS \JOBS\37000\SIE37757B ROUSE HILL HOSPITAL\CAD\E37757B.DWG



LEGEND

— — —	APPROXIMATE SITE BOUNDARY
BH/MW1	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
BH101	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW102	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
— — —	FORMER ASBESTOS PIPELINE
BH301	SAMPLE LOCATION AND NUMBER (SHARED PATHWAY AREA)
BH401	SAMPLE LOCATION AND NUMBER (COMMERCIAL ROAD AREA)
BH/MW405	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION AND NUMBER (COMMERCIAL ROAD AREA)
TP501	SAMPLE LOCATION, NUMBER AND DEPTH OF FILL (m) (HOSPITAL SITE AREA)
TP601	SAMPLE LOCATION, NUMBER AND DEPTH OF FILL (m) (DPHI LAND AREA)
	ABORIGINAL INVESTIGATION AREA
	SUBSTATION (NOT INCLUDED IN INVESTIGATION AREA)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 20 40 60 80 100

SCALE 1:2000 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAMPLE LOCATION PLAN**

Location: CNR WINDSOR AND COMMERCIAL ROAD, ROUSE HILL, NSW

Project No: E37757B

Figure No: 2

JKEnvironments

PLOT DATE: 27/08/2025 11:16:48 AM DWG FILE: K:\5C EIS JOBS\37000'S\E37757B ROUSE HILL HOSPITAL\CAD\E37757B.DWG

LEGEND

- APPROXIMATE SITE BOUNDARY
- FORMER ASBESTOS PIPELINE
- APPROXIMATE SHARED PATHWAY SITE BOUNDARY
- BH301 — SAMPLE LOCATION, NUMBER AND DEPTH OF FILL (m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 5 10 15 20 25

SCALE 1:500 @A3 METRES

This plan should be read in conjunction with the Environmental report.

Title: **SAMPLE LOCATION PLAN SHARED PATHWAY SITE**

Location: CNR WINDSOR AND COMMERCIAL ROAD, ROUSE HILL, NSW

Project No: E37757B

Figure No: 2a

JKEnvironments

PLOT DATE: 12/09/2025 10:32:53 AM DWG FILE: K:\5C EIS JOBS\37000\SIE37757B ROUSE HILL HOSPITAL\CADIE37757B.DWG

Appendix B: Site Information

Site Photos

Project Ref: E37757B
Site Address: Corner of Windsor Road and Commercial Road, Rouse Hill, NSW
Selected Site Photos Dated: 24 July 2025

	**Photograph 1:** Taken along the northern boundary from the T-way junction.
	**Photograph 2:** Taken along the northern boundary of the site showing littering of general waste.
	**Photograph 3:** Taken along the western portion of the site, depicting the vegetation cover across the site.

	**Photograph 4:** Overview of the southern portion of the site, depicting the footing of the overhead Sydney Metro bridge and plant dieback noted along the edge of the bus lane to the west of the site.
	**Photograph 5:** Stormwater trench man hole observed in the southern portion of the site.
	**Photograph 6:** Overview from the southern boundary along Rouse Hill Drive, depicting the chain link fence along the north-eastern boundary, and the vegetated bank.
	**Photograph 7:** Overview from the northern boundary of the north-eastern boundary and the vegetated bank.

Lotsearch Enviro Report

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Date: 15 Jul 2025 09:44:11

Reference: LS087894 EP

Address: Commercial & Windsor Roads, Rouse Hill, NSW 2155

Dataset Listing

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

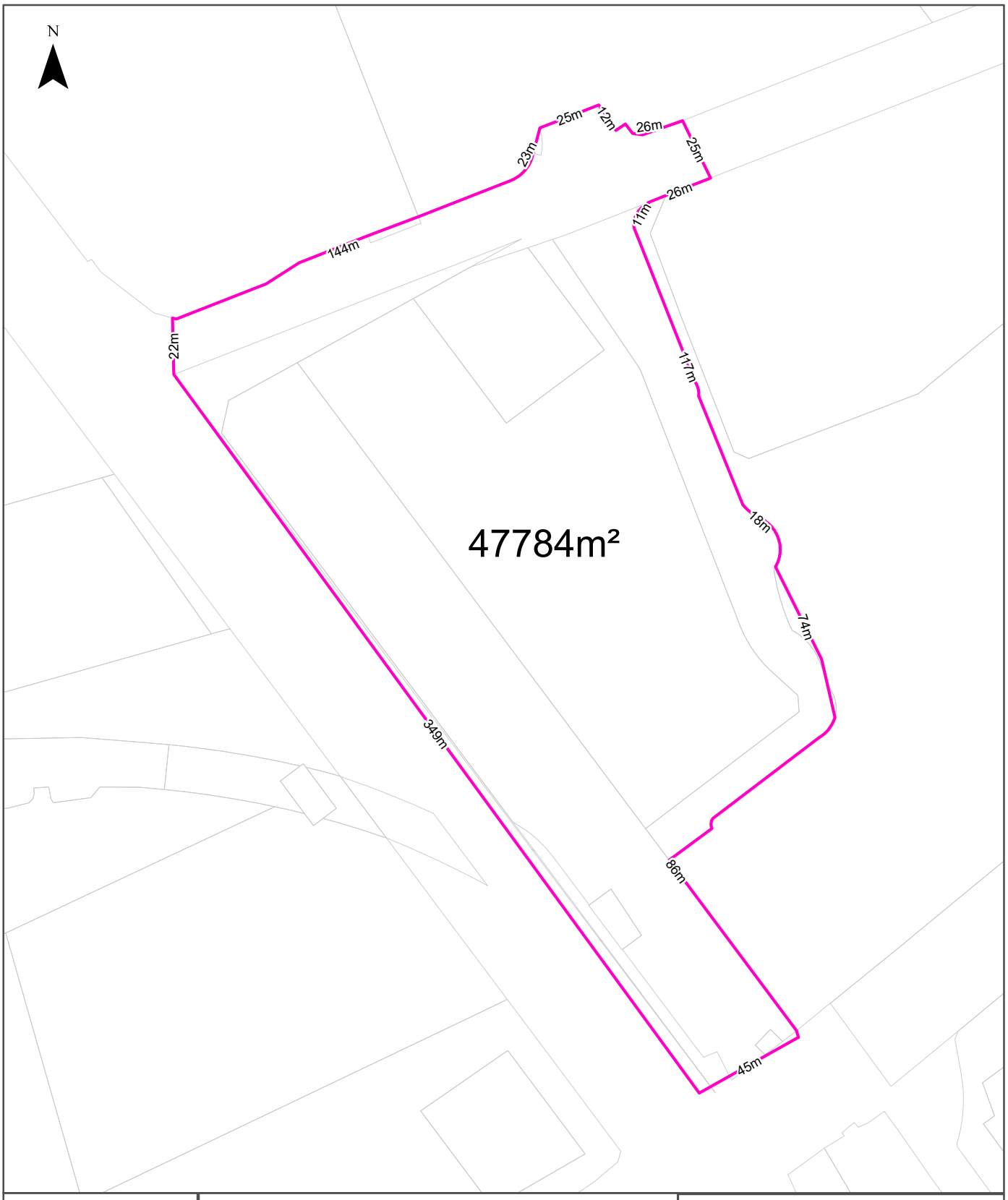
Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Customer Service - Spatial Services	24/06/2025	24/06/2025	Monthly	-	-	-	-
Topographic Data	NSW Department of Customer Service - Spatial Services	20/05/2025	20/05/2025	Annually	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority NSW	10/06/2025	08/05/2025	Monthly	1000m	0	0	0
Contaminated Land Records of Notice	Environment Protection Authority NSW	11/06/2025	11/06/2025	Monthly	1000m	0	0	0
Former Gasworks	Environment Protection Authority NSW	20/05/2025	15/05/2025	Quarterly	1000m	0	0	0
Notices under the POEO Act 1997	Environment Protection Authority NSW	30/06/2025	30/06/2025	Monthly	1000m	0	2	2
National Waste Management Facilities Database	Geoscience Australia	30/05/2025	19/01/2023	Annually	1000m	0	2	2
National Liquid Fuel Facilities	Geoscience Australia	16/10/2024	19/01/2023	Annually	1000m	0	0	2
EPA PFAS Investigation Program	Environment Protection Authority NSW	30/06/2025	05/02/2025	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Australian Department of Defence	11/06/2025	11/06/2025	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Australian Department of Defence	11/06/2025	11/06/2025	Monthly	2000m	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	11/06/2025	21/05/2025	Monthly	2000m	0	0	0
Defence Controlled Areas	Australian Department of Defence	10/04/2025	10/04/2025	Quarterly	2000m	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Australian Department of Defence	11/06/2025	02/09/2022	Quarterly	2000m	0	0	0
National Unexploded Ordnance (UXO)	Australian Department of Defence	10/04/2025	10/04/2025	Quarterly	2000m	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority NSW	28/11/2024	15/12/2022	Annually	1000m	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority NSW	16/06/2025	16/06/2025	Monthly	1000m	1	1	1
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority NSW	16/06/2025	16/06/2025	Monthly	1000m	0	0	0
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority NSW	16/06/2025	16/06/2025	Monthly	1000m	4	5	16
UBD Business Directories (Premise & Intersection Matches)	Hardie Grant			Not required	150m	0	0	0
UBD Business Directories (Road & Area Matches)	Hardie Grant			Not required	150m	-	32	32
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500m	0	0	0
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500m	-	0	0
Points of Interest	NSW Department of Customer Service - Spatial Services	19/05/2025	19/05/2025	Quarterly	1000m	1	2	44
Tanks (Areas)	NSW Department of Customer Service - Spatial Services	19/05/2025	19/05/2025	Quarterly	1000m	0	0	0
Tanks (Points)	NSW Department of Customer Service - Spatial Services	19/05/2025	19/05/2025	Quarterly	1000m	0	0	0
Major Easements	NSW Department of Customer Service - Spatial Services	20/05/2025	20/05/2025	Quarterly	1000m	0	2	9
State Forest	Forestry Corporation of NSW	18/12/2024	11/11/2024	Annually	1000m	0	0	0
Hydrogeology Map of Australia	Geoscience Australia	22/04/2025	19/08/2019	Annually	1000m	1	1	1

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024	NSW Department of Climate Change, Energy, the Environment and Water	13/05/2025	28/06/2024	Quarterly	1000m	0	0	0
National Groundwater Information System (NGIS) Boreholes	Bureau of Meteorology; Water NSW	30/05/2025	04/03/2025	Annually	2000m	0	0	8
NSW Seamless Geology Single Layer: Rock Units	NSW Department of Primary Industries and Regional Development	19/05/2025	16/04/2024	Annually	1000m	1	1	5
NSW Seamless Geology Single Layer: Geological Boundaries and Faults	NSW Department of Primary Industries and Regional Development	19/05/2025	16/04/2024	Annually	1000m	0	0	0
NSW Seamless Geology Single Layer: Trendlines	NSW Department of Primary Industries and Regional Development	19/05/2025	16/04/2024	Annually	1000m	0	0	0
NSW Seamless Geology Single Layer: Fold Axes	NSW Department of Primary Industries and Regional Development	19/05/2025	16/04/2024	Annually	1000m	0	0	0
Naturally Occurring Asbestos Potential	NSW Department of Primary Industries and Regional Development	05/05/2025	30/09/2015	Annually	1000m	0	0	0
Atlas of Australian Soils	Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES)	15/01/2025	17/02/2011	Annually	1000m	1	1	1
Soil Landscapes of Central and Eastern NSW	NSW Department of Climate Change, Energy, the Environment and Water	18/12/2024	27/07/2020	Annually	1000m	1	1	2
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning, Housing and Infrastructure	26/06/2025	09/05/2025	Monthly	500m	0	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	15/01/2025	21/02/2013	Annually	1000m	1	1	1
Dryland Salinity - National Assessment	Australian Bureau of Agricultural and Resource Economics and Sciences	03/06/2025	15/04/2025	Annually	1000m	0	1	1
Dryland Salinity Potential of Western Sydney	NSW Department of Climate Change, Energy, the Environment and Water	29/04/2025	26/02/2024	Annually	1000m	1	1	5
Mining Subsidence Districts	NSW Department of Customer Service	20/05/2025	20/05/2025	Quarterly	1000m	0	0	0
Current Mining Titles	NSW Department of Primary Industries and Regional Development	09/07/2025	09/07/2025	Monthly	1000m	0	0	0
Mining Title Applications	NSW Department of Primary Industries and Regional Development	09/07/2025	09/07/2025	Monthly	1000m	0	0	0
Historic Mining Titles	NSW Department of Primary Industries and Regional Development	09/07/2025	09/07/2025	Monthly	1000m	12	12	12
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning, Housing and Infrastructure	26/06/2025	08/09/2023	Monthly	1000m	2	2	2
Environmental Planning Instrument Land Zoning	NSW Department of Planning, Housing and Infrastructure	26/06/2025	13/06/2025	Monthly	1000m	4	11	64
Commonwealth Heritage List	Australian Department of Climate Change, Energy, the Environment and Water	23/10/2024	13/04/2022	Annually	1000m	0	0	0
National Heritage List	Australian Department of Climate Change, Energy, the Environment and Water	23/10/2024	13/04/2022	Annually	1000m	0	0	1
State Heritage Register - Curtilages	NSW Department of Planning, Industry and Environment	20/05/2025	21/03/2025	Quarterly	1000m	0	1	2
Environmental Planning Instrument Local Heritage	NSW Department of Planning, Housing and Infrastructure	26/06/2025	13/06/2025	Monthly	1000m	2	2	14
Bush Fire Prone Land	NSW Rural Fire Service	24/06/2025	23/06/2025	Monthly	1000m	0	0	3
NSW Native Vegetation Type Map	NSW Department of Climate Change, Energy, the Environment and Water	28/05/2025	04/10/2024	Quarterly	1000m	2	2	52
Ramsar Wetlands of Australia	Australian Department of Climate Change, Energy, the Environment and Water	19/05/2025	05/03/2025	Annually	1000m	0	0	0

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Collaborative Australian Protected Areas Database (CAPAD) 2022 - Terrestrial	Australian Department of Climate Change, Energy, The Environment and Water	20/03/2025	19/06/2024	Annually	1000m	0	0	1
Collaborative Australian Protected Areas Database (CAPAD) 2022 - Marine	Australian Department of Climate Change, Energy, The Environment and Water	20/03/2025	30/06/2022	Annually	1000m	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	30/05/2025	07/05/2020	Annually	1000m	0	0	3
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	30/05/2025	07/05/2020	Annually	1000m	0	0	5
NSW BioNet Species Sightings	NSW Department of Climate Change, Energy, the Environment and Water	10/07/2025	10/07/2025	Monthly	10000m	-	-	-

Site Diagram

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Legend

- Site Boundary
- Internal Parcel Boundaries

Total Area: 47784m²

Total Perimeter: 1.1km

Disclaimers:

Measurements are approximate only and may have been simplified or smaller lengths removed for readability.

Parcels that make up a small percentage of the total site area have not been labelled for increased legibility.

Scale: 0 25 50 100 Meters

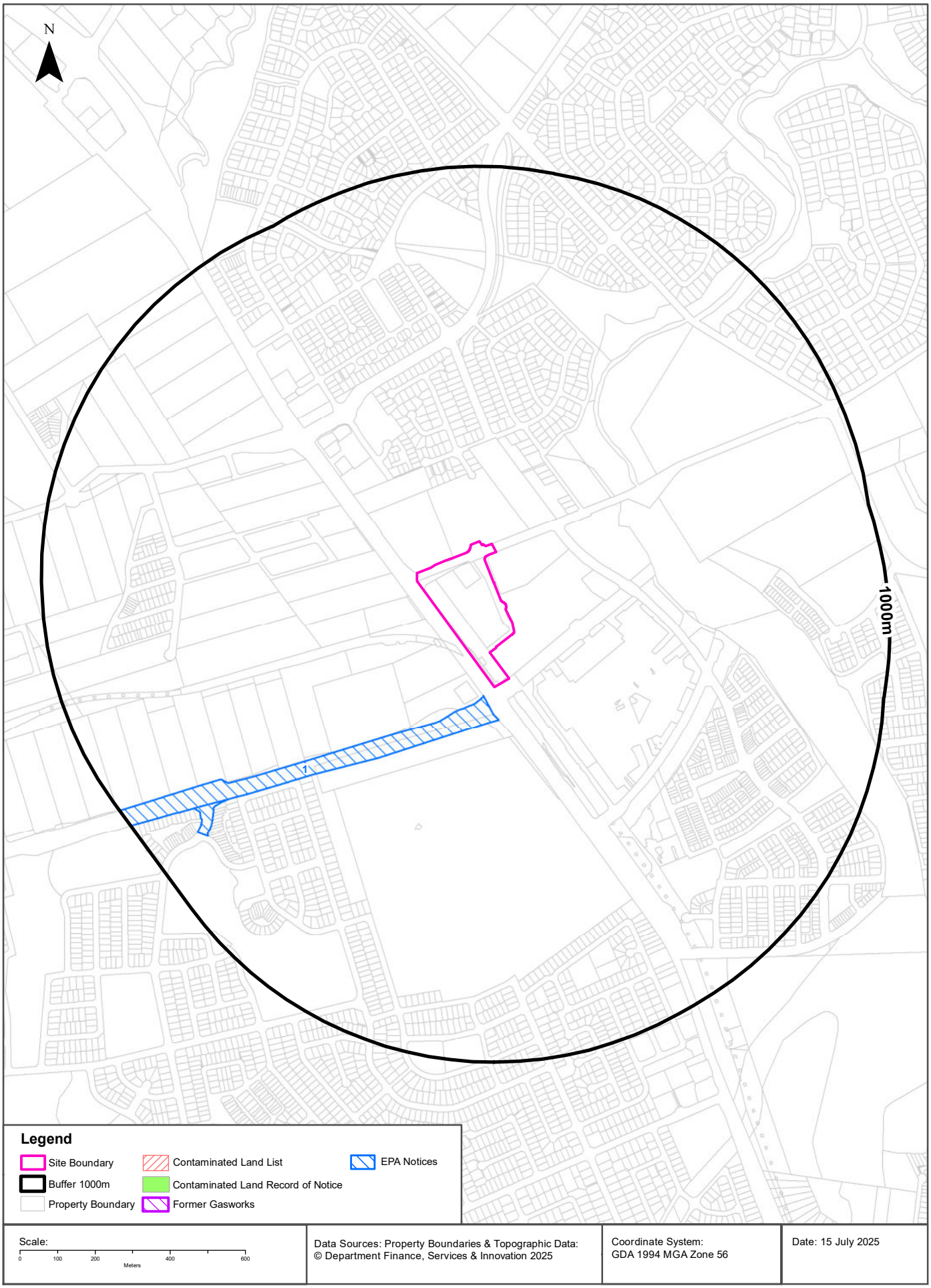
Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2025

Coordinate System: GDA 1994 MGA Zone 56

Date: 15 July 2025

Contaminated Land

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Contaminated Land

Commercial & Windsor Roads, Rouse Hill, NSW 2155

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	Direction
N/A	No records in buffer								

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

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

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

EPA Notices

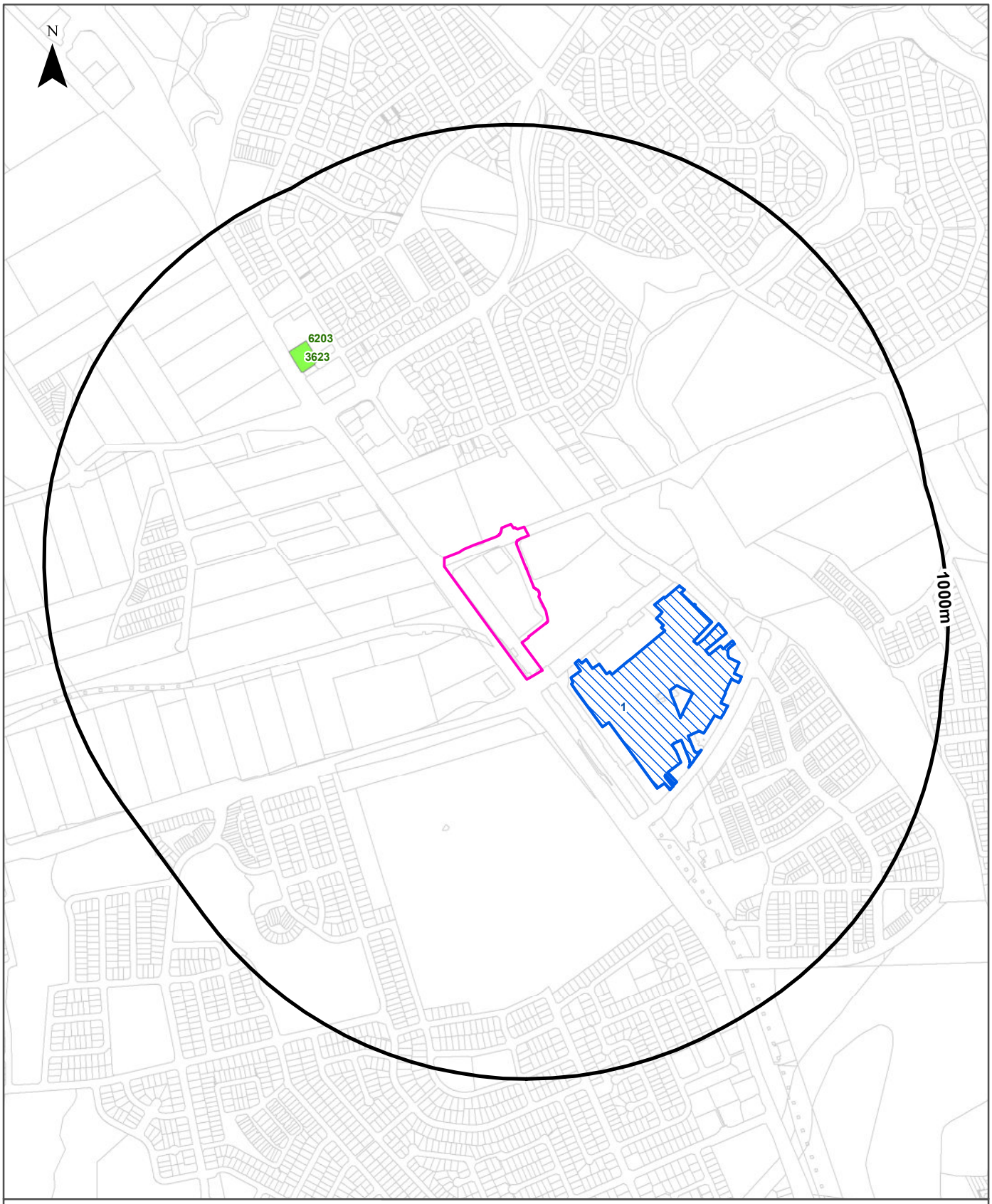
Penalty Notices, s.91 & s.92 Clean up Notices and s.96 Prevention Notices within the dataset buffer:

Map ID	Number	Type	Name	Address	Status	Issued Date	Act	Offence	Offence Date	Loc Conf	Dist	Dir
1	3085773617	Penalty Notice	OHL Abergeldie Schofields Road Upgrade joint Venture	Schofields Road East, ROUSE HILL, NSW 2155	Issued	03/04/2014	Protection of the Environment Operations Act 1997 - 120(1)	Pollute waters - Corporation	14/03/2014	Premise Match	38m	South West
	1531084	s.91 Clean Up Notice	OBRASCON HUARTE LAIN S.A	Schofields Road East, ROUSE HILL, NSW 2155	Issued	01/06/2015				Premise Match	38m	South West

NSW EPA Notice Data Source: Environment Protection Authority

Waste Management & Liquid Fuel Facilities

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Legend

- Site Boundary
- Buffer 1000m
- Property Boundary
- Waste Management Facilities
- National Liquid Fuel Facilities

Scale:	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2025	Coordinate System: GDA 1994 MGA Zone 56	Date: 15 July 2025

Scale: 0 100 200 400 600 Meters

Waste Management & Liquid Fuel Facilities

Commercial & Windsor Roads, Rouse Hill, NSW 2155

National Waste Management Facilities Database

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

Map ID	Owner	Name	Address	Management Type	Facility Type	Status	Loc Conf	Dist	Dir
1	WOOLWORTHS	WOOLWORTHS SUPERMARKET	33 MAIN STREET, ROUSE HILL	DROP-OFF	SOFT PLASTICS DROP-OFF FACILITY	OPERATIONAL	Premise Match	74m	South East
	COLES	COLES SUPERMARKET	82 MAIN STREET, ROUSE HILL	DROP-OFF	SOFT PLASTICS DROP-OFF FACILITY	OPERATIONAL	Premise Match	74m	South East

Source: Waste Management Facilities Database

National Liquid Fuel Facilities

National Liquid Fuel Facilties within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist	Direction
3623	Shell	Coles Express Rouse Hill	43 Panmure Street	Rouse Hill	Petrol Station	Operational		25/07/2011	Premise Match	583m	North West
6203	COLES EXPRESS	COLES EXPRESS ROUSE HILL	43 PANMURE ROAD	ROUSE HILL	PETROL STATION	OPERATIONAL			Premise Match	583m	North West

National Liquid Fuel Facilities Data Source: Geoscience Australia

PFAS Investigation & Management Programs

Commercial & Windsor Roads, Rouse Hill, NSW 2155

EPA PFAS Investigation Program

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

Map ID	Site	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

EPA PFAS Investigation Program: Environment Protection Authority

Defence PFAS Investigation Program

Sites being investigated by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Investigation Program Data Custodian: Department of Defence, Australian Government

Defence PFAS Management Program

Sites being managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Management Program Data Custodian: Department of Defence, Australian Government

Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

Defence Sites and Unexploded Ordnance

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Defence Controlled Areas (DCA)

Defence Controlled Areas provided by the Department of Defence within the dataset buffer:

Site ID	Location Name	Loc Conf	Dist	Dir
N/A	No records in buffer			

Defence Controlled Areas, Data Custodian: Department of Defence, Australian Government

Defence 3 Year Regional Contamination Investigation Program (RCIP)

Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
N/A	No records in buffer					

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government

National Unexploded Ordnance (UXO)

Sites which have been assessed by the Department of Defence for the potential presence of unexploded ordnance within the dataset buffer:

Site ID	Location Name	Category	Area Description	Additional Information	Commonwealth	Loc Conf	Dist	Dir
N/A	No records in buffer							

National Unexploded Ordnance (UXO), Data Custodian: Department of Defence, Australian Government

EPA Other Sites with Contamination Issues

Commercial & Windsor Roads, Rouse Hill, NSW 2155

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
- Pasminco Lead Abatement Strategy Area

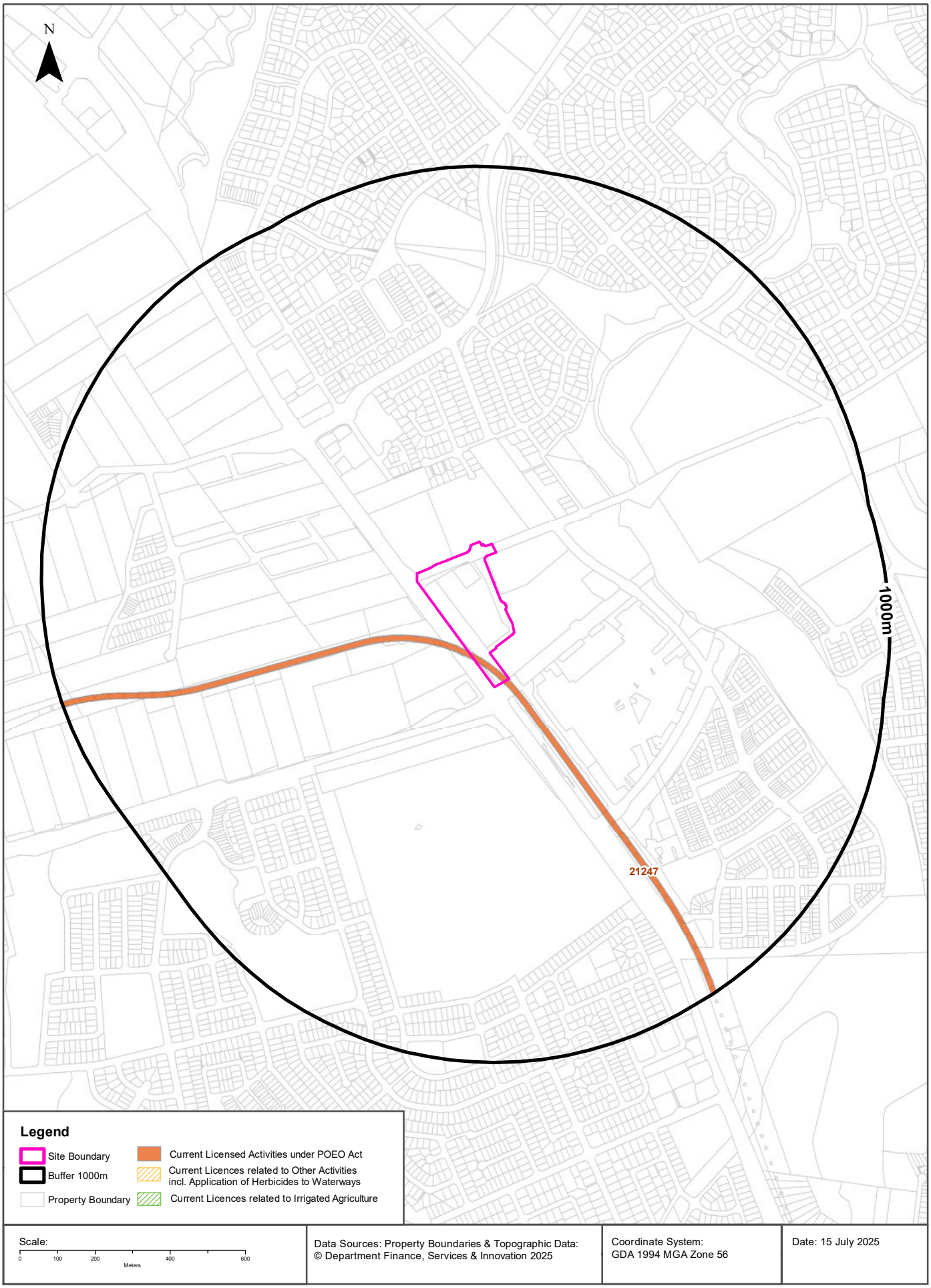
Sites within the dataset buffer:

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

Current EPA Licensed Activities

Commercial & Windsor Roads, Rouse Hill, NSW 2155



EPA Activities

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Licensed Activities under the POEO Act 1997

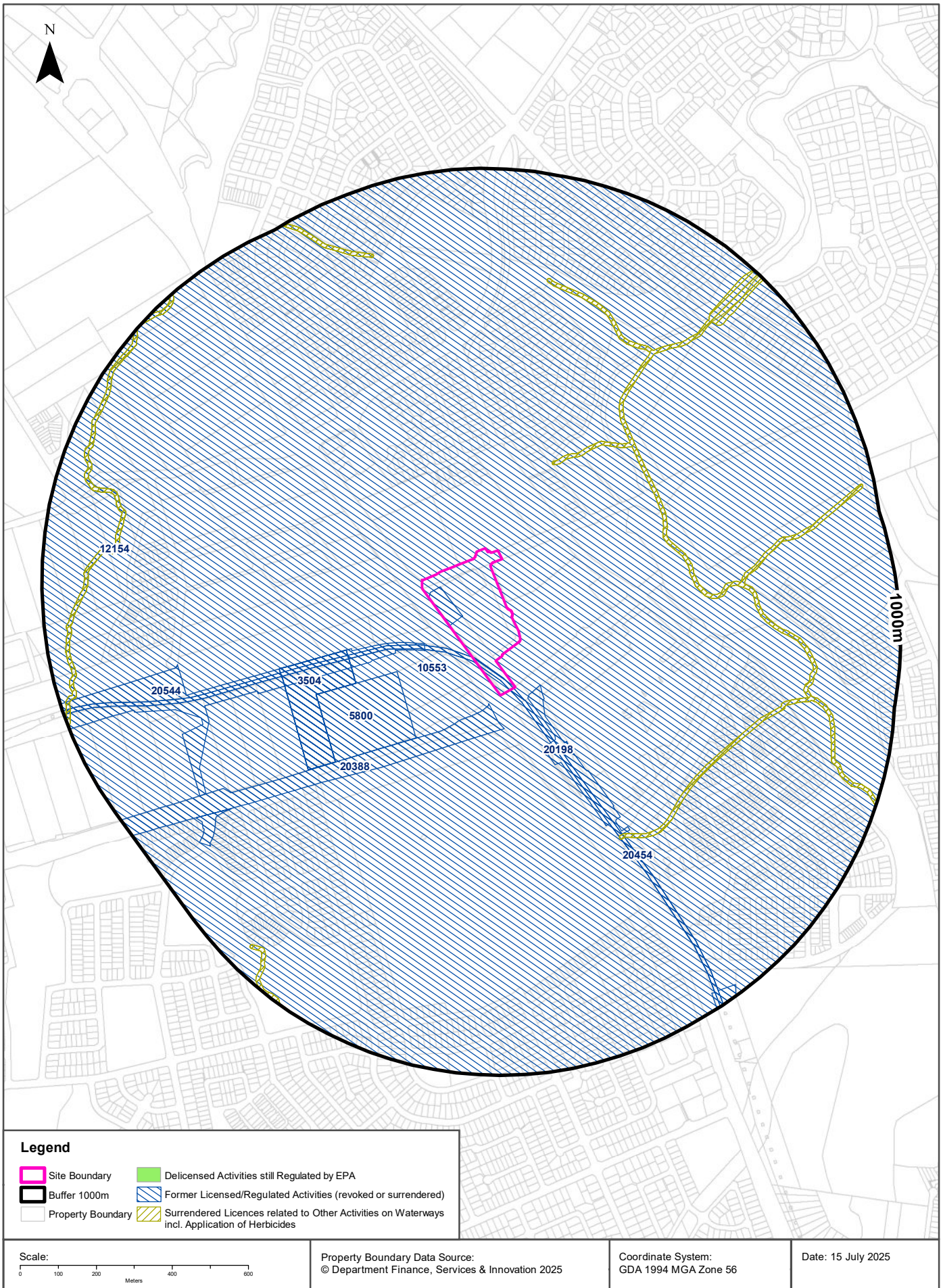
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
21247	Metro Trains Sydney Pty Ltd		SYDNEY METRO, ROUSE HILL, NSW 2155		Railway systems activities	Network of Features	0m	On-site

POEO Licence Data Source: Environment Protection Authority

Delicensed & Former Licensed EPA Activities

Commercial & Windsor Roads, Rouse Hill, NSW 2155



EPA Activities

Commercial & Windsor Roads, Rouse Hill, NSW 2155

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

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:

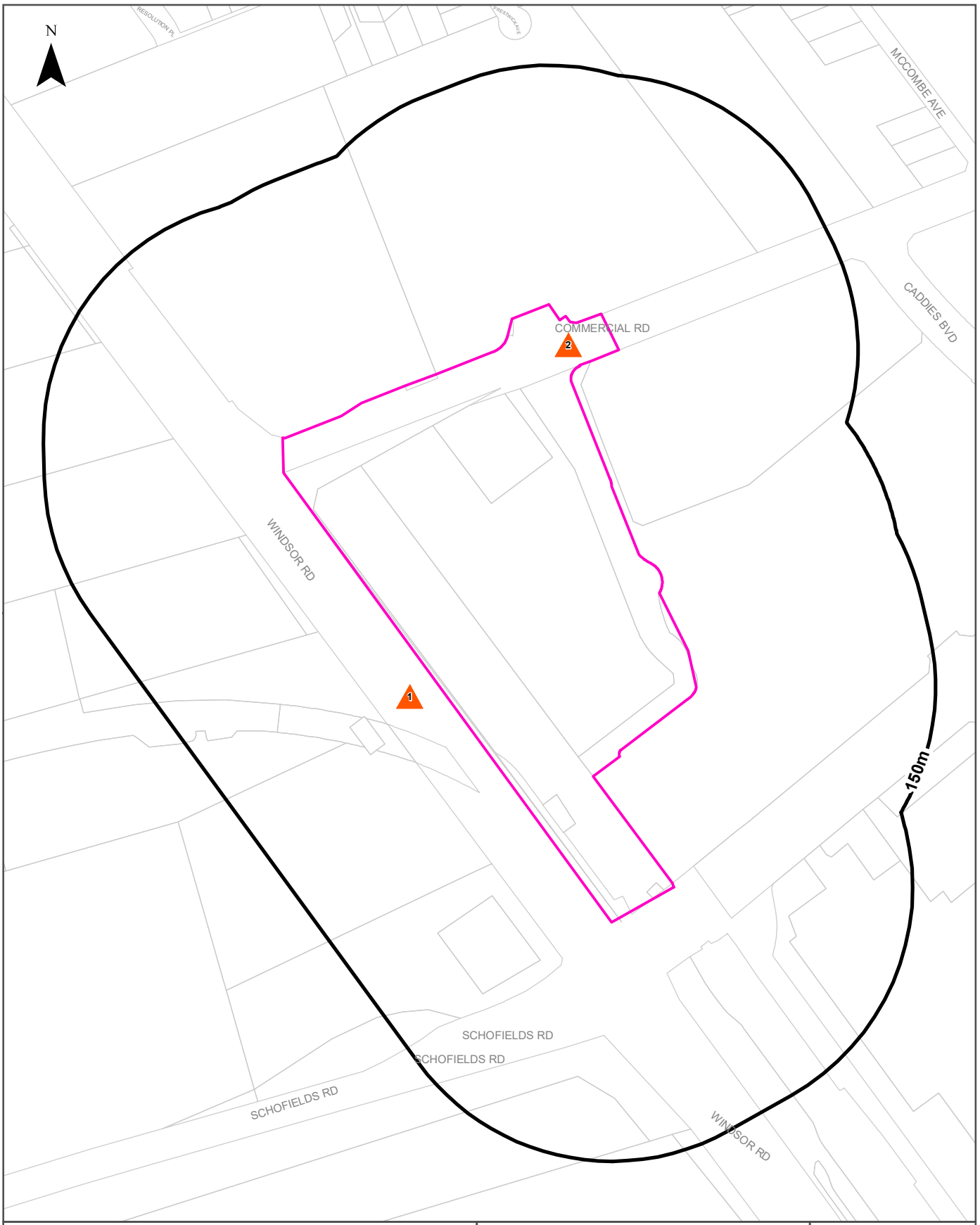
Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
10553	ACCIONA INFRASTRUCTURE PROJECTS AUSTRALIA PTY LTD	ROUSE HILL DEVELOPMENT AREA, STAGE 2, KELLYVILLE, NSW 2155	Surrendered	27/11/2000	Miscellaneous licensed discharge to waters (at any time)	Area Match	0m	On-site
20198	ACCIONA INFRASTRUCTURE PROJECTS AUSTRALIA PTY LTD	North West Rail Link Early Works Project, Between Tallawong Road Maintenance Facility and Epping Station, EPPING	Surrendered	08/03/2013	Railway systems activities	Network of Features	0m	On-site
20454	Salini Australia Pty Ltd	North West Rail Link - Surface and Viaduct Project, North West Rail Corridor from Balmoral Road Bella Vista to Cudgegong Road Rouse Hill, BELLA VISTA	Surrendered	03/06/2014	Railway systems activities	Network of Features	0m	On-site
20544	JOHN HOLLAND PTY LTD	North West Rail Link - Operations Trains and Stations Project, Between First Ponds Creek, Schofields and Cudgegong Road, ROUSE HILL, NSW 2155, ROUSE HILL	Surrendered	19/12/2014	Railway systems activities	Network of Features	0m	On-site
20388	OBRASCON HUARTE LAIN S.A	, Schofields Road East, ROUSE HILL, NSW 2155,	Surrendered	08/07/2014	Land-based extractive activity; Road construction	Premise Match	38m	South West
5800	BLACKTOWN CITY COUNCIL	ROUSE HILL SHALE PIT, SCHOFIELDS ROAD, ROUSE HILL	Surrendered	19/10/2000	Land-based extractive activity	Premise Match	183m	South West
3504	KNIGHTS SYNDICATE PTY LTD	KNIGHT'S SYNDICATE PTY LTD, 105 SCHOFIELDS ROAD, ROUSE HILL	Surrendered	08/01/2001	Recovery of general waste	Premise Match	257m	South West
3504	KNIGHTS SYNDICATE PTY LTD	KNIGHT'S SYNDICATE PTY LTD, 105 SCHOFIELDS ROAD, ROUSE HILL	Surrendered	08/01/2001	Waste storage - other types of waste	Premise Match	257m	South West
3504	KNIGHTS SYNDICATE PTY LTD	KNIGHT'S SYNDICATE PTY LTD, 105 SCHOFIELDS ROAD, ROUSE HILL	Surrendered	08/01/2001	Land-based extractive activity	Premise Match	257m	South West

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
3504	KNIGHTS SYNDICATE PTY LTD	KNIGHT'S SYNDICATE PTY LTD, 105 SCHOFIELDS ROAD, ROUSE HILL	Surrendered	08/01/2001	Crushing, grinding or separating	Premise Match	257m	South West
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	269m	North East
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered	07/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	269m	North East
5446	SYDNEY WATER CORPORATION	BAULKHAM HILLS (including Rouse Hill Development Area) - NSW 2153	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	269m	North East
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered	09/11/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	269m	North East
12154	JOHN HOLLAND PTY LTD	-, KELLYVILLE, NSW 2155	Surrendered	16/08/2004	Crushing, grinding or separating	Premise Match	798m	West
12154	JOHN HOLLAND PTY LTD	-, KELLYVILLE, NSW 2155	Surrendered	16/08/2004	Sewage treatment processing by small plants	Premise Match	798m	West

Former Licensed Activities Data Source: Environment Protection Authority

Historical Business Directories

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Legend

- Site Boundary
- Buffer 150m
- Property Boundary
- Business directory records mapped to a specific premise
- Business directory records mapped to a road intersection
- Business directory records mapped to a road corridor
- Business directory records mapped to a general area

Scale: 0 40 80 120 160 Meters

Coordinate System: GDA 1994 MGA Zone 56

Date: 15 July 2025

Historical Business Directories

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Business Directory Records 1950-1991
Premise or Road Intersection Matches

Potentially contaminative business activities extracted from Universal Business Directories from years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 1961 & 1950, mapped to a premise or road intersection within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
N/A	No records in buffer						

Business Directory Records 1950-1991
Road or Area Matches

Potentially contaminative business activities extracted from Universal Business Directories from years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 1961 & 1950, 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:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
1	Butchers Wholesale	Bush, A. J. (Manufacturers) Pty. Ltd., Windsor Rd., Rouse Hill 2155	37759	1991	Road Match	0m
	Agricultural Machinery &/or Parts &/or Imps &/or Dists	Hardi Pumps & Sprayers N.S.W. Pty. Ltd., Windsor Rd. Rouse Hill 2155	33650	1991	Road Match	0m
	Motor Panel Beaters &/or Spray Painters	Kirkpatrick & Marshall, Windsor Rd Rouse Hill 2155	54514	1991	Road Match	0m
	Stock Foods &/or Additives Mfrs &/or Dists	Rouse Hill Meats Pty Ltd, Windsor Rd Rouse Hill 2155	63560	1991	Road Match	0m
	ANIMAL &/OR BIRD FOOD SUPPLIES.	Burns Animal Food Co. Pty. Pty., Windsor Rd., Rouse Hill. 2153	3012	1986	Road Match	0m
	ANIMAL &/OR BIRD SUPPLIES.	Burns Animal Food Co. Pty. Pty., Windsor Rd., Rouse Hill. 2153	3075	1986	Road Match	0m
	BUTCHERS-WHOLESALE.	Bush, A. J. (Manufacturers) Pty. Ltd., Windsor Rd., Rouse Hill.2153	10902	1986	Road Match	0m
	AGRICULTURAL MACHINERY MFRS. &/OR IMPS. &/OR DISTS.	Hardi Pumps & Sprayers N.S.W Pty. Ltd., Windsor Rd., Rouse Hill. 2153	1753	1986	Road Match	0m
	SPRAYING EQUIPMENT MFRS. &/OR DISTS.	Hardi Pumps & Sprayers N.S.W. Pty. Ltd., Windsor Rd., Rouse Hill 2153	87767	1986	Road Match	0m
	PUMPS &/OR PUMPING EQUIPMENT MFRS.' &/OR DISTS.	Hardi Pumps & Sprayers N.S.W. Pty. Ltd., Windsor Rd., Rouse Hill. 2153	78600	1986	Road Match	0m
	AGRICULTURAL MACHINERY REPAIRS.	Hardi Pumps & Sprayers N.S.W. Pty. Ltd., Windsor Rd., Rouse Hill.2153	1786	1986	Road Match	0m
	AGRICULTURAL SPRAY EQUIPMENT MFRS. &/OR DISTS.	Hardi Pumps & Sprayers N.S.W. Pty. Ltd., Windsor Rd., Rouse Hill.2153	1796	1986	Road Match	0m
	AGRICULTURAL MACHINERY PARTS MFRS. &/OR IMPS. &/OR DISTS.	Hardi Pumps & Sprayers NS.W. Pty. Ltd., Windsor Rd., Rouse Hill.2153	1781	1986	Road Match	0m
	PUMP MFRS. &/OR DISTS.	Hardl Pumps & Sprayers N.S.W. Pty. Ltd., Windsor Rd., Rouse Hill. 2153	78487	1986	Road Match	0m
	MOTOR PANEL BEATERS &/OR SPRAY PAINTERS.	Kirkpatrick & Marshall, Windsor Rd., Rouse Hill. 2153	66461	1986	Road Match	0m
	STOCK FOODS MFRS. &/OR DIST.	Rouse Hill Meats Pty, Ltd., Windsor Rd., Rouse Hill., 2153	89379	1986	Road Match	0m
	DOG FOOD &/OR MEDICINEMFRS. (D5250)	Burns Animal Food Co, Pty. Ltd., Windsor Rd., Rouse Hill. 2153.	21895	1982	Road Match	0m
	ANIMAL &/OR BIRD FOOD SUPPLIES. (A5880)	Burns Animal Food Co. Pty, Ltd., Windsor Rd., Rouse Hill. 2153.	2713	1982	Road Match	0m
	BUTCHERS - WHOLESALE. (B8120)	Bush, A. J. (Manufacturers) Pty. Ltd, Windsor Rd., Rouse Hill. 2153.	11877	1982	Road Match	0m
	MOTOR PANEL BEATERS &/OR SPRAY PAINTERS. (M7360)	Kirkpatrick & Marshall, Windsor Rd., Rouse Hill. 2153.	58445	1982	Road Match	0m
	STOCK FOODS MFRS. &/OR DISTS. (S7065)	Rouse Hill Meats Pty. Ltd., Windsor Rd., Rouse Hill. 2153	77317	1982	Road Match	0m
	GOLF LINKS	Braeside Picnic Golf Course (L. G. Brown, Propr.), Windsor Rd. Rouse Hill	155906	1950	Road Match	0m
	STUD FARMS	Riverstone Hall Stud Farm, Windsor Rd. Rouse Hill	155909	1950	Road Match	0m
2	CARRIERS &/OR CARTAGE CONTRACTORS.	M D.G. Haulage Pty. Ltd., Lot 1 Commercial Rd., Rouse Hill. 2153	12907	1986	Road Match	0m
	EARTH MOVING MACHINERY HIRERS.	M D.G. Haulage Pty. Ltd., Lot 1 Commercial Rd., Rouse Hill. 2153	25858	1986	Road Match	0m
	HAULAGE CONTRACTORS.	M.D.G. Haulage Pty. Ltd., Lot 1 Commercial Rd., Rouse Hill. 2153	44949	1986	Road Match	0m
	LANDSCAPERS.	Supafortruss Soil Supplies, Lot 1 Commercial Rd., Rouse Hill. 2153	51002	1986	Road Match	0m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
2	CARRIERS &/OR CARTAGE CONTRACTORS. (C2115)	M.D.G Haulage Pty. Ltd, Lot 1 Commercial Rd., Rouse Hill 2766	13740	1982	Road Match	0m
	EARTH MOVING MACHINERYHIRERS. (E0270)	M.D.G. Haulage Pty. Ltd., Lot 1 Commercial Rd., Rouse Hill. 2766.	24368	1982	Road Match	0m
	HAULAGE CONTRACTORS. (H2750)	M.D.G. Haulage Pty. Ltd., Lot 1 Commercial Rd., Rouse Hill. 2766.	39437	1982	Road Match	0m
	GRAVEL, SAND &/OR SOIL SUPPLIES. (G7050)	Supafortruss Soil Supplies, Lot 1 Commercial Rd., Rouse Hill. 2766.	37221	1982	Road Match	0m
	LANDSCAPE GARDENERS. (L1350)	Supafortruss Soil Supplies, Lot 1 Commercial Rd., Rouse Hill. 2766.	44667	1982	Road Match	0m

Historical Business Directories

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Dry Cleaners, Motor Garages & Service Stations 1948-1993 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.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
N/A	No records in buffer						

Dry Cleaners, Motor Garages & Service Stations 1948-1993 Road or Area Matches

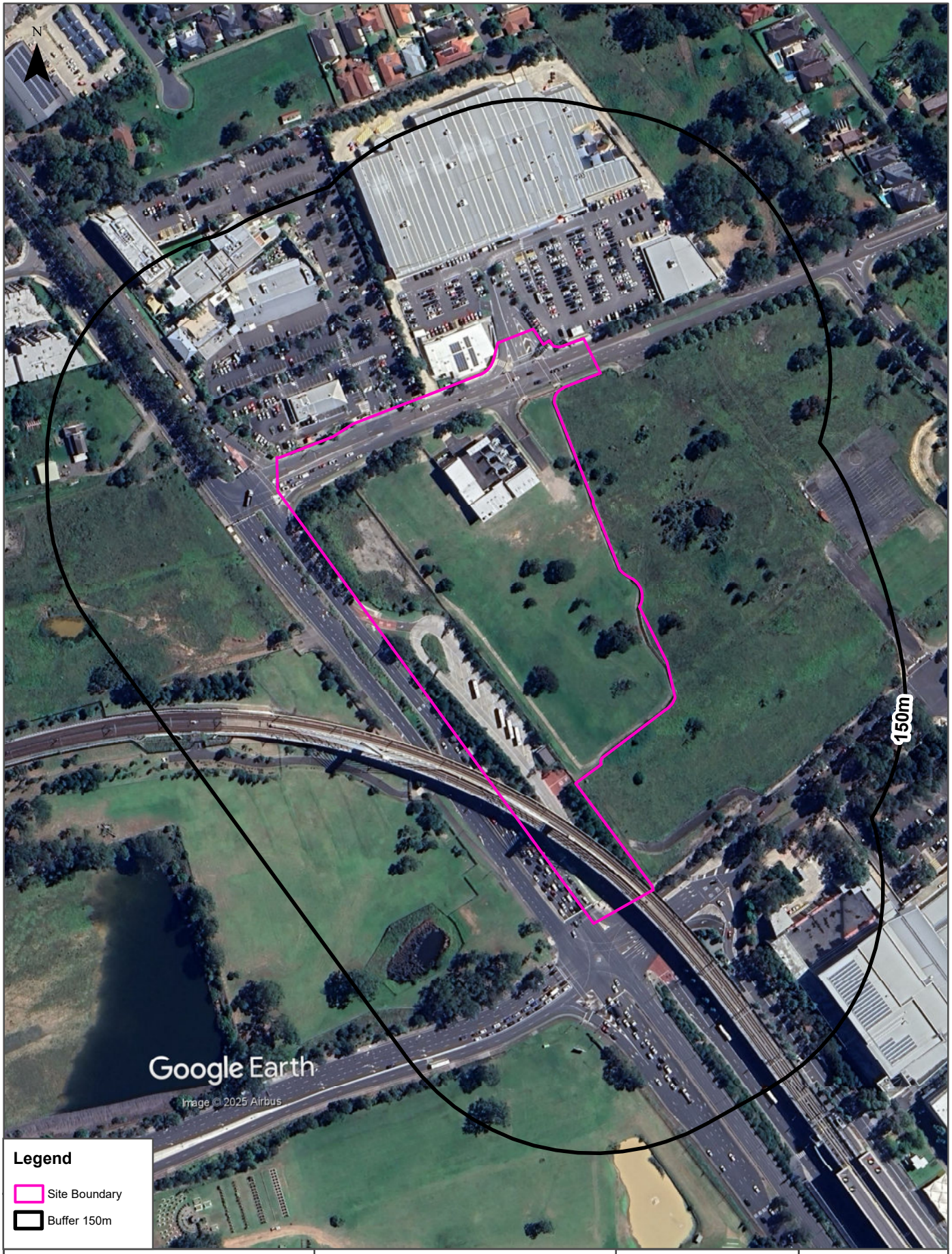
Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

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

Aerial Imagery 2025

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Scale:	Data Source Aerial Imagery: © 2025 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 15 July 2025

0 30 60 90 120 Meters

Aerial Imagery 2014

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Scale: 0 30 60 90 120 Meters	Data Source Aerial Imagery: © 2025 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 15 July 2025

Aerial Imagery 2004

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Scale: 0 30 60 90 120 Meters	Data Source Aerial Imagery: © 2025 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 15 July 2025

Aerial Imagery 1994

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Scale:	Data Sources: Aerial Imagery:	Coordinate System:	Date: 14 July 2025
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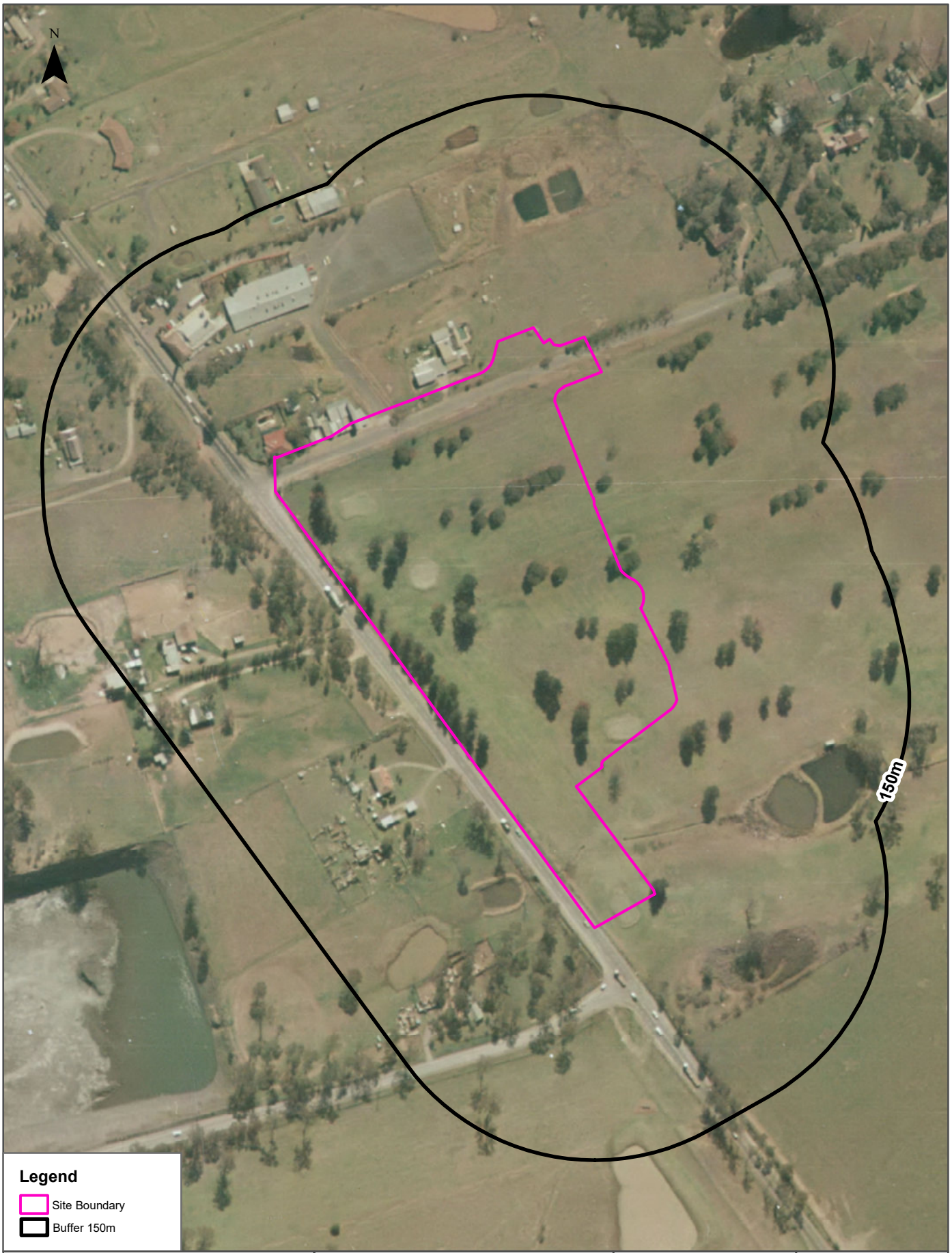
Aerial Imagery 1991

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Scale:	Data Sources: Aerial Imagery:	Coordinate System:	Date: 14 July 2025
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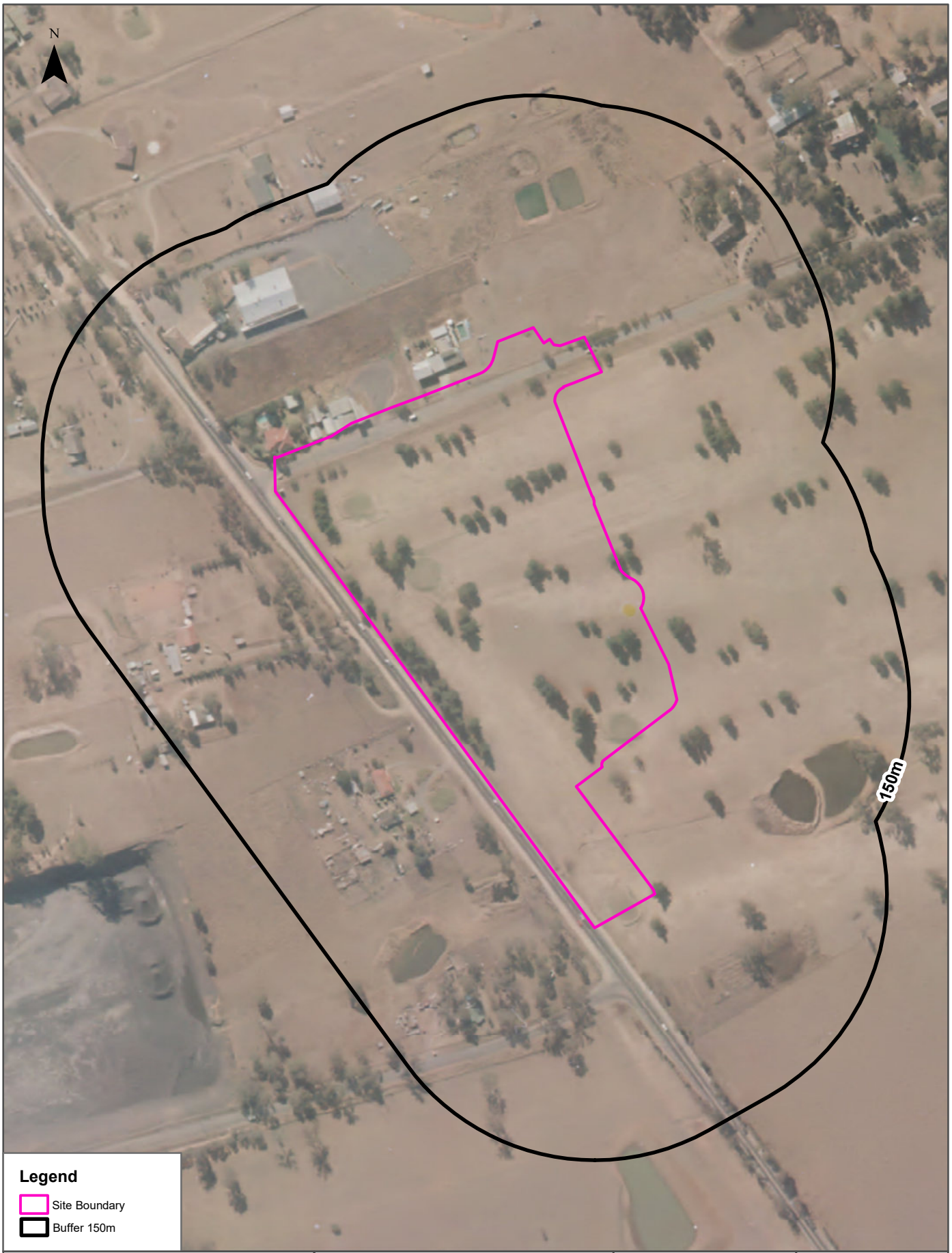
Aerial Imagery 1986

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Aerial Imagery 1982

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Scale:	Data Sources: Aerial Imagery:	Coordinate System:	Date: 14 July 2025
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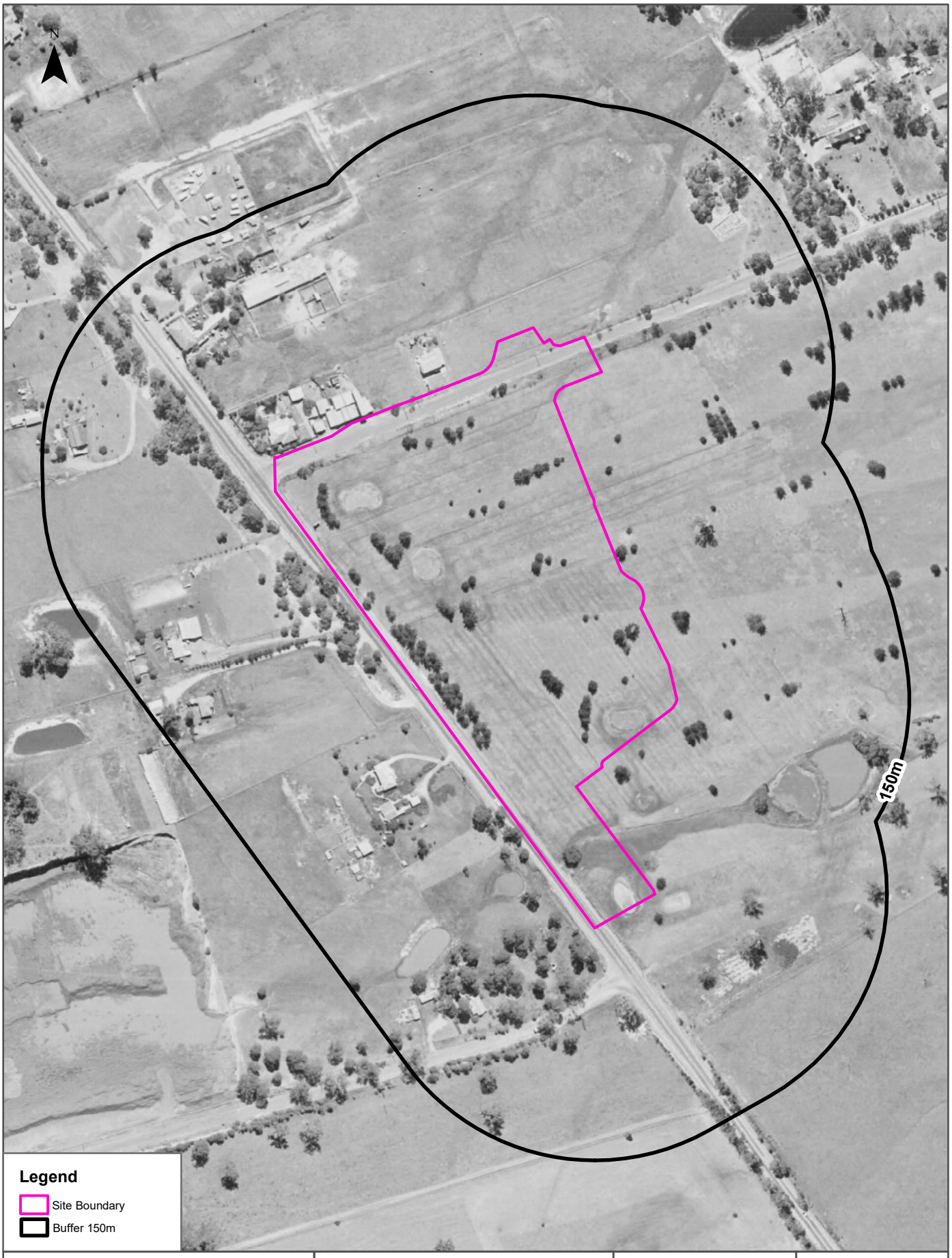
Aerial Imagery 1978

Commercial & Windsor Roads, Rouse Hill, NSW 2155



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Aerial Imagery 1970

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Scale:	Data Sources: Aerial Imagery:	Coordinate System:	Date: 14 July 2025
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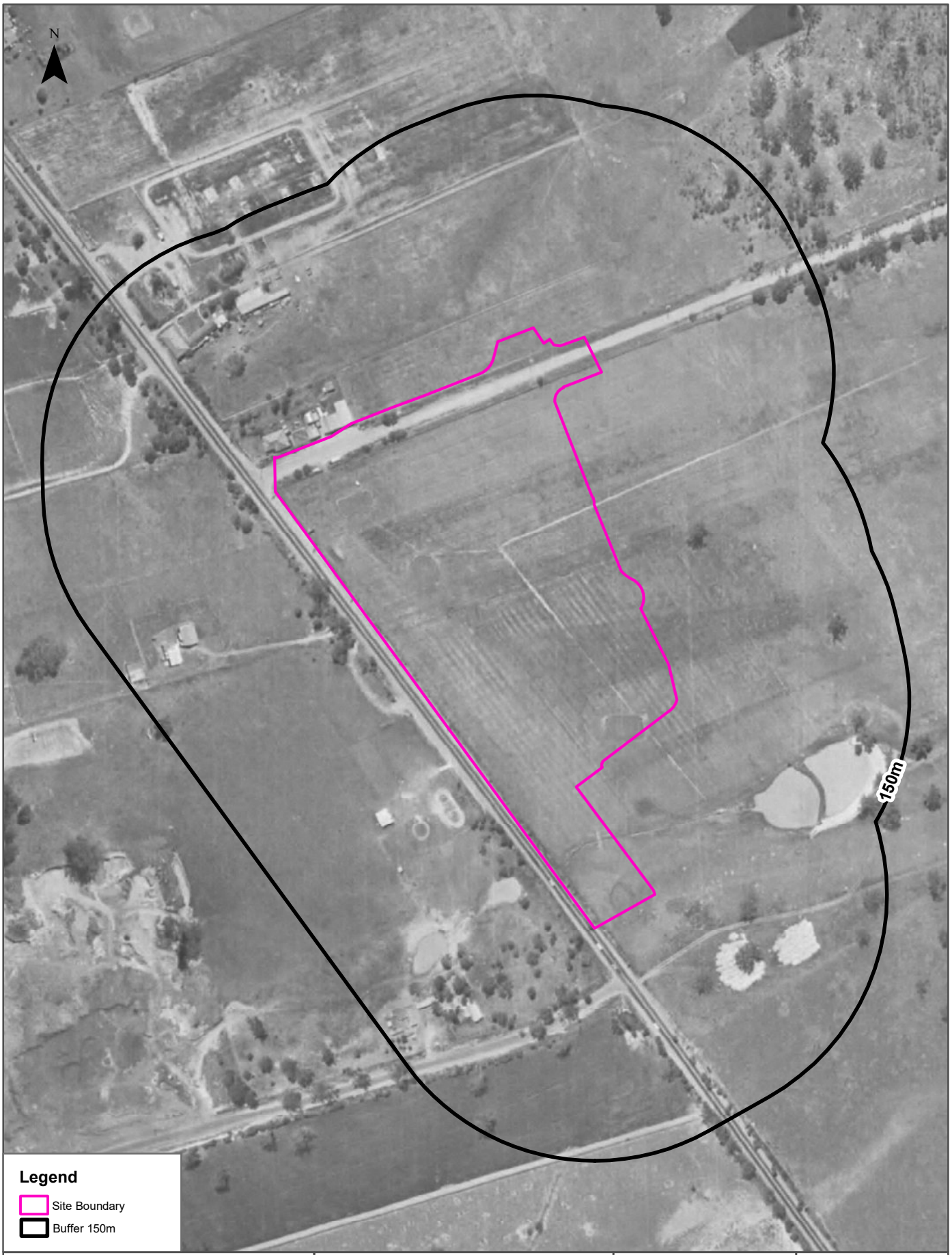
Aerial Imagery 1965

Commercial & Windsor Roads, Rouse Hill, NSW 2155



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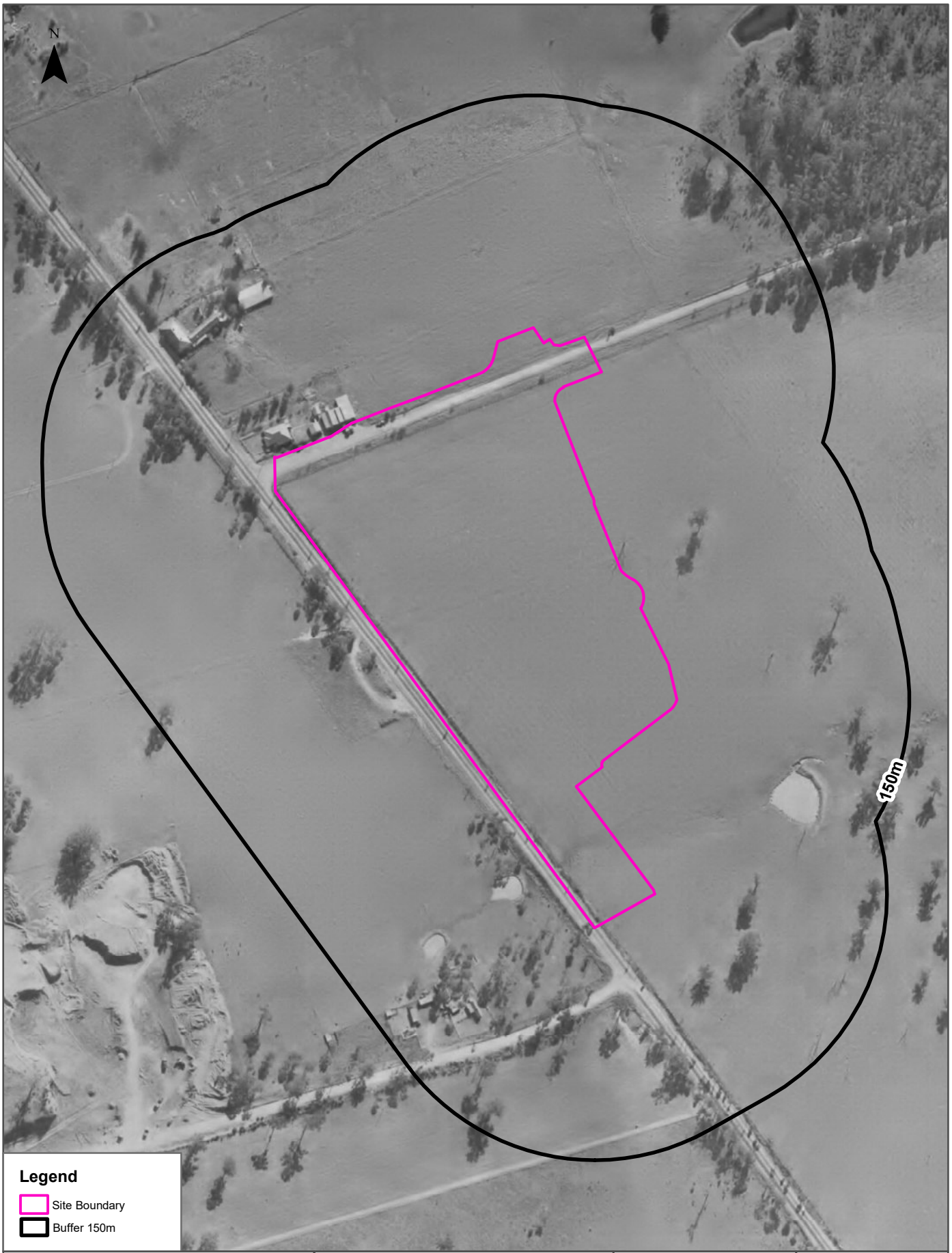
Aerial Imagery 1961

Commercial & Windsor Roads, Rouse Hill, NSW 2155



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Aerial Imagery 1955, 1956

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Aerial Imagery 1949

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Aerial Imagery 1930

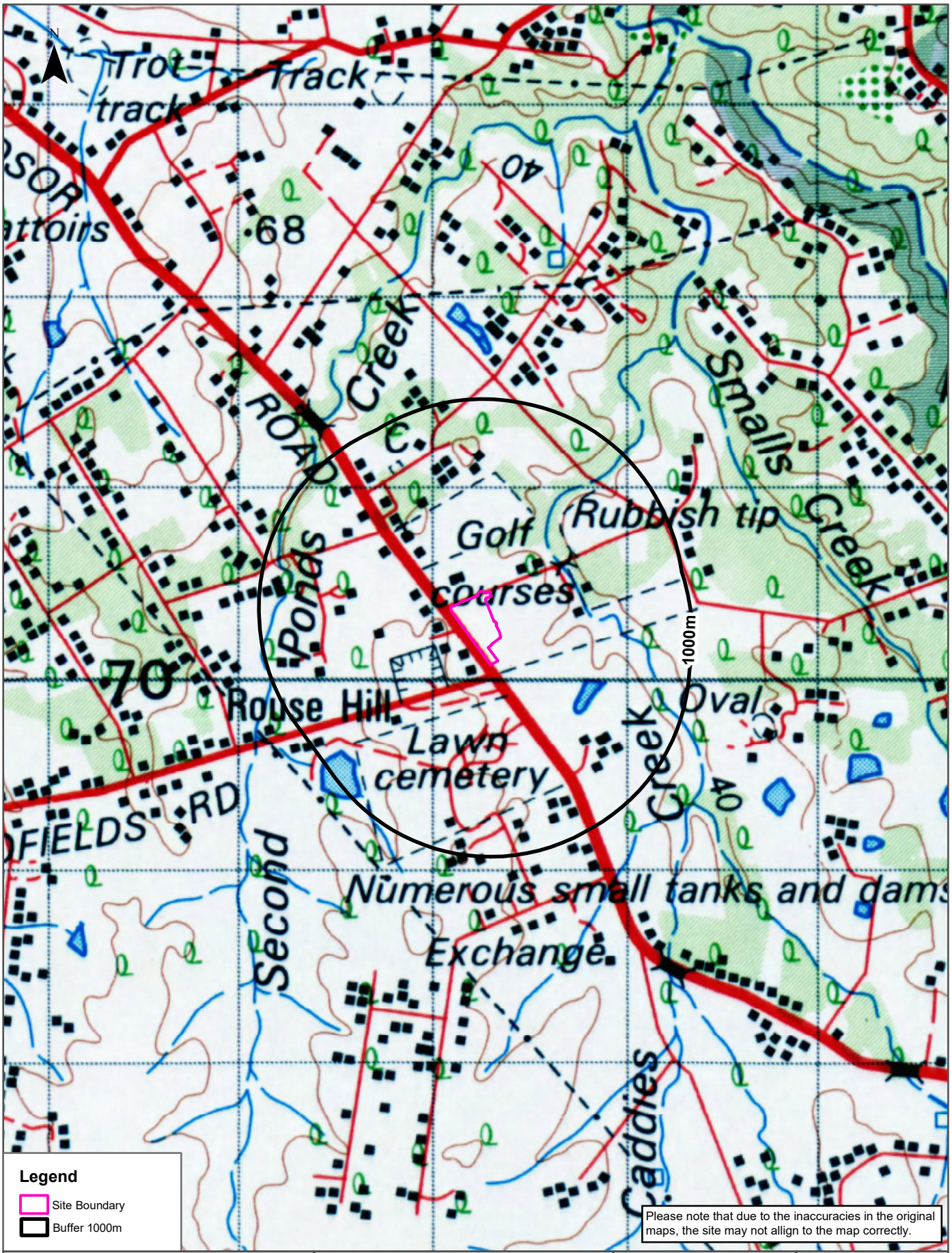
Commercial & Windsor Roads, Rouse Hill, NSW 2155

Scale:	Data Sources: Aerial Imagery: © Geoscience Australia	Coordinate System: GDA 1994 MGA Zone 56	Date: 14 July 2025

Scale: 0 30 60 90 120 Meters

Historical Map 1975

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Scale: 0 310 620 930 1,240 Meters

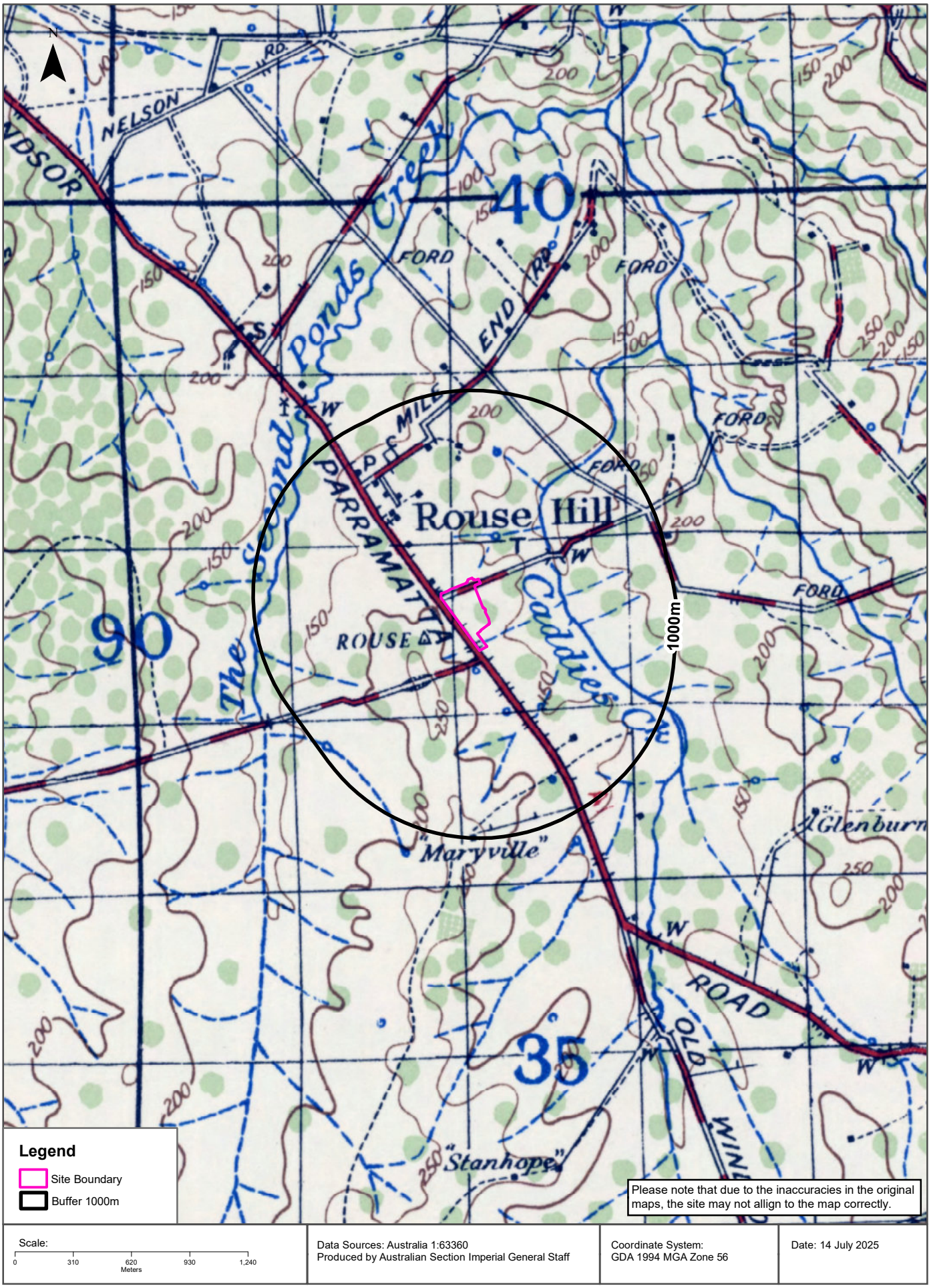
Data Sources: NATMAP 1:100,000
Topographic Maps Geoscience Australia

Coordinate System:
GDA 1994 MGA Zone 56

Date: 14 July 2025

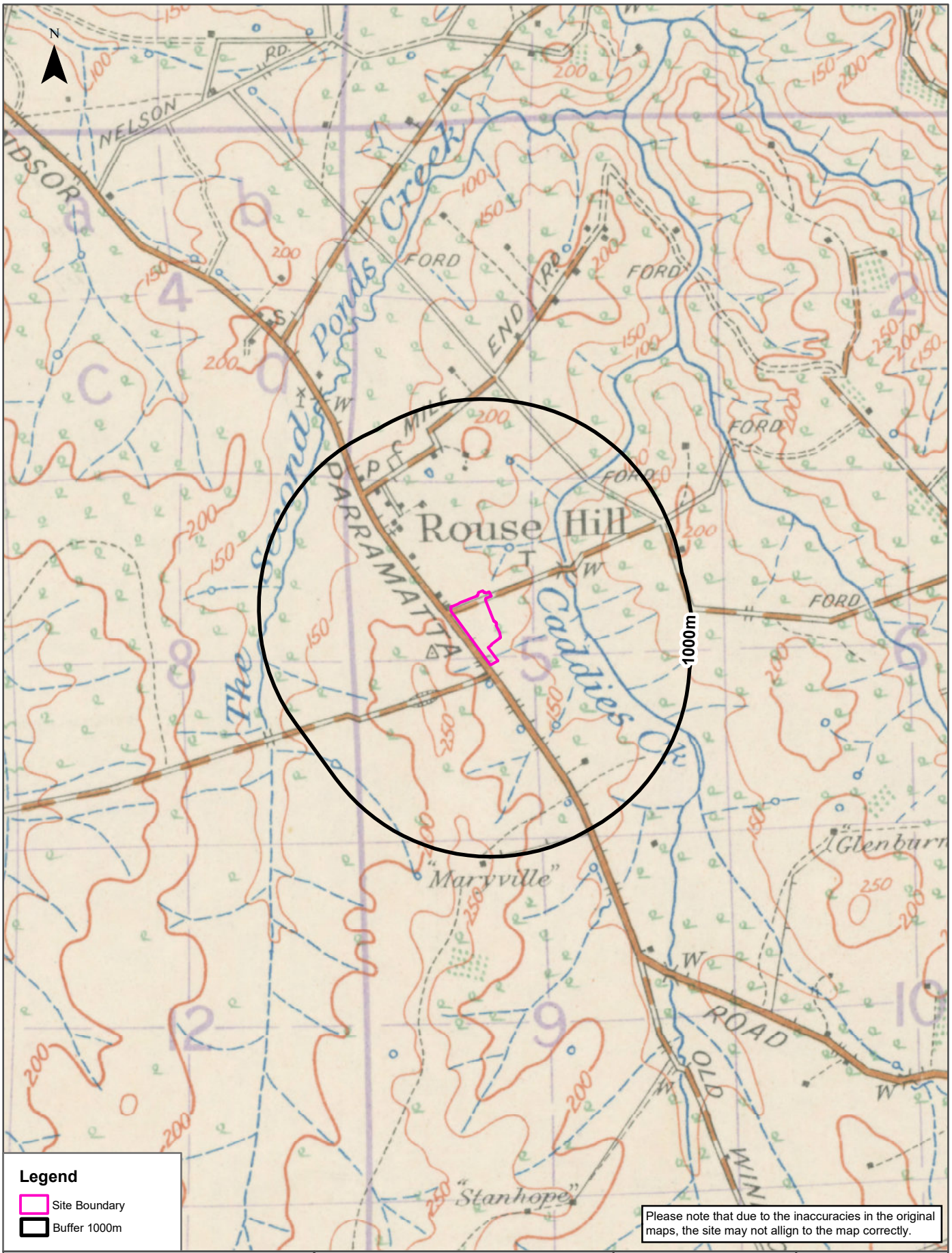
Historical Map c.1942

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Historical Map c.1929

Commercial & Windsor Roads, Rouse Hill, NSW 2155



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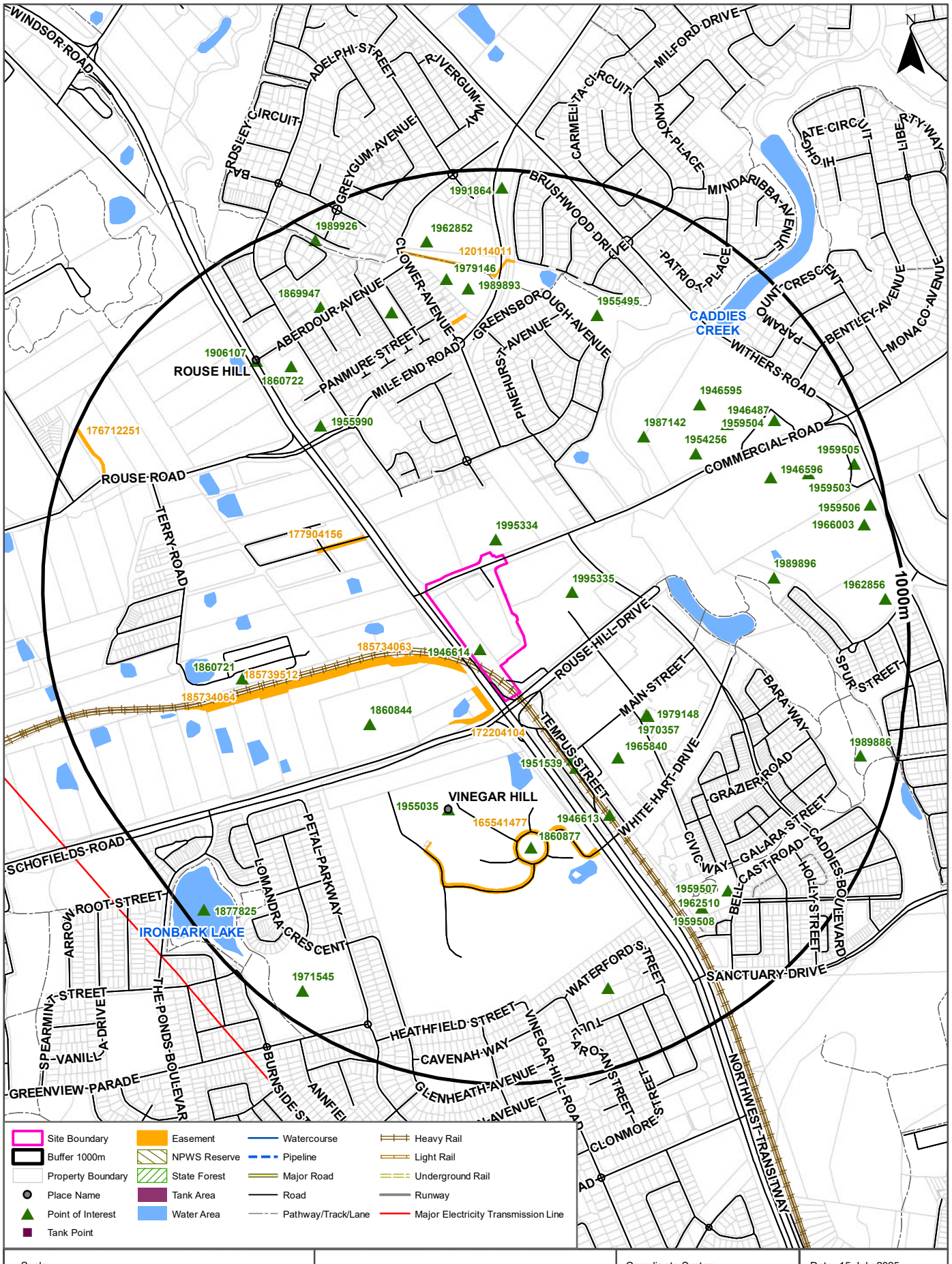
Topographic Features

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2025

Coordinate System: GDA 1994 MGA Zone 56

Date: 15 July 2025

Topographic Features

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
1946614	Parking Area	Parking Area	0m	On-site
1995334	Parking Area	Parking Area	37m	North
1995335	Parking Area	Parking Area	158m	East
1951539	Bus Interchange	ROUSE HILL BUS INTERCHANGE	222m	South East
1995762	Railway Station	ROUSE HILL RAILWAY STATION	245m	South East
1965840	Post Office	ROUSE HILL TOWN CENTRE POST OFFICE	306m	South East
1955035	Urban Place	VINEGAR HILL	319m	South
1860844	Quarry - Open Cut	Quarry - Open Cut	321m	South West
1979148	Community Facility	VINEGAR HILL MEMORIAL COMMUNITY CENTRE	335m	South East
1970357	Library	ROUSE HILL LIBRARY	339m	South East
1860877	Cemetery	CASTLEBROOK MEMORIAL PARK	388m	South
1946613	Parking Area	Parking Area	396m	South East
1987142	Park	WITHERS ROAD RESERVE	481m	North East
1955990	Place Of Worship	ANGLICAN CHURCH	498m	North West
1860721	Tourist Park / Home Village	OK CARAVAN PARK	528m	West
1954256	Sports Field	BASEBALL FIELD	569m	North East
1946595	Sports Field	CRICKET GROUND	647m	North East
1989896	Park	IRONBARK RIDGE RESERVE	670m	East
1860722	Post Office	ROUSE HILL POST OFFICE	670m	North West
1955495	Park	WILLIAM HARVEY RESERVE	673m	North
1879272	Park	ABERDOUR VILLAGE RESERVE	677m	North
1989909	Park	ABERDOUR VILLAGE RESERVE	677m	North
1946487	Park	THE HILLS CENTENARY PARK	677m	North East
1989893	Park	ABERDOON HOMESTEAD RESERVE	692m	North
1962510	Tourist Information Centre	ROUSE HILL VISITOR INFORMATION CENTRE	707m	South East
1979146	Community Facility	ROUSE HILL COMMUNITY CENTRE	722m	North
1946596	Park	BRUCE PURSER RESERVE	724m	North East
1959508	Sports Court	TENNIS COURT	734m	South East
1906107	Suburb	ROUSE HILL	734m	North West
1959507	Sports Court	TENNIS COURT	748m	South East
1869947	Cemetery	ROUSE HILL CEMETERY	773m	North West
1959504	Parking Area	Parking Area	791m	North East

Map Id	Feature Type	Label	Distance	Direction
1946492	Park	VINEGAR HILL RESERVE	795m	South
1959503	Sports Field	OVAL	822m	North East
1962852	Primary School	ROUSE HILL PUBLIC SCHOOL	828m	North
1989886	Park	BARA WAY RESERVE	903m	East
1971545	Park	LAKES EDGE PARK	923m	South West
1989926	Park	MCCABE PLACE RESERVE	932m	North West
1966003	High School	ROUSE HILL HIGH SCHOOL	936m	East
1959505	Parking Area	Parking Area	943m	East
1962856	Primary School	IRONBARK RIDGE PUBLIC SCHOOL	946m	East
1991864	Park	BRUSHWOOD DRIVE RESERVE	954m	North
1877825	Manmade Waterbody	IRONBARK LAKE	956m	South West
1959506	Parking Area	Parking Area	961m	East

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
N/A	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
N/A	No records in buffer					

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
172204104	Primary	Right of way	variable width	38m	South
185734063	Primary	Right of way		40m	South West
177904156	Primary	Right of way	6.5 & 2.5 & VAR	197m	North West
165541477	Primary	Right of way	VAR	343m	South
185739512	Primary	Right of way		437m	West
120118356	Primary	Undefined		601m	North
185734064	Primary	Right of way		647m	West
120114011	Primary	Undefined		720m	North
176712251	Secondary	Easement for Access	5m	883m	North West

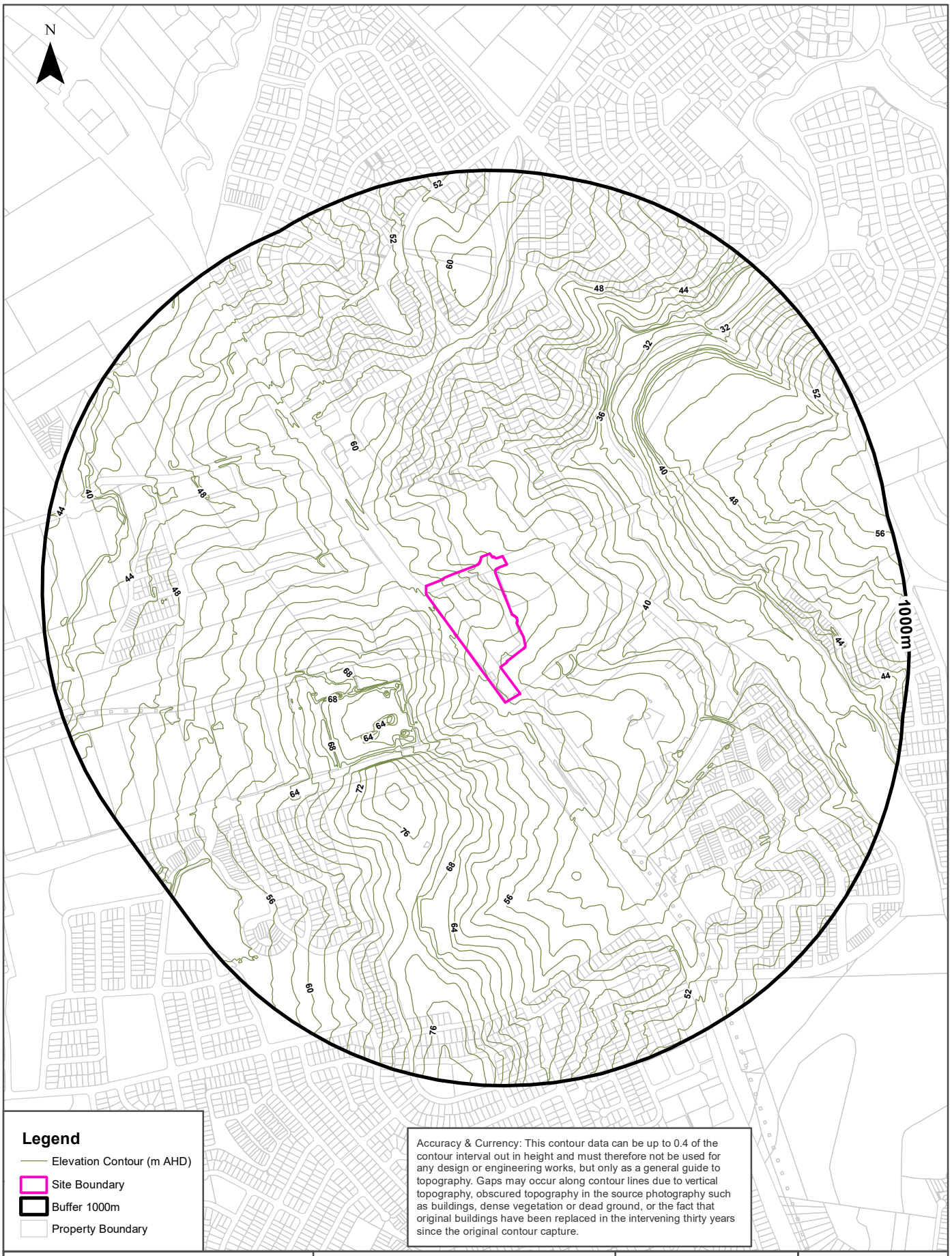
State Forest

What State Forest exist within the dataset buffer?

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

Elevation Contours (m AHD)

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Hydrogeology & Groundwater

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Hydrogeology

Description of aquifers within the dataset buffer:

Description	Distance	Direction
Porous, extensive aquifers of low to moderate productivity	0m	On-site

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024

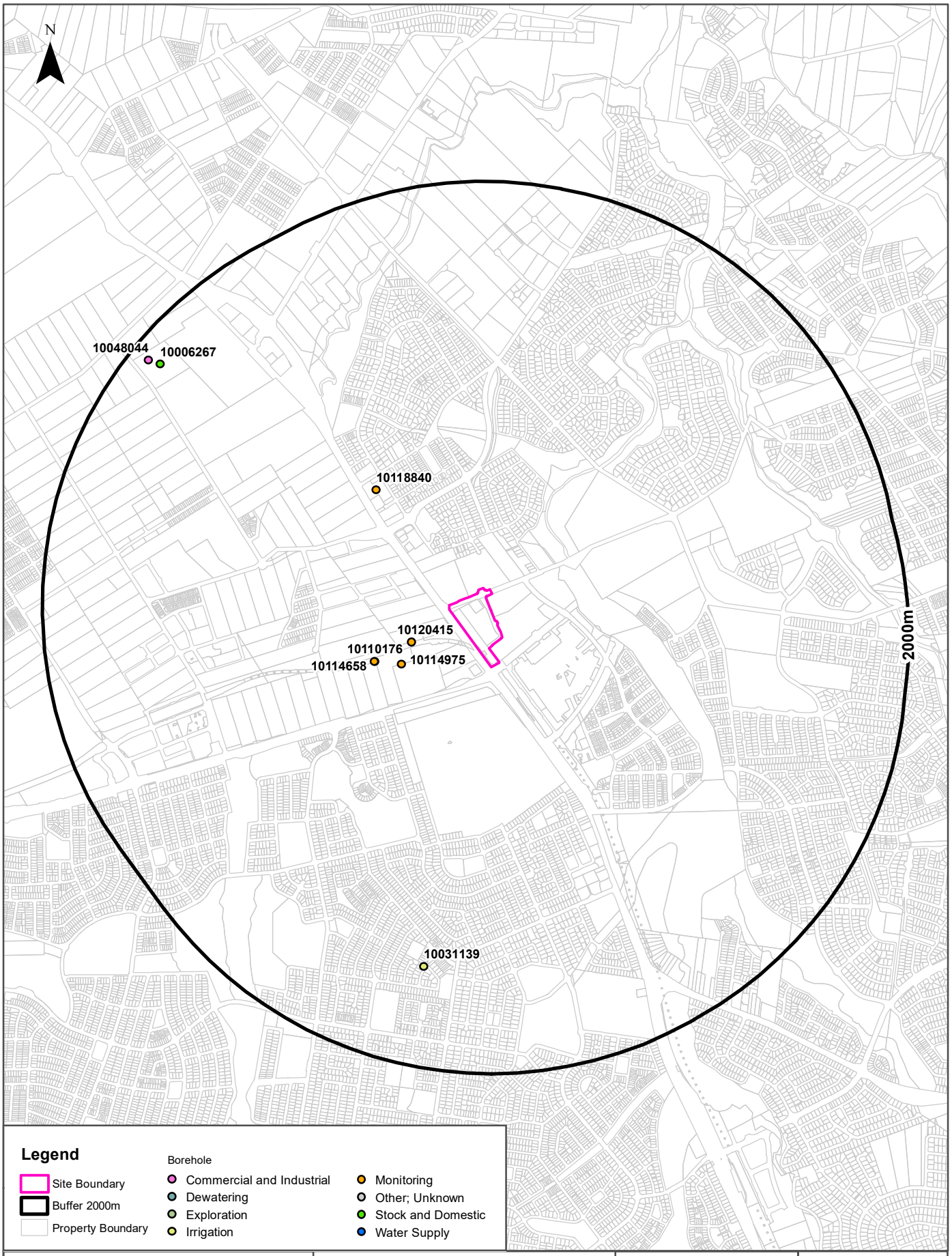
Temporary water restrictions relating to the Botany Sands aquifer within the dataset buffer:

Prohibition Area No.	Prohibition	Distance	Direction
N/A	No records in buffer		

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024 Data Source : NSW Department of Primary Industries

Groundwater Boreholes

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Hydrogeology & Groundwater

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Groundwater Boreholes

Boreholes within the dataset buffer:

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10120415	GW115516	Monitoring	Functional	06/02/2016	18.00		AHD				245m	West
10114975	GW115513	Monitoring	Functional	02/02/2016	20.00		AHD				348m	South West
10110176	GW115515	Monitoring	Functional	03/02/2016	4.50		AHD				447m	West
10114658	GW115514	Monitoring	Functional	03/02/2016	18.00		AHD				448m	West
10118840	GW107600	Monitoring	Unknown	01/11/2002	29.40		AHD				670m	North West
10031139	GW047282	Irrigation	Unknown	01/02/1979	152.00		AHD				1511m	South
10006267	GW054878	Stock and Domestic	Functioning	01/11/1981	7.00		AHD	Stock			1850m	North West
10048044	GW107940	Commercial and Industrial	Unknown	22/08/2005	240.00		AHD	4500	1.100		1905m	North West

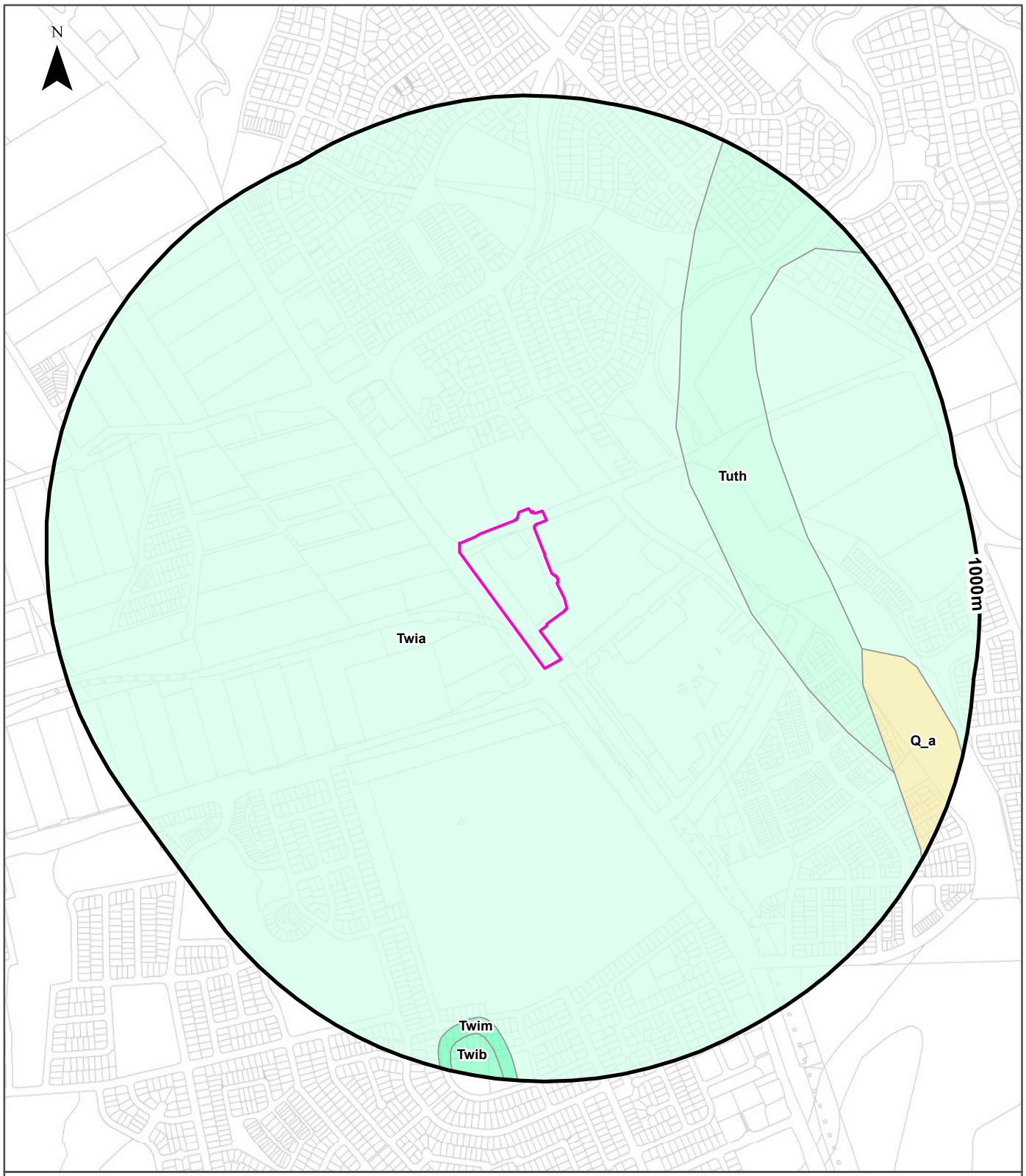
Driller's Logs

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

NGIS Bore ID	Drillers Log	Distance	Direction
10118840	0.00m-3.05m CLAYEY SILT 3.05m-10.83m SHALE 10.83m-29.40m SANDSTONE	670m	North West
10031139	0.00m-0.40m Topsoil Dark 0.40m-1.20m Clay 1.20m-6.80m Shale Clay 6.80m-60.30m Shale Water Supply 60.30m-61.00m Shale Sandstone 61.00m-83.80m Sandstone Grey 83.80m-84.20m Shale Clay 84.20m-137.00m Sandstone Grey Silty 137.00m-138.60m Shale Clay 138.60m-152.00m Sandstone Grey Silty	1511m	South
10006267	0.00m-7.01m Soil Nominal 0.00m-7.01m Clay Nominal 0.00m-7.01m Shale Nominal	1850m	North West
10048044	0.00m-2.00m FILL 2.00m-5.00m BROWN SHALE 5.00m-39.00m SHALE 39.00m-92.00m SANDSTONE 92.00m-105.00m SANDSTONE,SHALE 105.00m-106.00m SHALE 106.00m-146.00m SANDSTONE, SHALE 146.00m-148.00m SHALE 148.00m-154.00m SANDSTONE, SHALE 154.00m-170.00m SANDSTONE 170.00m-180.00m SANDSTONE, SHALE 180.00m-184.00m SANDSTONE, QUARTZ 184.00m-190.00m SANDSTONE, SHALE 190.00m-194.00m SANDSTONE, QUARTZ 194.00m-198.00m SANDSTONE, SHALE,QUARTZ 198.00m-206.00m SANDSTONE, SHALE 206.00m-232.00m SANDSTONE, QUARTZ 232.00m-239.00m SANDSTONE 239.00m-240.00m SHALE	1905m	North West

Geology

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Legend

Linear Geological Structures and Boundaries

Site Boundary	Trendline	Marker Bed	Miscellaneous Boundary
Report Buffer	Fold Axis	Faulted Boundary	Water/Coastline Boundary
Property Boundary	Geological Boundary	Shear Zone or Schist Zone Boundary	State/Territory Border

Scale: 0 100 200 400 600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2025	Coordinate System: GDA 1994 MGA Zone 56	Date: 15 July 2025

Geology

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Geological Units

Geological units within the dataset buffer:

Code	Unit Name	Description	Stratigraphy	Age Range	Dominant Lithology	Dist	Dir
Twia	Ashfield Shale	Black to light grey shale and laminite.	/Wianamatta Group//Ashfield Shale//	Middle Triassic (base) to Middle Triassic (top)	Shale	0m	On-site
Tuth	Hawkesbury Sandstone	Medium- to coarse-grained quartz sandstone displaying small- to large-scale, high-angle cross-bedding; minor shale and laminite lenses.	/Ungrouped Triassic units//Hawkesbury Sandstone//	Anisian (base) to Anisian (top)	Sandstone	358m	North East
Q_a	Alluvium	Unconsolidated grey to brown to beige humic (±)micaceous silty clay, quartz-(±)lithic silt, fine- to medium-grained quartz-rich to quartz-lithic sand, polymictic pebble to cobble gravel (as sporadic lenses); sporadic palaeosol horizons.	/Alluvium////	Quaternary (base) to Now (top)	Clastic sediment	721m	East
Twim	Minchinbury Sandstone	Fine- to medium-grained lithic sandstone.	/Wianamatta Group//Minchinbury Sandstone//	Middle Triassic (base) to Middle Triassic (top)	Sandstone	859m	South
Twib	Bringelly Shale	Shale, carbonaceous claystone, laminite, lithic sandstone, rare coal.	/Wianamatta Group//Bringelly Shale//	Middle Triassic (base) to Middle Triassic (top)	Shale	900m	South

Linear Geological Structures

Fault and shear or schist zone boundaries within the dataset buffer:

Map ID	Boundary Type	Feature Description	Fault Dip Angle	Fault Dip Direction	Dist	Dir
NA	No records in buffer					

Trendlines within the dataset buffer:

Map ID	Feature Description	Observation Method	Structure Name	Dist	Dir
NA	No records in buffer				

Fold axes within the dataset buffer:

Map ID	Feature Description	Observation Method	Structure Name	Dist	Dir
NA	No records in buffer				

Marker beds within the dataset buffer:

Map ID	Feature Description	Rock Unit Description	Dist	Dir
NA	No records in buffer			

Naturally Occurring Asbestos Potential

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Naturally Occurring Asbestos Potential

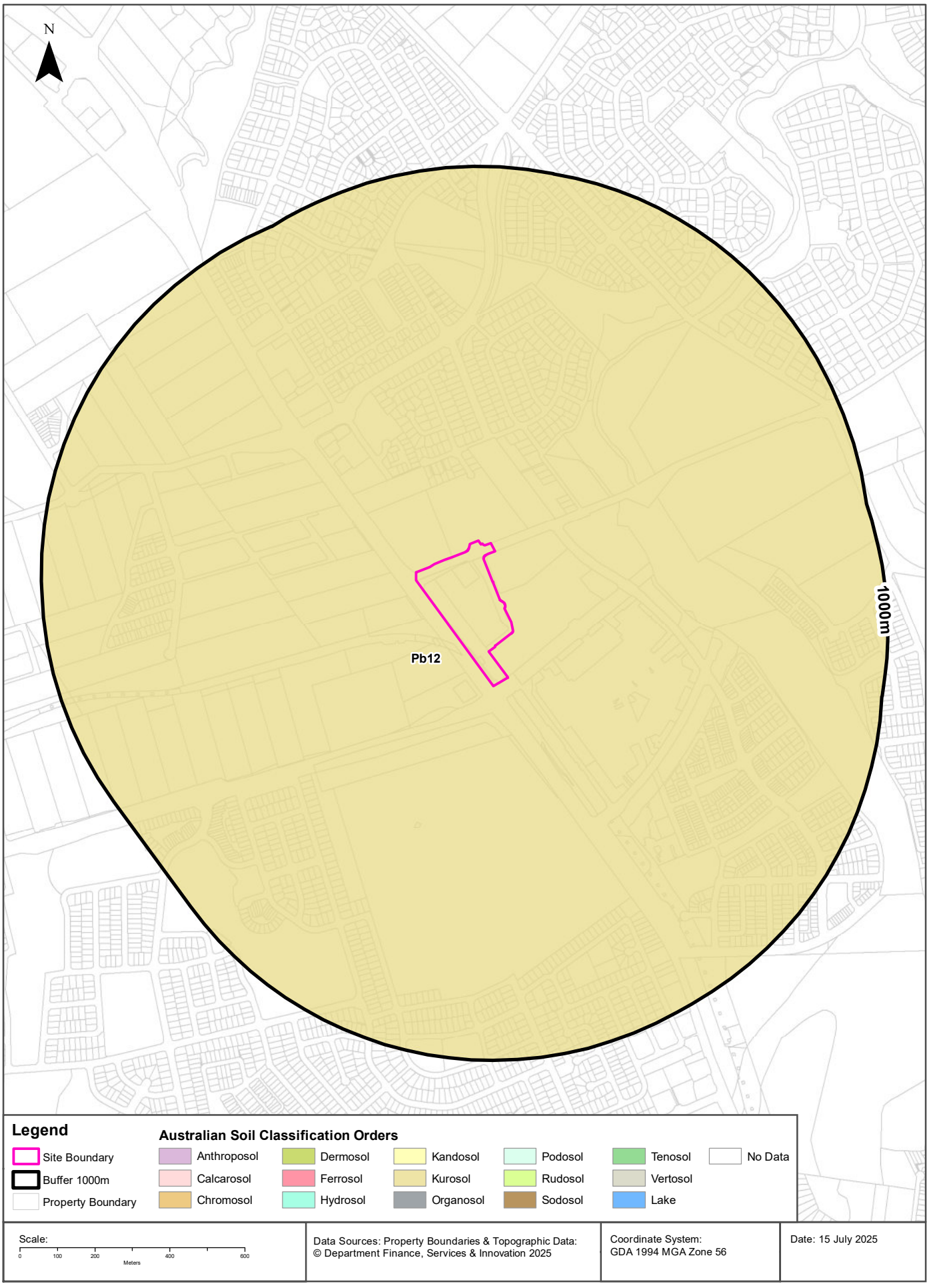
Naturally Occurring Asbestos Potential within the dataset buffer:

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

Naturally Occurring Asbestos Potential Data Source: Statewide Seamless Geology v2.4, NSW Department of Primary Industries and Regional Development

Atlas of Australian Soils

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Soils

Commercial & Windsor Roads, Rouse Hill, NSW 2155

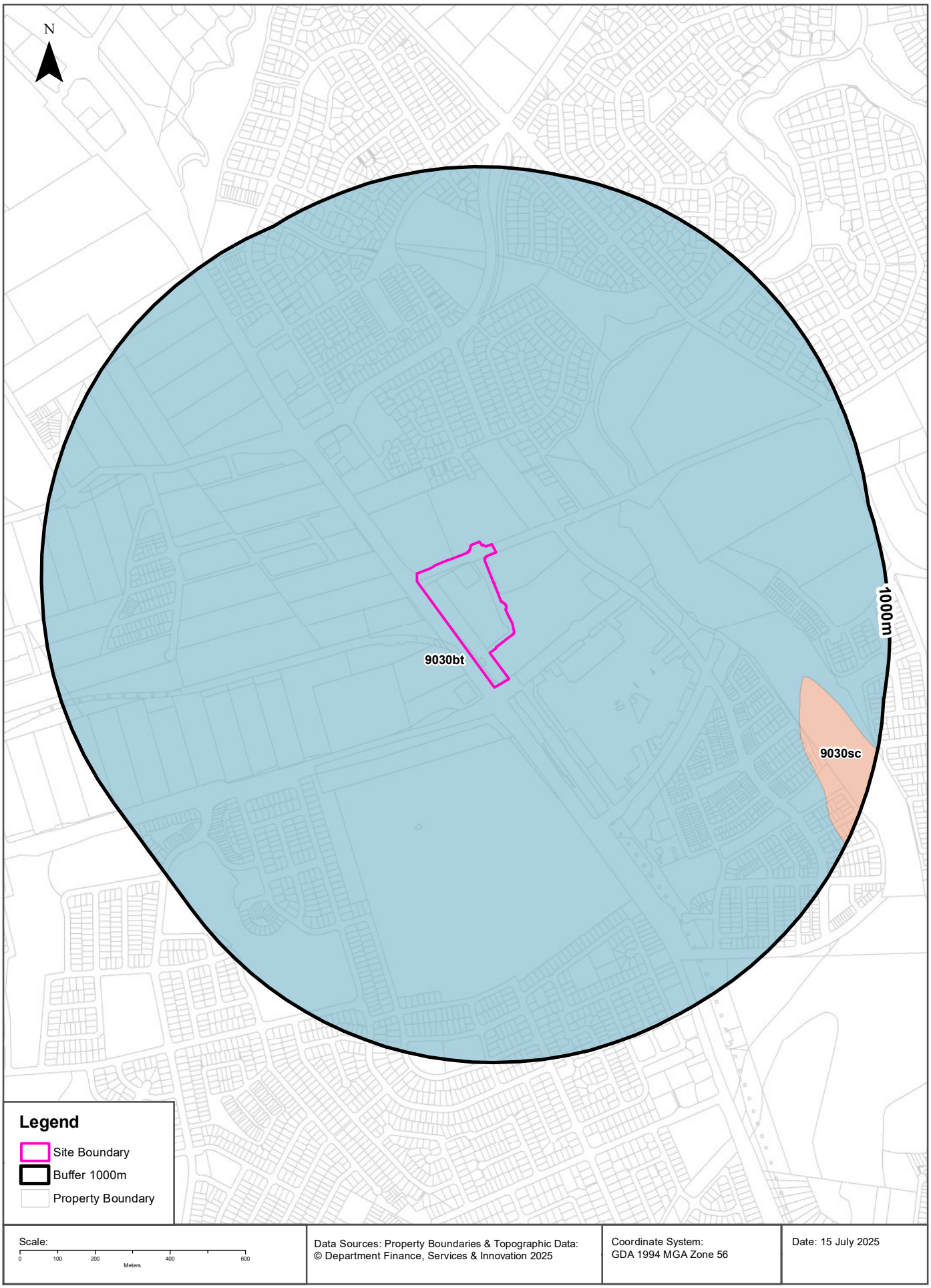
Atlas of Australian Soils

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

Map Unit Code	Soil Order	Map Unit Description	Distance	Direction
Pb12	Kurosol	Gently rolling to rounded hilly country with some steep slopes and broad valleys: chief soils are hard acidic red soils (Dr2.21) with hard neutral and acidic yellow mottled soils (Dy3.42 and Dy3.41) on lower slopes and in valleys. Associated are small areas of various soils including (Gn3.54) on some ridges, (Dr3.31) on some slopes; (Dr2.23) in saddles and some mid-slope positions, and some low- lying swampy areas of (Uf6) soils and (Uc1.2) soils with peaty surfaces. Small areas of other soils such as (Db1.2) are likely throughout.	0m	On-site

Soil Landscapes of Central and Eastern NSW

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Soil Landscapes of Central and Eastern NSW

Soil Landscapes of Central and Eastern NSW within the dataset buffer:

Soil Code	Name	Distance	Direction
9030bt	Blacktown	0m	On-site
9030sc	South Creek	775m	East

Acid Sulfate Soils

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Environmental Planning Instrument - Acid Sulfate Soils

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

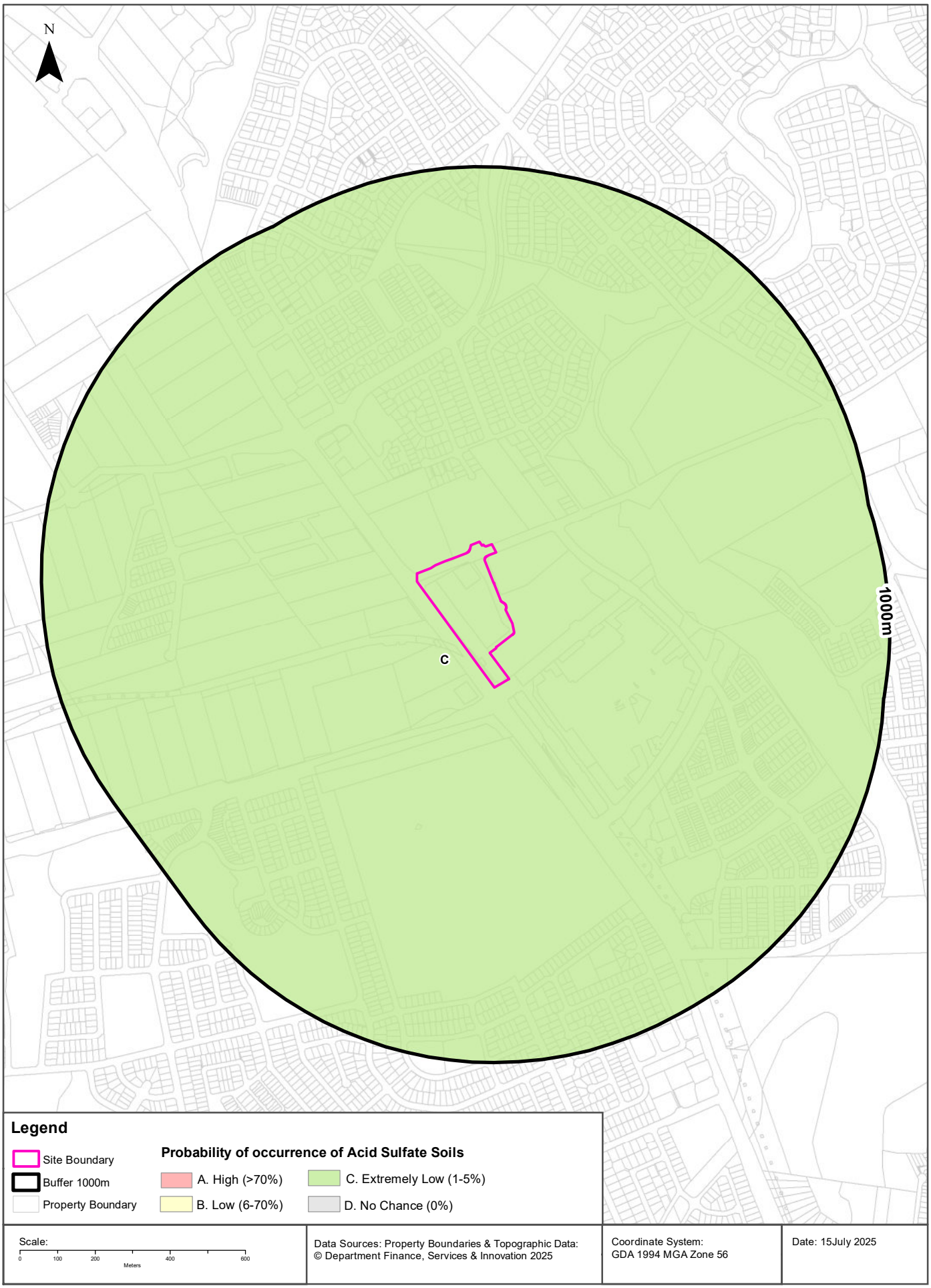
Soil Class	Description	EPI Name
N/A		

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

Soil Class	Description	EPI Name	Distance	Direction
N/A				

Atlas of Australian Acid Sulfate Soils

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Acid Sulfate Soils

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Atlas of Australian Acid Sulfate Soils

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

Class	Description	Distance	Direction
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m	On-site

Dryland Salinity

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Dryland Salinity

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

No

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

Yes

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
High hazard or risk	High hazard or risk	High hazard or risk	6m	South East

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
274	MODERATE	Area of Moderate Salinity Potential	0m	On-site
255	LOW	Area of Very Low Salinity Potential	358m	North East
800	HIGH	Area of High Salinity Potential	422m	West
787	HIGH	Area of High Salinity Potential	736m	East
785	SALT	Area of Known Salinity	915m	South West

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

Mining

Commercial & Windsor Roads, Rouse Hill, NSW 2155

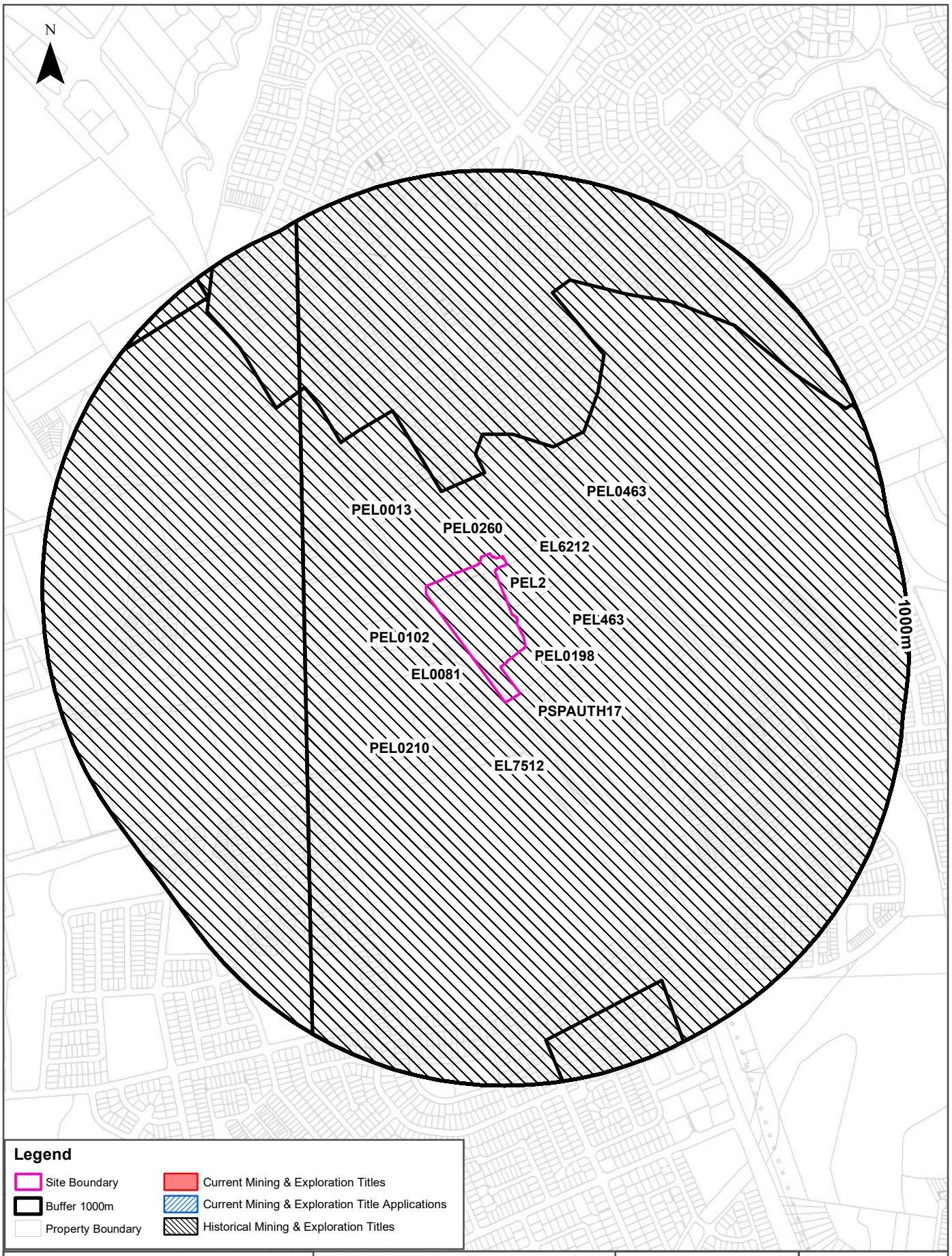
Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining & Exploration Titles

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2025

Coordinate System: GDA 1994 MGA Zone 56

Date: 15 July 2025

Mining

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Current Mining & Exploration Titles

Current Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Grant Date	Expiry Date	Last Renewed	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer								

Current Mining & Exploration Titles Data Source: Statewide Seamless Geology v2.4, NSW Department of Primary Industries and Regional Development

Current Mining & Exploration Title Applications

Current Mining & Exploration Title Applications within the dataset buffer:

Application Ref	Applicant	Application Date	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer						

Current Mining & Exploration Title Applications Data Source: Statewide Seamless Geology v2.4, NSW Department of Primary Industries and Regional Development

Historical Mining & Exploration Titles

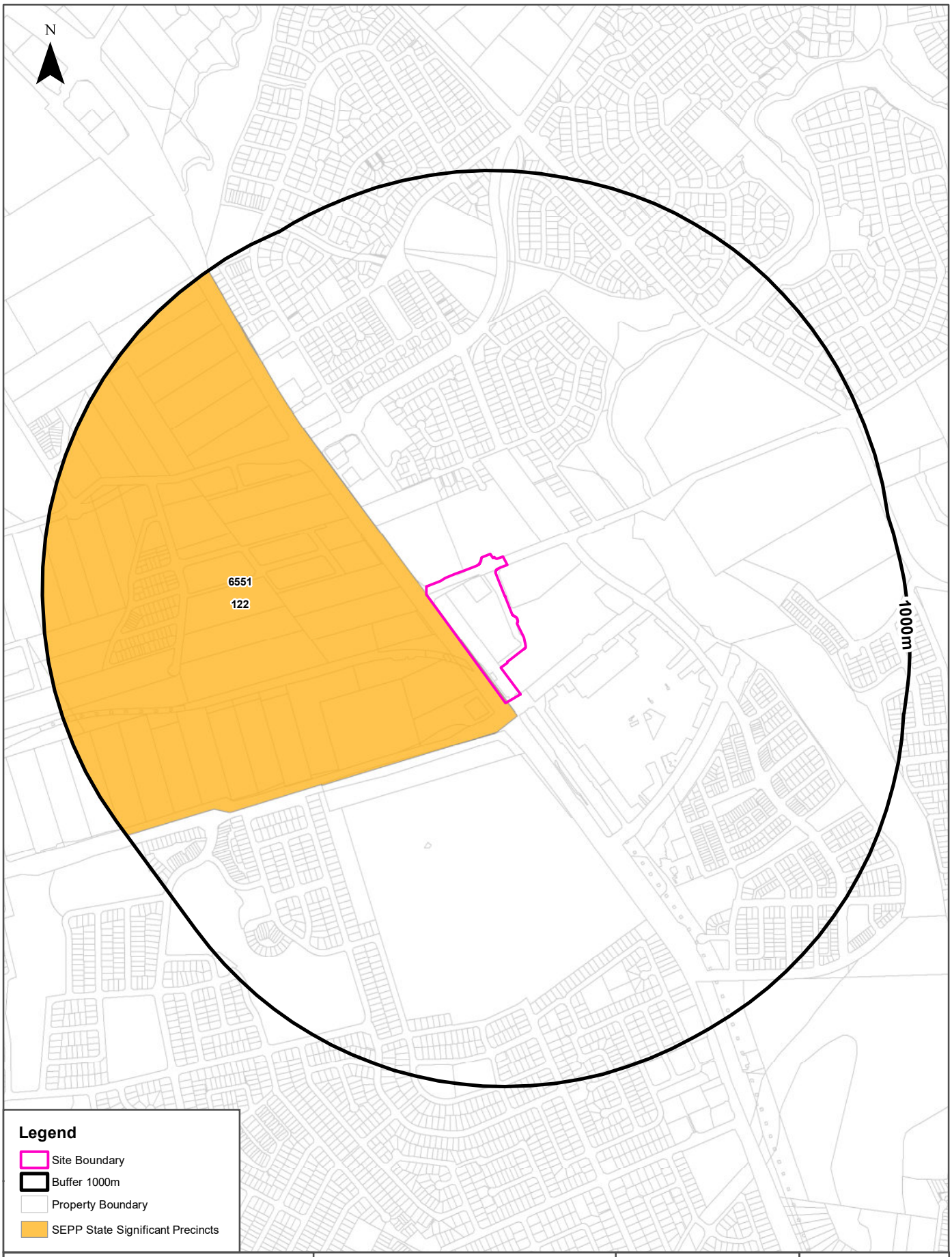
Historical Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Start Date	End Date	Resource	Minerals	Dist	Dir
EL0081	CONTINENTAL OIL CO OF AUSTRALIA LIMITED	19670201	19680201	MINERALS		0m	On-site
PEL2	AGL UPSTREAM INVESTMENTS PTY LIMITED	20000120	20001108	MINERALS		0m	On-site
PEL0463	DART ENERGY (APOLLO) PTY LTD	20091010	20150603	PETROLEUM	Petroleum	0m	On-site
PEL0013	AUSTRALIAN OIL AND GAS CORPORATION LTD			PETROLEUM	Petroleum	0m	On-site
PEL0260	NORTH BULLI COLLIERIES PTY LTD, AGL PETROLEUM OPERATIONS PTY LTD, THE AUSTRALIAN GAS LIGHT CO.	19810909	19930803	PETROLEUM	Petroleum	0m	On-site
PSPAUTH17	MACQUARIE ENERGY PTY LTD	20070803	20080703	PETROLEUM	Petroleum	0m	On-site
PEL463	DART ENERGY (APOLLO) PTY LTD	20081022	20130227	MINERALS		0m	On-site
EL6212	HOT ROCK ENERGY PTY LTD,LONGREACH OIL LIMITED	20040304	20130303	MINERALS	Geothermal	0m	On-site
PEL0210	THE AUSTRALIAN GAS LIGHT COMPANY (AGL), NORTH BULLI COLLIERIES PTY LTD			PETROLEUM	Petroleum	0m	On-site
PEL0102	AUSTRALIAN OIL AND GAS CORPORATION LTD			PETROLEUM	Petroleum	0m	On-site
PEL0198	JOHN STREVENS (TERRIGAL) NL			PETROLEUM	Petroleum	0m	On-site
EL7512	GRADIENT ENERGY LIMITED	20100407	20110415	MINERALS	Geothermal	0m	On-site

Historical Mining & Exploration Titles Data Source: Statewide Seamless Geology v2.4, NSW Department of Primary Industries and Regional Development

SEPP State Significant Precincts

Commercial & Windsor Roads, Rouse Hill, NSW 2155



State Environmental Planning Policy

Commercial & Windsor Roads, Rouse Hill, NSW 2155

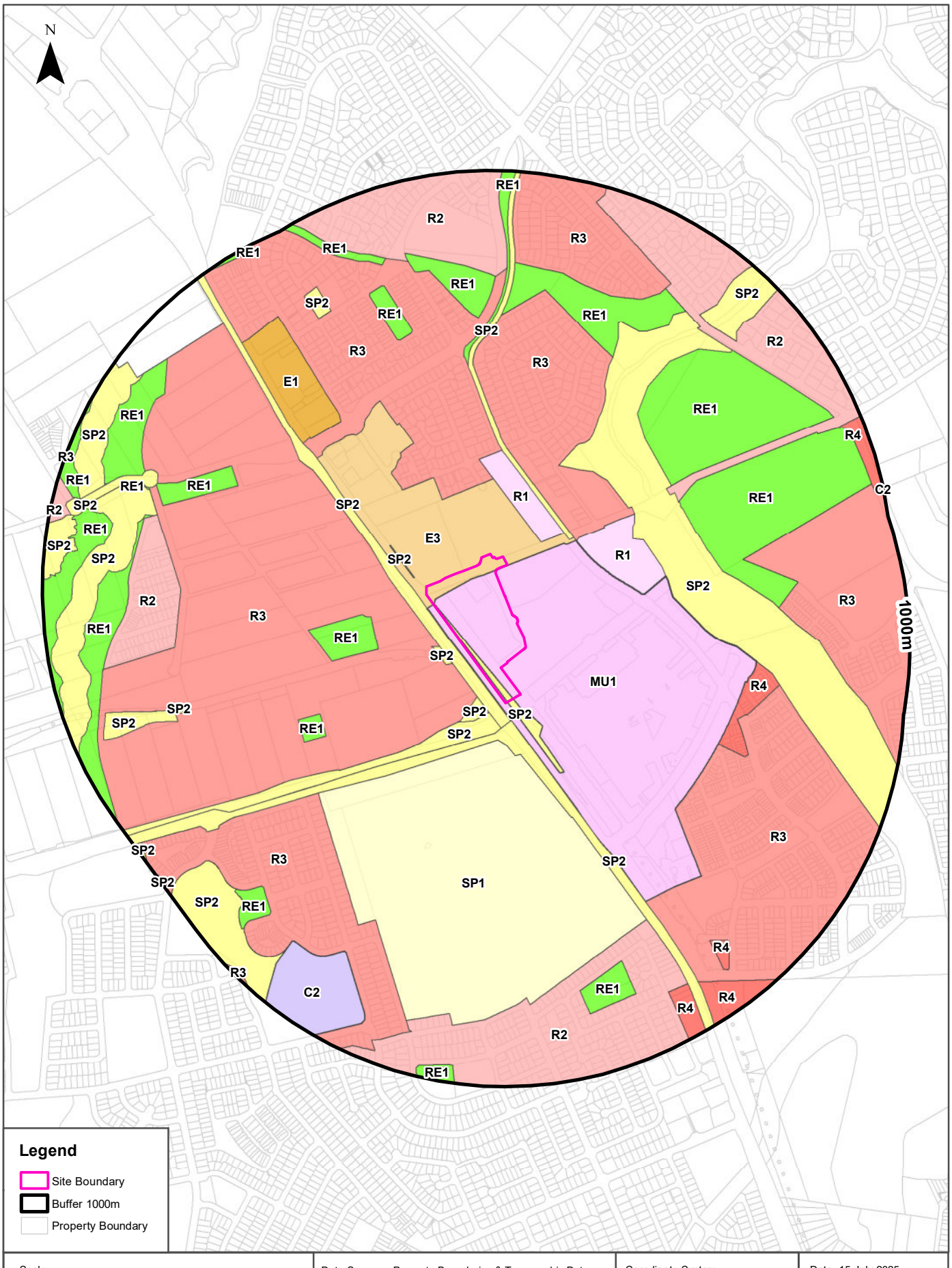
State Significant Precincts

What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
122	Area 20 Precinct Plan	State Environmental Planning Policy (Precincts - Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		0m	On-site
6551		State Environmental Planning Policy (Precincts - Central River City) 2021	02/12/2021	01/03/2022	01/03/2022		0m	On-site

EPI Planning Zones

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2025
Planning: NSW Crown Copyright - Planning & Environment

Coordinate System: GDA 1994 MGA Zone 56

Date: 15 July 2025

Environmental Planning Instrument

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Land Zoning

What EPI Land Zones exist within the dataset buffer?

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
MU1	Mixed Use		The Hills Local Environmental Plan 2019	16/12/2022	26/04/2023	27/11/2024	State Environmental Planning Policy Amendment (Land Use Zones) (No 2) 2022	0m	On-site
SP2	Infrastructure	Classified Road	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		0m	On-site
E3	Productivity Support		The Hills Local Environmental Plan 2019	16/12/2022	26/04/2023	27/11/2024	State Environmental Planning Policy Amendment (Land Use Zones) (No 2) 2022	0m	On-site
SP2	Infrastructure	Classified Road - Acquisition	State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		0m	On-site
SP2	Infrastructure	Classified Road	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		39m	North West
SP2	Infrastructure	Classified Road	Blacktown Local Environmental Plan 2015	23/05/2025	23/05/2025	23/05/2025	State Environmental Planning Policy Amendment (Riverstone East Stage 3 Precinct) 2025	47m	South
SP2	Infrastructure	Local Drainage	State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		50m	South
SP2	Infrastructure	Classified Road	State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		50m	South West
R3	Medium Density Residential		State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		50m	West
SP2	Infrastructure	Local Road	State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		51m	South West
SP1	Special Activities	Cemetery and Crematorium	Blacktown Local Environmental Plan 2015	23/05/2025	23/05/2025	23/05/2025	State Environmental Planning Policy Amendment (Riverstone East Stage 3 Precinct) 2025	99m	South
R1	General Residential		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		101m	North
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		156m	West
SP2	Infrastructure	Public Transport Corridor	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		164m	North

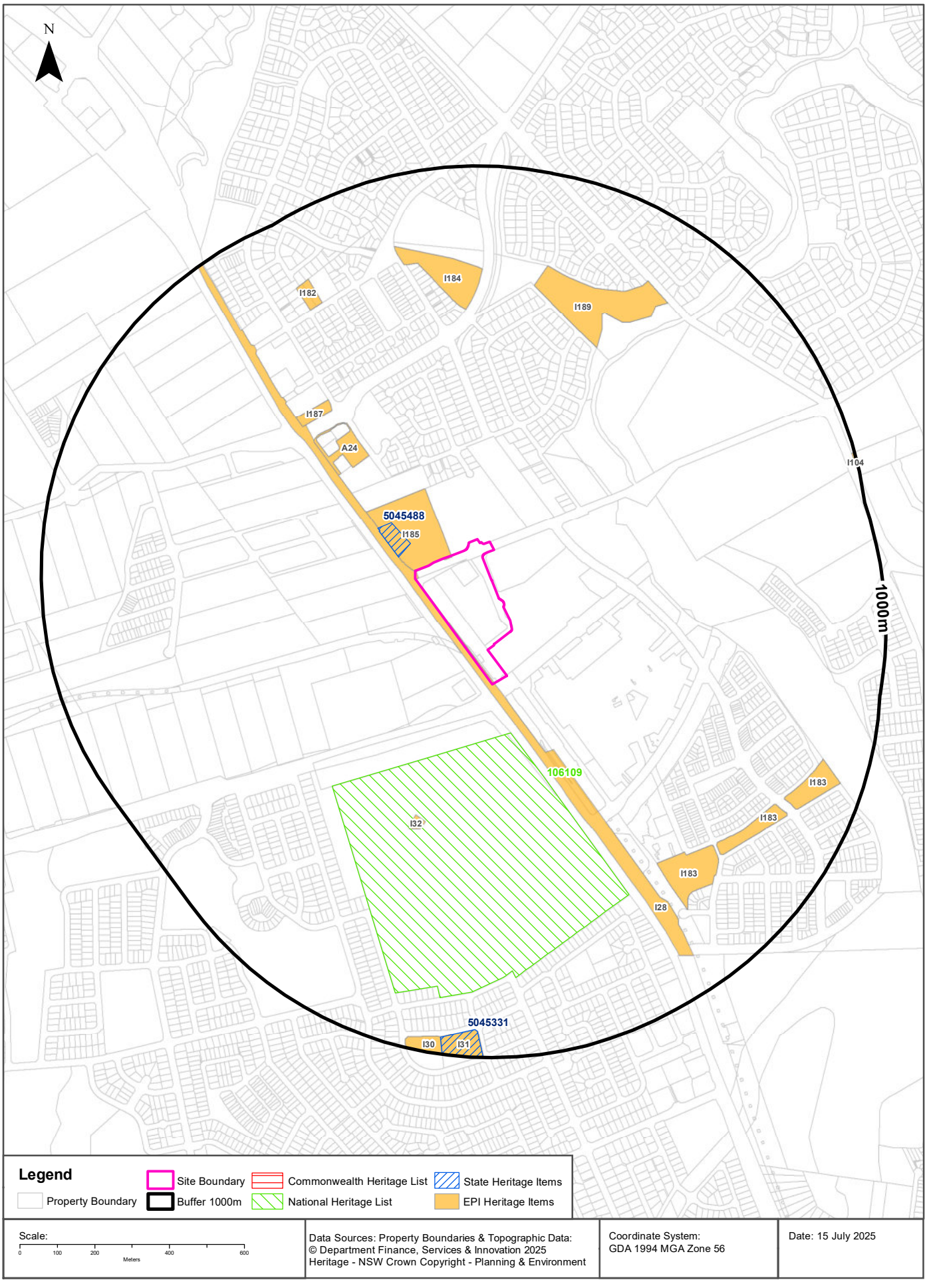
Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
R3	Medium Density Residential		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		177m	North
R3	Medium Density Residential		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		180m	North
R1	General Residential		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		189m	North East
SP2	Infrastructure	Stormwater Management System	The Hills Local Environmental Plan 2019	16/07/2021	16/07/2021	27/11/2024	Amendment No 20	278m	East
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		408m	South West
R2	Low Density Residential		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		459m	North East
RE1	Public Recreation		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		472m	North East
RE1	Public Recreation		The Hills Local Environmental Plan 2019	16/07/2021	16/07/2021	27/11/2024	Amendment No 20	475m	East
E1	Local Centre		The Hills Local Environmental Plan 2019	16/12/2022	26/04/2023	27/11/2024	State Environmental Planning Policy Amendment (Land Use Zones) (No 2) 2022	484m	North West
RE1	Public Recreation		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		493m	North
R3	Medium Density Residential		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		501m	South East
R4	High Density Residential		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		530m	East
R3	Medium Density Residential		Blacktown Local Environmental Plan 2015	23/05/2025	23/05/2025	23/05/2025	State Environmental Planning Policy Amendment (Riverstone East Stage 3 Precinct) 2025	533m	South West
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		557m	North West
RE1	Public Recreation		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		592m	North
R3	Medium Density Residential		The Hills Local Environmental Plan 2019	16/07/2021	16/07/2021	27/11/2024	Amendment No 20	605m	East
RE1	Public Recreation		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		606m	North
RE1	Public Recreation		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		618m	North
R2	Low Density Residential		State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		640m	West
R2	Low Density Residential		Blacktown Local Environmental Plan 2015	23/05/2025	23/05/2025	23/05/2025	State Environmental Planning Policy Amendment (Riverstone East Stage 3 Precinct) 2025	670m	South
SP2	Infrastructure	Local Road	State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		697m	West
SP2	Infrastructure	Local Drainage	State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		706m	West

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
SP2	Infrastructure	Local Drainage	State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		720m	West
R2	Low Density Residential		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		724m	North
RE1	Public Recreation		Blacktown Local Environmental Plan 2015	23/05/2025	23/05/2025	23/05/2025	State Environmental Planning Policy Amendment (Riverstone East Stage 3 Precinct) 2025	735m	South
R3	Medium Density Residential		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		735m	North
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		735m	West
SP2	Infrastructure	Local Road	State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		751m	West
SP2	Infrastructure	Cemetery	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		753m	North West
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		763m	West
C2	Environmental Conservation		Blacktown Local Environmental Plan 2015	23/05/2025	23/05/2025	23/05/2025	State Environmental Planning Policy Amendment (Riverstone East Stage 3 Precinct) 2025	770m	South West
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		791m	North West
RE1	Public Recreation		Blacktown Local Environmental Plan 2015	23/05/2025	23/05/2025	23/05/2025	State Environmental Planning Policy Amendment (Riverstone East Stage 3 Precinct) 2025	793m	South West
RE1	Public Recreation		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		804m	North
SP2	Infrastructure	Stormwater Management System	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		807m	North East
R4	High Density Residential		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		807m	South East
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		833m	West
SP2	Infrastructure	Drainage	Blacktown Local Environmental Plan 2015	23/05/2025	23/05/2025	23/05/2025	State Environmental Planning Policy Amendment (Riverstone East Stage 3 Precinct) 2025	854m	South West
R4	High Density Residential		Blacktown Local Environmental Plan 2015	23/05/2025	23/05/2025	23/05/2025	State Environmental Planning Policy Amendment (Riverstone East Stage 3 Precinct) 2025	863m	South East

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
SP2	Infrastructure	Local Drainage	State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		873m	North West
R4	High Density Residential		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		879m	South East
SP2	Infrastructure	Local Drainage	State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		914m	West
R4	High Density Residential		The Hills Local Environmental Plan 2019	16/07/2021	16/07/2021	27/11/2024	Amendment No 20	927m	North East
RE1	Public Recreation		State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		930m	West
R2	Low Density Residential		State Environmental Planning Policy (Precincts—Central River City) 2021	23/05/2025	23/05/2025	23/05/2025	State Environmental Planning Policy Amendment (Riverstone East Stage 3 Precinct) 2025	945m	West
RE1	Public Recreation		Blacktown Local Environmental Plan 2015	23/05/2025	23/05/2025	23/05/2025	State Environmental Planning Policy Amendment (Riverstone East Stage 3 Precinct) 2025	954m	South
SP2	Infrastructure	Drainage	Blacktown Local Environmental Plan 2015	23/05/2025	23/05/2025	23/05/2025	State Environmental Planning Policy Amendment (Riverstone East Stage 3 Precinct) 2025	981m	South West
RE1	Public Recreation		The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	27/11/2024		984m	North West
R3	Medium Density Residential		State Environmental Planning Policy (Precincts—Central River City) 2021	02/12/2021	01/03/2022	23/05/2025		995m	West
C2	Environmental Conservation		The Hills Local Environmental Plan 2019	05/11/2021	01/12/2021	27/11/2024	Standard Instrument (Local Environmental Plans) Amendment (Land Use Zones) Order 2021	998m	East

Heritage Items

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Heritage

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

National Heritage List

What are the National Heritage List Items located within the dataset buffer?
Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
106109	Vinegar Hill	712 Windsor Rd, Kellyville NSW	1/14/005/0014	Historic	Indicative place		138m	South

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
5045488	Royal Oak Inn (Former)	Rouse Hill	THE HILLS SHIRE	13/07/2012	00698	2554	57m	North West
5045331	Merriville House & Gardens	Vinegar Hill Road, Kellyville Ridge	BLACKTOWN	02/04/1999	00091	302	925m	South

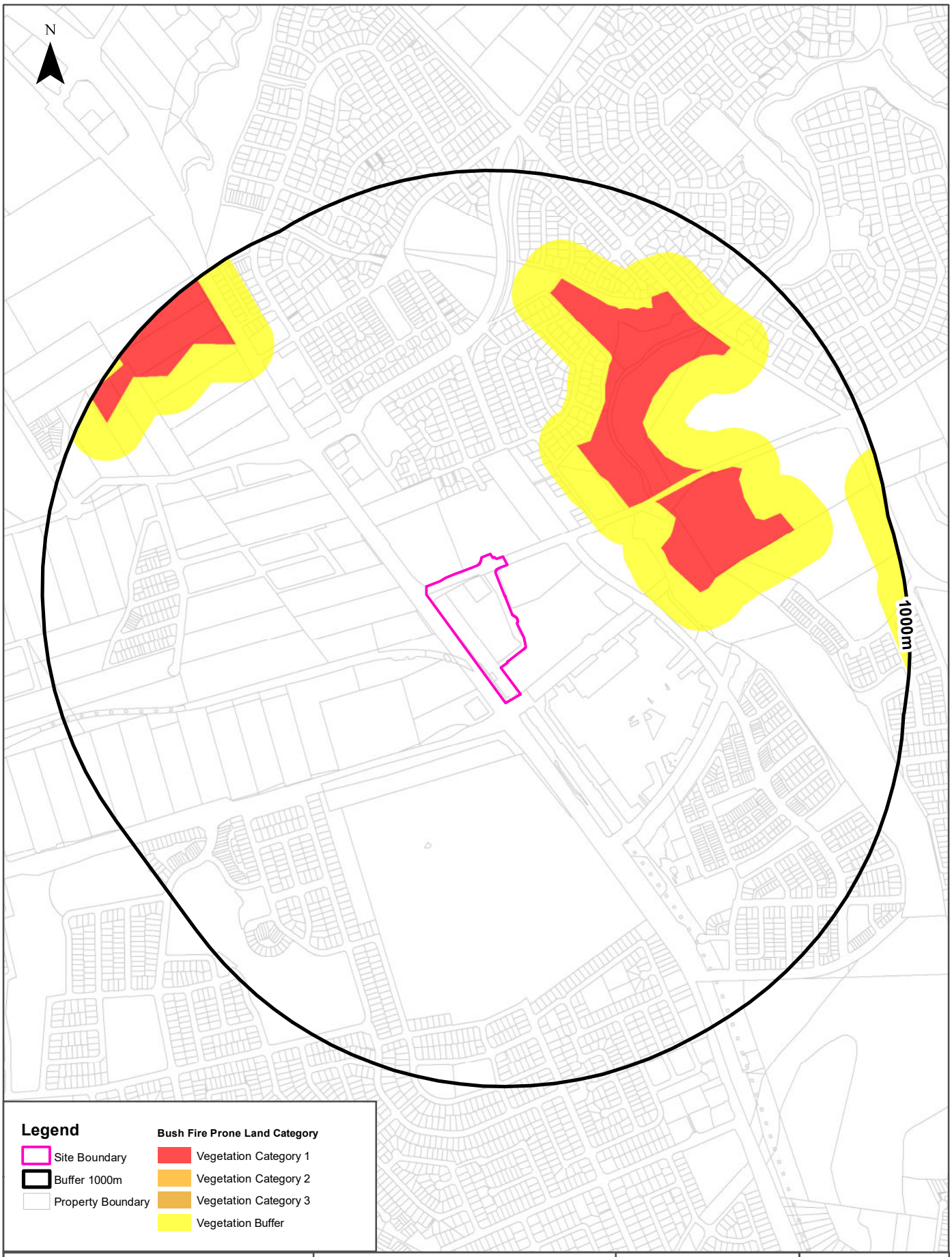
Environmental Planning Instrument - Heritage

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

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I185	Royal Oak Inn	Item - General	State	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	16/07/2021	0m	On-site
I28	Windsor Road from Baulkham Hills to Box Hill	Item - General	Local	The Hills Local Environmental Plan 2019	16/07/2021	16/07/2021	16/07/2021	0m	On-site
A24	Queens Arms Inn site	Item - Archaeological	Local	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	16/07/2021	323m	North West
I32	PlaceBattle of Vinegar Hill	Item - General	Local	Blacktown Local Environmental Plan 2015	26/05/2015	07/07/2015	07/07/2015	405m	South
I187	Christchurch	Item - General	Local	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	16/07/2021	484m	North West
I189	Private Burial Ground	Item - General	Local	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	16/07/2021	592m	North East
I184	Aberdoon House	Item - General	Local	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	16/07/2021	618m	North
I183	Mungerie	Item - General	Local	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	16/07/2021	640m	South East
I183	Mungerie	Item - General	Local	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	16/07/2021	717m	South East
I182	Rouse Hill Cemetery	Item - General	Local	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	16/07/2021	753m	North West
I183	Mungerie	Item - General	Local	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	16/07/2021	809m	South East
I31	Merriville House and gardens	Item - General	State	Blacktown Local Environmental Plan 2015	26/05/2015	07/07/2015	07/07/2015	925m	South
I30	Merriville Rise Park	Item - General	Local	Blacktown Local Environmental Plan 2015	26/05/2015	07/07/2015	07/07/2015	954m	South
I104	Lintbrae House	Item - General	Local	The Hills Local Environmental Plan 2019	06/12/2019	06/12/2019	16/07/2021	990m	East

Natural Hazards - Bush Fire Prone Land

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Data Sources: Bush Fire Prone Land: © NSW Rural Fire Service 2025. Property Boundaries: © Department Finance, Services & Innovation 2025

Coordinate System: GDA 1994 MGA Zone 56

Date: 15 July 2025

Natural Hazards

Commercial & Windsor Roads, Rouse Hill, NSW 2155

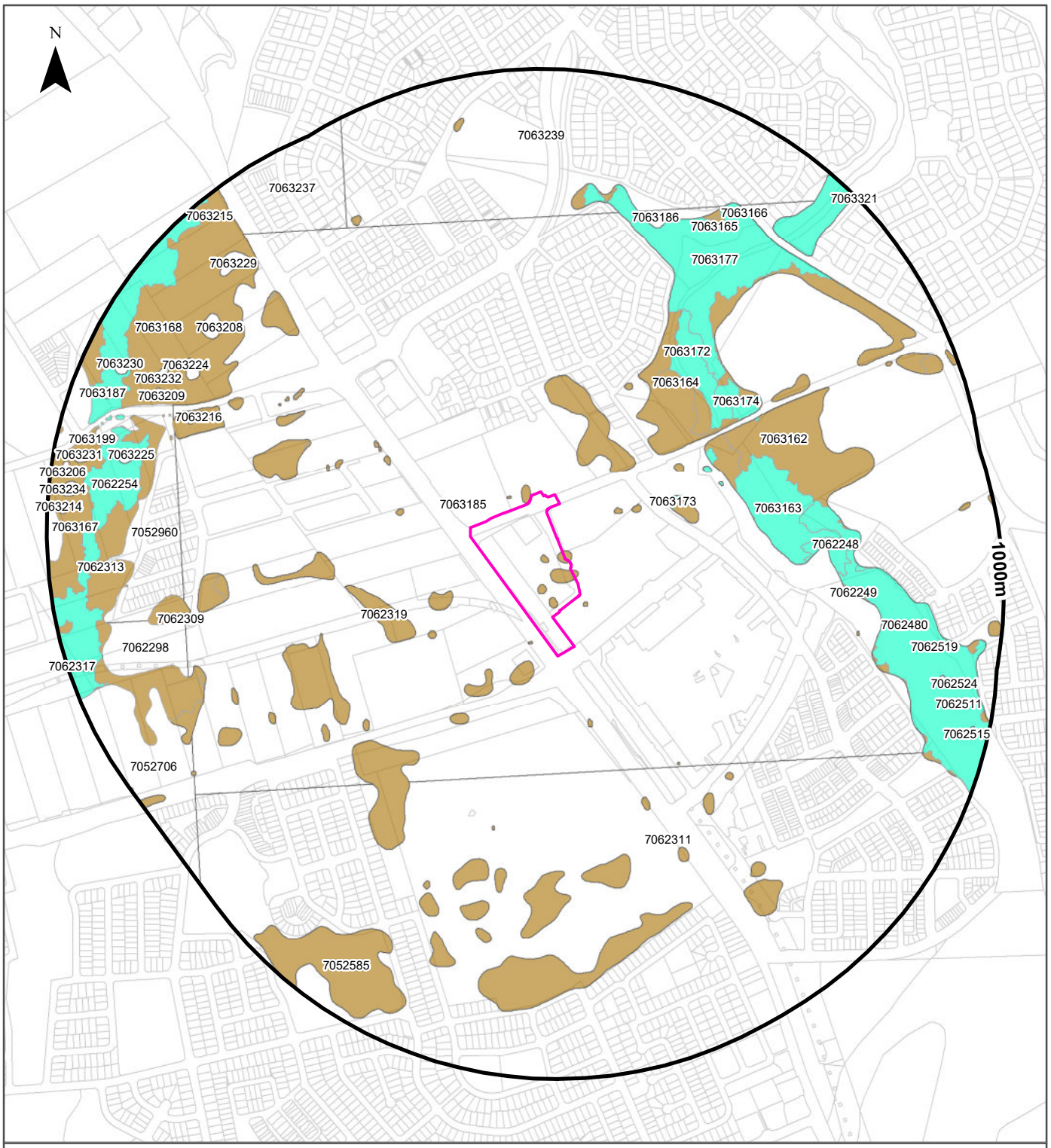
Bush Fire Prone Land

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

Bush Fire Prone Land Category	Distance	Direction
Vegetation Buffer	229m	North East
Vegetation Category 1	329m	North East
Vegetation Category 3	995m	North West

Ecological Constraints - Vegetation & Ramsar Wetlands

Commercial & Windsor Roads, Rouse Hill, NSW 2155



- Site Boundary
- ReportBuffer
- Property Boundary
- Ramsar Wetland

Native Vegetation

- Alpine Complex
- Arid Shrublands (Acacia sub-formation)
- Arid Shrublands (Chenopod sub-formation)
- Dry Sclerophyll Forests (Shrub/grass sub-formation)
- Dry Sclerophyll Forests (Shrubby sub-formation)
- Forested Wetlands
- Freshwater Wetlands
- Grasslands
- Grassy Woodlands
- Heathlands
- Rainforests
- Saline Wetlands
- Semi-arid Woodlands (Grassy sub-formation)
- Semi-arid Woodlands (Shrubby sub-formation)
- Wet Sclerophyll Forests (Grassy sub-formation)
- Wet Sclerophyll Forests (Shrubby sub-formation)
- Non vegetated
- Unattributed
- Not classified
- Other

Scale: 0 100 200 400 600 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2025

Coordinate System: GDA 1994 MGA Zone 56

Date: 15 July 2025

Ecological Constraints

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Native Vegetation

What native vegetation exists within the dataset buffer?

Map ID	Vegetation Formation	Plant Community Type and Vegetation Formation	Vegetation Class	Dist	Dir
7052585	Grassy Woodlands	(Grassy Woodlands) Cumberland Shale Plains Woodland	Coastal Valley Grassy Woodlands	0m	On-site
7063185	Not classified	(Not classified) Not classified	Not classified	0m	On-site
7063173	Forested Wetlands	(Forested Wetlands) Cumberland Red Gum Riverflat Forest	Coastal Floodplain Wetlands	251m	North East
7062319	Not classified	(Not classified) Not classified	Not classified	267m	West
7062311	Not classified	(Not classified) Not classified	Not classified	277m	South
7063164	Grassy Woodlands	(Grassy Woodlands) Cumberland Shale-Sandstone Ironbark Forest	Coastal Valley Grassy Woodlands	351m	North East
7063168	Grassy Woodlands	(Grassy Woodlands) Cumberland Shale-Sandstone Ironbark Forest	Coastal Valley Grassy Woodlands	367m	West
7063172	Forested Wetlands	(Forested Wetlands) Cumberland Red Gum Riverflat Forest	Coastal Floodplain Wetlands	399m	North East
7063162	Grassy Woodlands	(Grassy Woodlands) Cumberland Shale-Sandstone Ironbark Forest	Coastal Valley Grassy Woodlands	404m	North East
7063163	Forested Wetlands	(Forested Wetlands) Cumberland Red Gum Riverflat Forest	Coastal Floodplain Wetlands	415m	East
7063174	Forested Wetlands	(Forested Wetlands) Sydney Hinterland Red Gum Riverflat Forest	Coastal Floodplain Wetlands	440m	North East
7063177	Forested Wetlands	(Forested Wetlands) Sydney Hinterland Red Gum Riverflat Forest	Coastal Floodplain Wetlands	461m	North East
7062249	Grassy Woodlands	(Grassy Woodlands) Cumberland Shale-Sandstone Ironbark Forest	Coastal Valley Grassy Woodlands	517m	East
7062248	Forested Wetlands	(Forested Wetlands) Sydney Hinterland Red Gum Riverflat Forest	Coastal Floodplain Wetlands	532m	East
7062480	Forested Wetlands	(Forested Wetlands) Cumberland Red Gum Riverflat Forest	Coastal Floodplain Wetlands	610m	East
7063239	Not classified	(Not classified) Not classified	Not classified	650m	North
7063186	Not classified	(Not classified) Not classified	Not classified	674m	North
7052960	Not classified	(Not classified) Not classified	Not classified	684m	West
7063216	Not classified	(Not classified) Not classified	Not classified	687m	North West
7062309	Not classified	(Not classified) Not classified	Not classified	699m	West
7063204	Not classified	(Not classified) Not classified	Not classified	701m	North West
7062298	Not classified	(Not classified) Not classified	Not classified	702m	West
7063165	Grassy Woodlands	(Grassy Woodlands) Cumberland Shale-Sandstone Ironbark Forest	Coastal Valley Grassy Woodlands	731m	North East
7063224	Not classified	(Not classified) Not classified	Not classified	734m	North West
7063208	Not classified	(Not classified) Not classified	Not classified	750m	North West
7063237	Not classified	(Not classified) Not classified	Not classified	766m	North West
7062254	Forested Wetlands	(Forested Wetlands) Cumberland Red Gum Riverflat Forest	Coastal Floodplain Wetlands	782m	West
7063209	Not classified	(Not classified) Not classified	Not classified	791m	North West
7063166	Grassy Woodlands	(Grassy Woodlands) Cumberland Shale-Sandstone Ironbark Forest	Coastal Valley Grassy Woodlands	798m	North East
7063232	Not classified	(Not classified) Not classified	Not classified	801m	North West

Map ID	Vegetation Formation	Plant Community Type and Vegetation Formation	Vegetation Class	Dist	Dir
7052706	Not classified	(Not classified) Not classified	Not classified	810m	South West
7063225	Not classified	(Not classified) Not classified	Not classified	812m	West
7063229	Not classified	(Not classified) Not classified	Not classified	813m	North West
7062519	Not classified	(Not classified) Not classified	Not classified	844m	East
7062520	Not classified	(Not classified) Not classified	Not classified	866m	East
7062313	Not classified	(Not classified) Not classified	Not classified	870m	West
7063167	Grassy Woodlands	(Grassy Woodlands) Cumberland Shale-Sandstone Ironbark Forest	Coastal Valley Grassy Woodlands	876m	West
7062354	Grassy Woodlands	(Grassy Woodlands) Cumberland Shale-Sandstone Ironbark Forest	Coastal Valley Grassy Woodlands	886m	East
7062524	Not classified	(Not classified) Not classified	Not classified	888m	East
7063230	Not classified	(Not classified) Not classified	Not classified	890m	North West
7063187	Not classified	(Not classified) Not classified	Not classified	902m	West
7062511	Not classified	(Not classified) Not classified	Not classified	907m	East
7063199	Not classified	(Not classified) Not classified	Not classified	907m	West
7063231	Not classified	(Not classified) Not classified	Not classified	917m	West
7063234	Not classified	(Not classified) Not classified	Not classified	928m	West
7062315	Not classified	(Not classified) Not classified	Not classified	944m	West
7062515	Not classified	(Not classified) Not classified	Not classified	950m	East
7063214	Not classified	(Not classified) Not classified	Not classified	953m	West
7063215	Not classified	(Not classified) Not classified	Not classified	956m	North West
7063206	Not classified	(Not classified) Not classified	Not classified	957m	West
7062317	Not classified	(Not classified) Not classified	Not classified	974m	West
7063321	Not classified	(Not classified) Not classified	Not classified	992m	North East

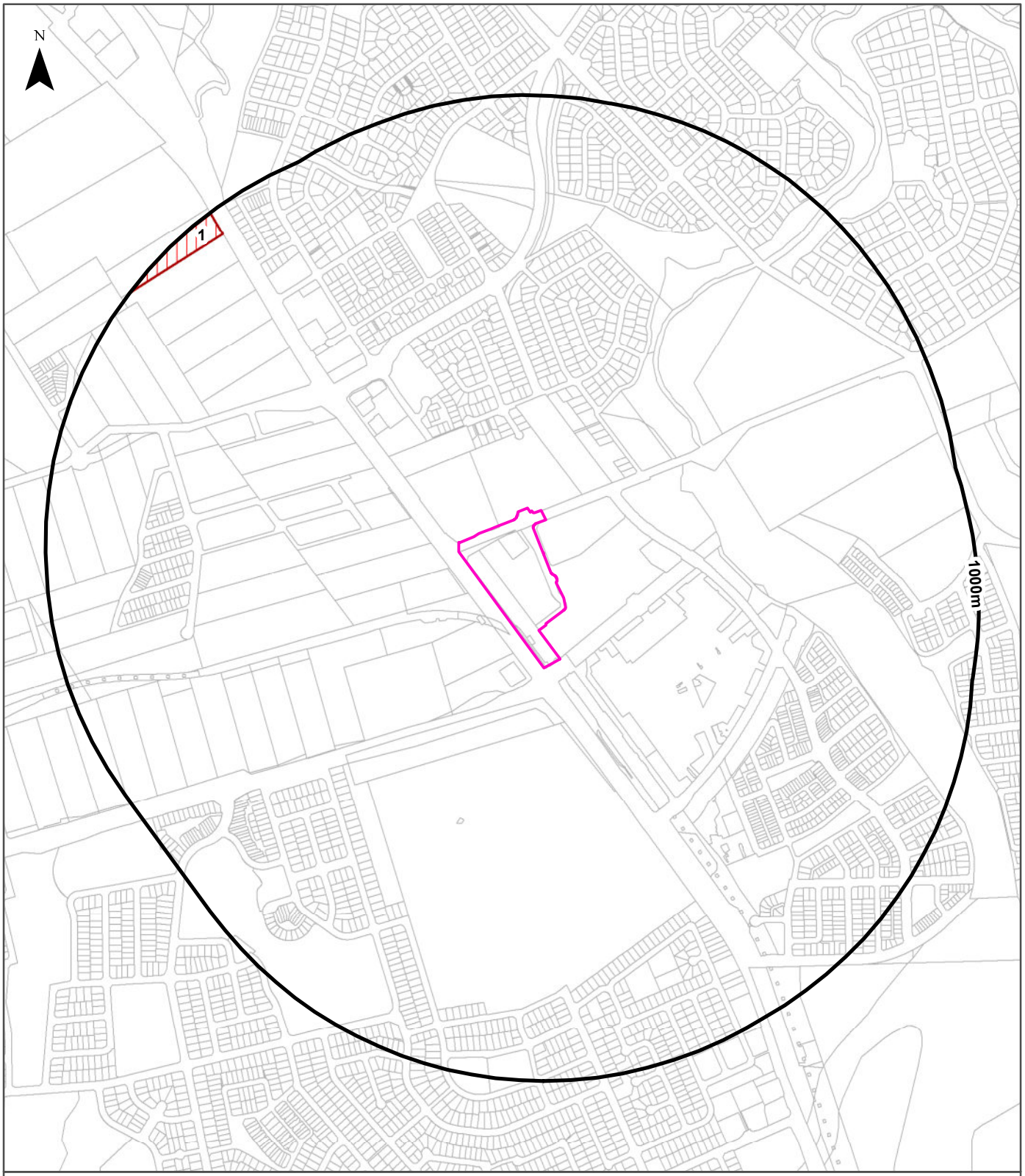
Ramsar Wetlands

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					

Ecological Constraints - Protected Areas

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Legend

IUCN category

- Site Boundary
- Buffer 1000m
- Property Boundary
- Strict Nature Reserve
- Wilderness Area
- National Park
- Natural Monument or Feature
- Habitat/Species Management Area
- Protected Landscape/Seascape
- Protected area sustainable use of natural resources
- Uncategorised Protected Area

Scale: 0 100 200 400 600 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2025

Coordinate System: GDA 1994 MGA Zone 56

Date: 15 July 2025

Ecological Constraints

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Collaborative Australian Protected Areas Database - Terrestrial

Protected areas in terrestrial environments identified by the CAPAD within the dataset buffer:

Map ID	Area Name	Area Details	Management Category	Authority	Jurisdiction	Dist	Dir
1	Rouse Hill	Regional Park	Protected Landscape/Seascape	NSW Department of Planning and Environment	State	941m	North West

Collaborative Australian Protected Areas Database - Marine

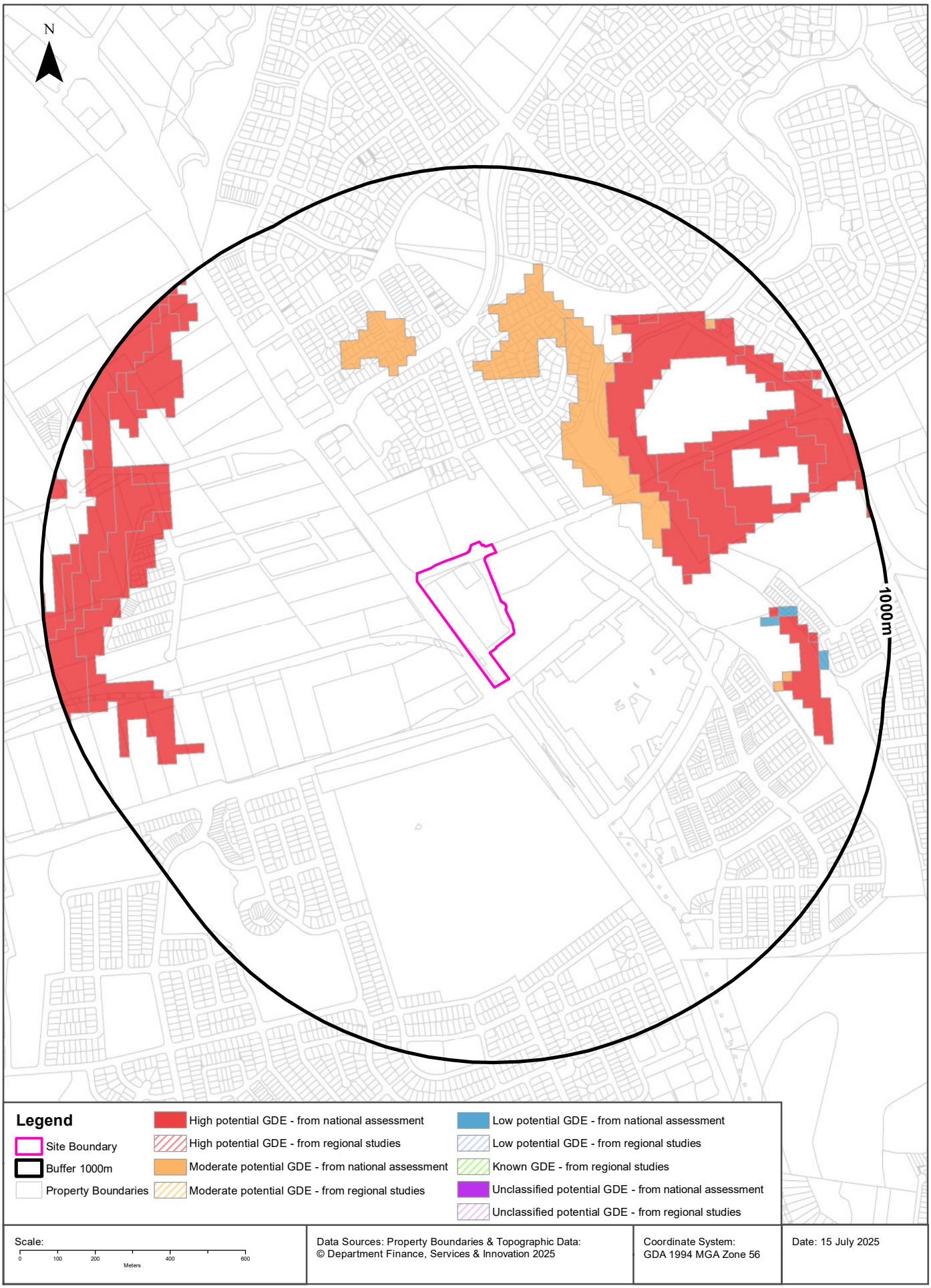
Protected areas in marine environments identified by the CAPAD within the dataset buffer:

Map ID	Area Name	Area Details	Management Category	Authority	Jurisdiction	Dist	Dir
N/A	No records in buffer						

Source: Collaborative Australian Protected Areas Database (CAPAD) 2022

Ecological Constraints - Groundwater Dependent Ecosystems Atlas

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Ecological Constraints

Commercial & Windsor Roads, Rouse Hill, NSW 2155

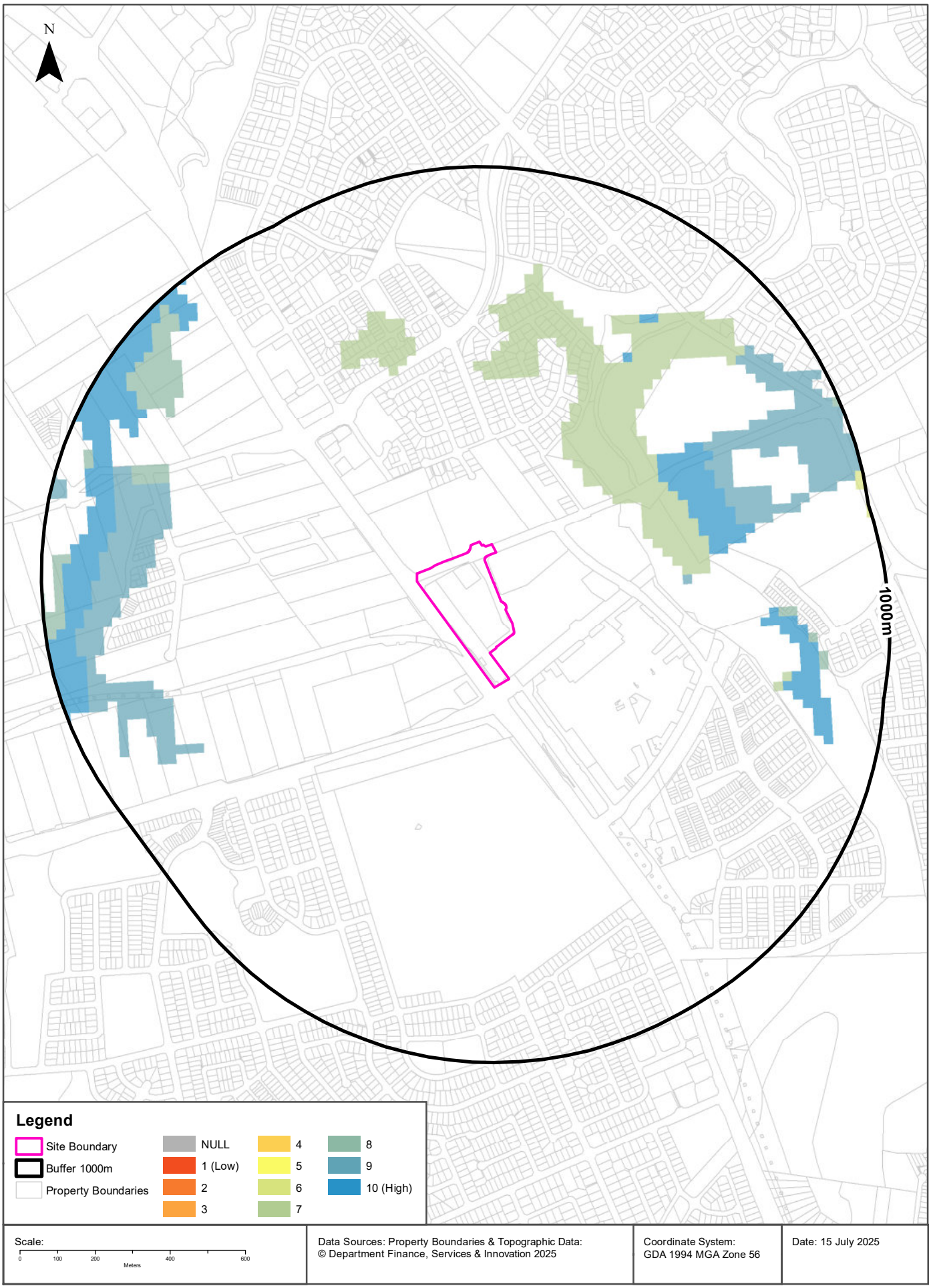
Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial	Moderate potential GDE - from national assessment	Deeply dissected sandstone plateaus.	Vegetation	Consolidated sedimentary	287m	North East
Terrestrial	High potential GDE - from national assessment	Deeply dissected sandstone plateaus.	Vegetation	Consolidated sedimentary	410m	North East
Terrestrial	Low potential GDE - from national assessment	Deeply dissected sandstone plateaus.	Vegetation	Consolidated sedimentary	654m	East

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology

Ecological Constraints - Inflow Dependent Ecosystems Likelihood

Commercial & Windsor Roads, Rouse Hill, NSW 2155



Ecological Constraints

Commercial & Windsor Roads, Rouse Hill, NSW 2155

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial	7	Deeply dissected sandstone plateaus.	Vegetation	Consolidated sedimentary	287m	North East
Terrestrial	9	Deeply dissected sandstone plateaus.	Vegetation	Consolidated sedimentary	465m	East
Terrestrial	10	Deeply dissected sandstone plateaus.	Vegetation	Consolidated sedimentary	470m	North East
Terrestrial	8	Deeply dissected sandstone plateaus.	Vegetation	Consolidated sedimentary	702m	West
Terrestrial	6	Deeply dissected sandstone plateaus.	Vegetation	Consolidated sedimentary	972m	East

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology

Ecological Constraints

Commercial & Windsor Roads, Rouse Hill, NSW 2155

NSW BioNet Species Sightings

Species sightings from the NSW BioNet Repository that have either a state or federal conservation status, or a sensitivity status, and are within 10 km of the site:
Note: This data does not include NSW Category 1 sensitive species.

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Heleioporus australiacus	Giant Burrowing Frog	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Not Sensitive	Endangered	Vulnerable	
Animalia	Amphibia	Pseudophryne australis	Red-crowned Toadlet	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Actitis hypoleucos	Common Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Anseranas semipalmata	Magpie Goose	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Category 2	Critically Endangered	Critically Endangered	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Ardenna pacifica	Wedge-tailed Shearwater	Not Sensitive	Not Listed	Not Listed	JAMBA
Animalia	Aves	Arenaria interpres	Ruddy Turnstone	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Botaurus poiciloptilus	Australasian Bittern	Not Sensitive	Endangered	Endangered	
Animalia	Aves	Burhinus grallarius	Bush Stone-curlew	Not Sensitive	Endangered	Not Listed	
Animalia	Aves	Calidris acuminata	Sharp-tailed Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris alba	Sanderling	Not Sensitive	Vulnerable	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris ferruginea	Curlew Sandpiper	Not Sensitive	Critically Endangered	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Calidris melanotos	Pectoral Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Calidris ruficollis	Red-necked Stint	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Category 3	Endangered	Endangered	
Animalia	Aves	Calyptorhynchus banksii samueli	Red-tailed Black-Cockatoo (inland subspecies)	Category 2	Vulnerable	Not Listed	
Animalia	Aves	Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	Category 2	Vulnerable	Vulnerable	
Animalia	Aves	Circus assimilis	Spotted Harrier	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	Cuculus optatus	Oriental Cuckoo	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Epthianura albifrons	White-fronted Chat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Falco subniger	Black Falcon	Not Sensitive	Vulnerable	Not Listed	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;JAMBA
Animalia	Aves	Grantiella picta	Painted Honeyeater	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	Haematopus fuliginosus	Sooty Oystercatcher	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Hirundo rustica	Barn Swallow	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Irediparra gallinacea	Comb-crested Jacana	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Ixobrychus flavicollis	Black Bittern	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Lathamus discolor	Swift Parrot	Not Sensitive	Endangered	Critically Endangered	
Animalia	Aves	Lophochroa leadbeateri	Pink Cockatoo	Category 2	Vulnerable	Endangered	
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Melanodryas cucullata cucullata	South-eastern Hooded Robin	Not Sensitive	Endangered	Endangered	
Animalia	Aves	Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Neophema pulchella	Turquoise Parrot	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Ninox connivens	Barking Owl	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Ninox strenua	Powerful Owl	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Oxyura australis	Blue-billed Duck	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Pachycephala olivacea	Olive Whistler	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Pandion cristatus	Eastern Osprey	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Parvipsitta pusilla	Little Lorikeet	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Petroica rodinogaster	Pink Robin	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Pluvialis fulva	Pacific Golden Plover	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pluvialis squatarola	Grey Plover	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Polytelis swainsonii	Superb Parrot	Category 3	Vulnerable	Vulnerable	
Animalia	Aves	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Ptilinopus magnificus	Wompoo Fruit-Dove	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Pycnoptilus floccosus	Pilotbird	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	Pyrrholaemus sagittatus	Speckled Warbler	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Rhipidura fuliginosa	New Zealand Fantail (Lord Howe Is. subsp.)	Not Sensitive	Extinct	Extinct	
Animalia	Aves	Rostratula australis	Australian Painted Snipe	Not Sensitive	Endangered	Endangered	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	Stictonetta naevosa	Freckled Duck	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Thalassarche melanophris	Black-browed Albatross	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	Thalasseus bergii	Crested Tern	Not Sensitive	Not Listed	Not Listed	JAMBA
Animalia	Aves	Thinornis cucullatus cucullatus	Eastern Hooded Dotterel	Not Sensitive	Critically Endangered	Vulnerable	
Animalia	Aves	Tringa glareola	Wood Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa nebularia	Common Greenshank	Not Sensitive	Endangered	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tringa stagnatilis	Marsh Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Tyto novaehollandiae	Masked Owl	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Tyto tenebricosa	Sooty Owl	Category 3	Vulnerable	Not Listed	
Animalia	Gastropoda	Meridolum corneovirens	Cumberland Plain Land Snail	Not Sensitive	Endangered	Not Listed	
Animalia	Gastropoda	Pommerhelix duralensis	Dural Land Snail	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	Chalinolobus dwyeri	Large-eared Pied Bat	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Not Sensitive	Vulnerable	Endangered	
Animalia	Mammalia	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Miniopterus australis	Little Bent-winged Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Miniopterus orianae oceanensis	Large Bent-winged Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Myotis macropus	Southern Myotis	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Notomys cervinus	Fawn Hopping-mouse	Not Sensitive	Extinct	Not Listed	
Animalia	Mammalia	Nyctophilus bifax	Eastern Long-eared Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Petauroides volans	Southern Greater Glider	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	Petaurus australis	Yellow-bellied Glider	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Mammalia	Petaurus norfolcensis	Squirrel Glider	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Mammalia	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Scoteanax rueppellii	Greater Broad-nosed Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Vespadelus troughtoni	Eastern Cave Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	Aspidites ramsayi	Woma	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	Caretta caretta	Loggerhead Turtle	Not Sensitive	Endangered	Endangered	
Animalia	Reptilia	Chelonia mydas	Green Turtle	Not Sensitive	Vulnerable	Vulnerable	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Reptilia	Cyclodomorphus melanops elongatus	Mallee Slender Blue-tongue Lizard	Not Sensitive	Endangered	Not Listed	
Animalia	Reptilia	Diplodactylus platyurus	Eastern Fat-tailed Gecko	Not Sensitive	Endangered	Not Listed	
Animalia	Reptilia	Eulamprus kosciuskoi	Alpine Water Skink	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Reptilia	Hemiaspis damelii	Grey Snake	Not Sensitive	Endangered	Endangered	
Animalia	Reptilia	Tiliqua occipitalis	Western Blue-tongued Lizard	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	Uvidicolus sphyrurus	Border Thick-tailed Gecko	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Acacia bynoeana	Bynoe's Wattle	Not Sensitive	Endangered	Vulnerable	
Plantae	Flora	Acacia pubescens	Downy Wattle	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Callistemon linearifolius	Netted Bottle Brush	Category 3	Vulnerable	Not Listed	
Plantae	Flora	Cryptostylis hunteriana	Leafless Tongue Orchid	Category 2	Vulnerable	Vulnerable	
Plantae	Flora	Darwinia biflora		Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Dillwynia tenuifolia		Not Sensitive	Endangered Population, Vulnerable	Not Listed	
Plantae	Flora	Dillwynia tenuifolia		Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	Doryanthes palmeri	Giant Spear Lily	Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	Epacris purpurascens var. purpurascens		Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	Eucalyptus cryptica		Not Sensitive	Critically Endangered	Critically Endangered	
Plantae	Flora	Eucalyptus leucoxylon subsp. pruinosa	Yellow Gum	Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	Eucalyptus nicholii	Narrow-leaved Black Peppermint	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Eucalyptus scoparia	Wallangarra White Gum	Not Sensitive	Endangered	Vulnerable	
Plantae	Flora	Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea	Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	Hibbertia puberula		Not Sensitive	Endangered	Not Listed	
Plantae	Flora	Hibbertia spanantha	Julian's Hibbertia	Category 2	Critically Endangered	Critically Endangered	
Plantae	Flora	Hibbertia superans		Not Sensitive	Endangered	Not Listed	
Plantae	Flora	Isotoma fluviatilis subsp. fluviatilis		Category 3	Not Listed	Extinct	
Plantae	Flora	Lasiopetalum joyceae		Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Leucopogon fletcheri subsp. fletcheri		Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	Macadamia integrifolia	Macadamia Nut	Not Sensitive	Not Listed	Vulnerable	
Plantae	Flora	Macadamia tetraphylla	Rough-shelled Bush Nut	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Marsdenia viridiflora subsp. viridiflora	Native Pear	Not Sensitive	Endangered Population	Not Listed	
Plantae	Flora	Melaleuca deanei	Deane's Paperbark	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Micromyrtus minutiflora		Not Sensitive	Endangered	Vulnerable	
Plantae	Flora	Persoonia hirsuta	Hairy Geebung	Category 3	Endangered	Endangered	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Persoonia mollis subsp. maxima		Not Sensitive	Endangered	Endangered	
Plantae	Flora	Pilularia novae-hollandiae	Austral Pillwort	Category 3	Endangered	Not Listed	
Plantae	Flora	Pimelea curviflora var. curviflora		Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Pimelea spicata	Spiked Rice-flower	Not Sensitive	Endangered	Endangered	
Plantae	Flora	Pomaderris brunnea	Brown Pomaderris	Not Sensitive	Endangered	Vulnerable	
Plantae	Flora	Pterostylis saxicola	Sydney Plains Greenhood	Category 2	Endangered	Endangered	
Plantae	Flora	Pultenaea parviflora		Not Sensitive	Endangered	Vulnerable	
Plantae	Flora	Syzygium paniculatum	Magenta Lilly Pilly	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Tetratheca glandulosa		Not Sensitive	Vulnerable	Not Listed	

Source: NSW BioNet Species Sightings

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Adjacent Match	Land adjacent to a georeferenced feature
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Appendix C: Laboratory Results Summary Tables

ABBREVIATIONS AND EXPLANATIONS FOR SALINITY TABLES

Abbreviations used in the Tables:

Ca	Calcium
CEC	Cation Exchange Capacity
DO	Dissolved Oxygen
EC	Electrical Conductivity
ECe	Extract Electrical Conductivity
Eh	Redox Potential
ESP	Exchangeable Sodium Percentage (Each Na/CEC)
K	Potassium
Mg	Magnesium
Na	Sodium
SWL	Standing Water Level

Units used in the Tables

°C	Degrees Celsius
dS/m	deciSiemens per metre
m	meters
meq/100g	milliequivalents per 100 grams
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
mV	millivolts
ohm.cm	ohm centimetre
µS/cm	microSiemens per centimetre

Notes on Specific Tables

SUMMARY OF SOIL LABORATORY RESULTS - EC and ECe

- The salinity Class has been adopted from 'Site Investigations for Urban Salinity' DLWC 2002.
- The chart function assumes an ECe value of 1.9 for values that are less than the practical quatitation limit.

SUMMARY OF RESISTIVITY CALCULATION ON SOIL EC RESULTS

- The resistivity values have been calculated on the laboratory EC values.
- The classification has been derived from the Australian Standard 2159-2009 Piling Design and Installation (Table 6.5.2 [A] & [C])
- Table 6.5.2 [A] of Australian Standard 2159-2009 recommends using a Moderate Exposure Classification for Steel Piles in Fresh Water - Soft Running Water

SUMMARY OF SOIL LABORATORY RESULTS - pH

- The pH Classification has been derived from the Australian Standard 2159-2009 Piling Design and Installation (Tables 6.4.2 [C] & 6.5.2 [C])
- Table 6.5.2 [A] of Australian Standard 2159-2009 recommends using a Moderate Exposure Classification for Steel Piles in Fresh Water - Soft Running Water

SUMMARY OF SOIL LABORATORY RESULTS - SULFATE & CHLORIDES

- The classification has been derived from the Australian Standard 2159-2009 Piling Design and Installation (Table 6.5.2 [A] & [C])
- The chart function assumes an concentration of 0.5mg/kg for values that are less than the practical quatitation limit.

SUMMARY OF SOIL LABORATORY RESULTS - CEC & ESP

- The Sodicity rating has been adopted from the publication 'Site Investigations for Urban Salinity' DLWC 2002.

SUMMARY OF GROUNDWATER LABORATORY RESULTS

- The classification has been derived from the Australian Standard 2159-2009 Piling Design and Installation (Table 6.5.2 [A] & [C]) .
- Table 6.4.2 [A] recommends using a Mild Exposure Classification for Concrete Piles in Fresh Water - Treat as in Soil Condition 'A'.
- Table 6.5.2 [A] recommends using a Moderate Exposure Classification for Steel Piles in Fresh Water - Soft Running Water.

TABLE
SUMMARY OF SOIL LABORATORY RESULTS - EC and ECe

Borehole Number	Sample Depth (m)	Sample Description	EC (µS/cm)	Ece (dS/m)	Salinity Class
BH301	0-0.2	Fill: Silty Sandy Clay	170	<2	NON SALINE
BH302	0-0.1	Fill: Silty Sand	110	<2	NON SALINE
BH303	0-0.2	Fill: Silty Sandy Clay	170	<2	NON SALINE
BH304	0-0.2	Fill: Silty Sandy Clay	190	<2	NON SALINE
BH305	0-0.1	Fill: Silty Sandy Clay	1900	17	HIGHLY SALINE
BH305	0.3-0.5	Fill: Silty Sandy Clay	300	2.7	SLIGHTLY SALINE
BH306	0-0.3	Fill: Silty Sandy Clay	90	<2	NON SALINE
BH306	0.5-0.75	Fill: Sandy Clay	190	<2	NON SALINE
BH307	0.1-0.3	Fill: Silty Sandy Clay	150	<2	NON SALINE
BH307	0.5-0.6	Fill: Silty Sandy Clay	220	<2	NON SALINE
BH308	0-0.1	Fill: Silty Sandy Clay	240	2.1	SLIGHTLY SALINE
BH308	0.4-0.5	Fill: Sandy Clay	160	<2	NON SALINE
Total Number of Samples			12	12	-
Minimum Value			90	<PQL	-
Maximum Value			1900	17	-

ECe Values (dS/m)	Salinity Class
<2	NON SALINE
2 to 4	SLIGHTLY SALINE
4 to 8	MODERATELY SALINE
8 to 16	VERY SALINE
>16	HIGHLY SALINE

TABLE C
SUMMARY OF RESISTIVITY CALCULATION ON SOIL EC RESULTS

Borehole Number	Sample Depth (m)	Sample Description	EC (µS/cm)	Resistivity (ohm.cm)	Classification Condition B
BH301	0-0.2	Fill: Silty Sandy Clay	170	5,882	Non Aggressive
BH302	0-0.1	Fill: Silty Sand	110	9,091	Non Aggressive
BH303	0-0.2	Fill: Silty Sandy Clay	170	5,882	Non Aggressive
BH304	0-0.2	Fill: Silty Sandy Clay	190	5,263	Non Aggressive
BH305	0-0.1	Fill: Silty Sandy Clay	1900	526	Moderately Aggressive
BH305	0.3-0.5	Fill: Silty Sandy Clay	300	3,333	Non Aggressive
BH306	0-0.3	Fill: Silty Sandy Clay	90	11,111	Non Aggressive
BH306	0.5-0.75	Fill: Sandy Clay	190	5,263	Non Aggressive
BH307	0.1-0.3	Fill: Silty Sandy Clay	150	6,667	Non Aggressive
BH307	0.5-0.6	Fill: Silty Sandy Clay	220	4,545	Non Aggressive
BH308	0-0.1	Fill: Silty Sandy Clay	240	4,167	Non Aggressive
BH308	0.4-0.5	Fill: Sandy Clay	160	6,250	Non Aggressive
Total Number of Samples			12	12	-
Minimum Value			90	526	-
Maximum Value			1900	11,111	-

Classification is based on Soil condition 'B' - low permeability soils (e.g. silts & clays) or all soils above groundwater.

Resistivity Values (ohm.cm)	Classification for Steel Piles
>5,000	Non-Aggressive
2,000 - 5,000	Non-Aggressive
1,000 - 2,000	Mildly Aggressive
<1,000	Moderately Aggressive

TABLE D
SUMMARY OF SOIL LABORATORY RESULTS - pH

Borehole Number	Sample Depth (m)	Sample Description	pH	Classification for Concrete Piles	Classification for Steel Piles
				Condition B	Condition B
BH301	0-0.2	Fill: Silty Sandy Clay	7.6	Non-Aggressive	Non-Aggressive
BH302	0-0.1	Fill: Silty Sand	8.4	Non-Aggressive	Non-Aggressive
BH302	0-0.1	LAB DUPLICATE	8.4	Non-Aggressive	Non-Aggressive
BH303	0-0.2	Fill: Silty Sandy Clay	8	Non-Aggressive	Non-Aggressive
BH304	0-0.2	Fill: Silty Sandy Clay	8.3	Non-Aggressive	Non-Aggressive
BH305	0-0.1	Fill: Silty Sandy Clay	7.1	Non-Aggressive	Non-Aggressive
BH305	0.3-0.5	Fill: Silty Sandy Clay	8.3	Non-Aggressive	Non-Aggressive
BH306	0-0.3	Fill: Silty Sandy Clay	7.3	Non-Aggressive	Non-Aggressive
BH306	0.5-0.75	Fill: Sandy Clay	8.2	Non-Aggressive	Non-Aggressive
BH307	0.1-0.3	Fill: Silty Sandy Clay	8.2	Non-Aggressive	Non-Aggressive
BH307	0.5-0.6	Fill: Silty Sandy Clay	9.2	Non-Aggressive	Non-Aggressive
BH307	0.5-0.6	LAB DUPLICATE	8.8	Non-Aggressive	Non-Aggressive
BH308	0-0.1	Fill: Silty Sandy Clay	7.2	Non-Aggressive	Non-Aggressive
BH308	0.4-0.5	Fill: Sandy Clay	8.3	Non-Aggressive	Non-Aggressive
Total Number of Samples			14	-	-
Minimum Value			7.1	-	-
Maximum Value			9.2	-	-

Classification is based on Soil condition 'B' - low permeability soils (e.g. silts & clays) or all soils above groundwater.

pH Value	Classification for Concrete Piles
>5.5	Non-Aggressive
4.5 - 5.5	Mildly Aggressive
4 - 4.5	Moderately Aggressive
<4	Severely Aggressive

pH Value	Classification for Steel Piles
>5	Non-Aggressive
4.0 - 5.0	Non-Aggressive
3.0 - 4.0	Mildly Aggressive
<3	Moderately Aggressive

TABLE E
SUMMARY OF SOIL LABORATORY RESULTS - SULPHATE & CHLORIDES

Borehole Number	Sample Depth (m)	Sample Description	Chloride (mg/kg)	Sulphate (mg/kg)	Classification for Concrete Piles	Classification for Steel Piles
BH301	0-0.2	Fill: Silty Sandy Clay	<10	28	Non-Aggressive	Non-Aggressive
BH302	0-0.1	Fill: Silty Sand	<10	10	Non-Aggressive	Non-Aggressive
BH302	0-0.1	LAB DUPLICATE	<10	10	Non-Aggressive	Non-Aggressive
BH303	0-0.2	Fill: Silty Sandy Clay	<10	49	Non-Aggressive	Non-Aggressive
BH304	0-0.2	Fill: Silty Sandy Clay	10	84	Non-Aggressive	Non-Aggressive
BH305	0-0.1	Fill: Silty Sandy Clay	73	4600	Non-Aggressive	Non-Aggressive
BH305	0.3-0.5	Fill: Silty Sandy Clay	26	270	Non-Aggressive	Non-Aggressive
BH306	0-0.3	Fill: Silty Sandy Clay	20	10	Non-Aggressive	Non-Aggressive
BH306	0.5-0.75	Fill: Sandy Clay	<10	130	Non-Aggressive	Non-Aggressive
BH307	0.1-0.3	Fill: Silty Sandy Clay	<10	22	Non-Aggressive	Non-Aggressive
BH307	0.5-0.6	Fill: Silty Sandy Clay	20	150	Non-Aggressive	Non-Aggressive
BH307	0.5-0.6	LAB DUPLICATE	10	150	Non-Aggressive	Non-Aggressive
BH308	0-0.1	Fill: Silty Sandy Clay	10	10	Non-Aggressive	Non-Aggressive
BH308	0.4-0.5	Fill: Sandy Clay	<10	44	Non-Aggressive	Non-Aggressive
Total Number of Samples			14	14	-	-
Minimum Value			<PQL	10	-	-
Maximum Value			73	4600	-	-

Classification is based on Soil condition 'B' - low permeability soils (e.g. silts & clays) or all soils above groundwater.

Sulfate Values	Classification for Concrete Piles
<5,000	Non-Aggressive
5,000 - 10,000	Mildly Aggressive
10,000 - 20,000	Moderately Aggressive
>20,000	Severely Aggressive

Chloride Values	Classification for Steel Piles
<5,000	Non-Aggressive
5,000 - 20,000	Non-Aggressive
20,000 - 50,000	Mildly Aggressive
>50,000	Moderately Aggressive

TABLE F
SUMMARY OF SOIL LABORATORY RESULTS - CEC & ESP

Borehole Number	Sample Depth (m)	Sample Description	Exchangeable Ca	Exchangeable K	Exchangeable Mg	Exchangeable Na	CEC	ESP	Ca:Mg
			(meq/100g)					%	
BH301	0-0.2	Fill: Silty Sandy Clay	29	0.4	1.1	0.2	31	0.6%	26.36:1
BH304	0-0.2	Fill: Silty Sandy Clay	32	0.6	1.3	0.4	34	1.2%	24.62:1
BH306	0-0.3	Fill: Silty Sandy Clay	15	0.3	1	<0.1	16	0.6%	15.0:1
BH307	0.1-0.3	Fill: Silty Sandy Clay	29	0.4	1	<0.1	30	0.3%	29.0:1
BH307	0.1-0.3	LAB DUPLICATE	28	0.4	0.9	<0.1	29	0.3%	31.11:1
Total Number of Samples			5	5	5	5	5	5	5
Minimum Value			15.00	0.30	0.90	<PQL	16.0	0.3%	15.0 :1
Maximum Value			32.00	0.60	1.30	0.40	34.0	1.2%	31.11 :1

ESP Value	Sodicity Rating
< 5%	Non-Sodic
5% to 15%	Sodic
> 15%	Highly Sodic

ABBREVIATIONS AND EXPLANATIONS FOR ACID SULFATE SOIL TABLE

Abbreviations used in the Tables:

ANC_{BT}	Acid Neutralising Capacity - Back Titration
ANCE	Excess Acid Neutralising Capacity
$CaCO_3$	Calcium Carbonate
kg	kilogram
mol H^+/t	moles hydrogen per tonne
pHF	Field pH
pHFOX	Field peroxide pH
pH_{KCl}	Pottasium chloride pH
S	Sulfur
SCr	The symbol given to the result from the Chromium Reducible Sulfur method
S_{NAS}	Net Acid Soluble Sulfur
% w/w	Percentage by mass

Results have been assessed against the criteria specified in Table 1.1 of National Acid sulfate Soil Guidance - National acid sulfate soil identification and laboratory method manual. Water Quality Australia. June 2018

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TABLE A
SUMMARY OF LABORATORY RESULTS - ACID SULFATE SOIL ANALYSIS

Soil Texture	Medium	Analysis	pH_F and pH_{FOX}				pH_{KCL}	Actual Acidity (Titratable Actual Acidity - TAA)	Potential Sulfidic Acidity		Retained Acidity	Acid Neutralising Capacity (ANC_{BT})	a-Net Acidity without ANCE	s-Net Acidity without ANCE	Liming Rate - without ANCE
			pH_F	pH_{FOX}	Reaction	pH_F - pH_{FOX}		(mol H^+/t)	(% SCr)	(mol H^+/t)	(%S_{NAS})	(% $CaCO_3$)	(mol H^+/t)	(%w/w S)	(kg $CaCO_3$/tonne)
National Acid Sulfate Soils Guidance (2018)			-	-	-	-	-	-	-	-	-	-	36	0.06	-
Sample Reference	**Sample Depth (m)**	**Sample Description**													
BH301	0-0.2	Fill: Silty Sandy Clay	8.2	5.2	Volcanic reaction	3	8.2	<5	0.008	5	NA	1.6	5.0	0.01	<0.75
BH302	0-0.1	Fill: Silty Sand	8.2	6.3	Low reaction	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH303	0-0.2	Fill: Silty Sandy Clay	8.2	7.6	Volcanic reaction	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH304	0-0.2	Fill: Silty Sandy Clay	8.6	6.4	Low reaction	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH305	0-0.1	Fill: Silty Sandy Clay	7.9	6	Low reaction	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH305	0.3-0.5	Fill: Silty Sandy Clay	8.5	6.5	Low reaction	2	8.7	<5	0.02	15	NA	1.4	15.0	0.02	1.1
BH305 (LAB_DUP)	0.3-0.5	Fill: Silty Sandy Clay	NA	NA	NA	NA	8.8	<5	0.02	15	NA	1.4	15.0	0.02	1.1
BH306	0-0.3	Fill: Silty Sandy Clay	7.9	5.6	Low reaction	2.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH306	0.5-0.75	Fill: Sandy Clay	8.4	6.3	Low reaction	2.1	8.6	<5	0.02	12	NA	1.2	12.0	0.02	0.94
BH307	0.1-0.3	Fill: Silty Sandy Clay	8.3	6.2	Low reaction	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH307	0.5-0.6	Fill: Silty Sandy Clay	8.6	5.3	Low reaction	3.3	9.1	<5	0.01	8	NA	1.3	7.5	0.01	<0.75
BH308	0-0.1	Fill: Silty Sandy Clay	8	5.5	Low reaction	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH308	0.4-0.5	Fill: Sandy Clay	8.6	6.2	Low reaction	2.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Number of Samples			12	12	-	12	5	5	5	5	-	5	5	5	3
Minimum Value			7.9	5.2	-	0.6	8.2	<5	0.008	5	-	1.20	5.0	0.008	0.94
Maximum Value			8.6	7.6	-	3.3	9.1	-	0.02	15	-	1.60	15.0	0.024	1.1

Values Exceeding Action Criteria **VALUE**

Appendix D: Information on Acid Sulfate Soils (ASS)

A. Background

Acid Sulfate Soil (ASS) is formed from iron rich alluvial sediments and sulfate (found in seawater) in the presence of sulfate reducing bacteria and plentiful organic matter. These conditions are generally found in mangroves, salt marsh vegetation or tidal areas and at the bottom of coastal rivers and lakes. ASS materials are distinguished from other soil or sediment materials (referred to as 'soil materials' throughout the National Acid Sulfate Soils Guidance) by having properties and behaviour that have either:

1) Been affected considerably by the oxidation of Reduced Inorganic Sulfur (RIS), or
2) The capacity to be affected considerably by the oxidation of their RIS constituents.

Acid sulfate soil materials include potential acid sulfate soils (PASS or sulfidic soil materials) and actual acid sulfate soils (AASS or sulfuric soil materials). These are often found in the same profile, with AASS overlying PASS. PASS and AASS are defined further below:

- PASS are soil materials which contain RIS such as pyrite. The field pH of these soils in their undisturbed state is usually more than pH 4 and is commonly neutral to alkaline (pH 7–9). These soil materials are invariably saturated with water in their natural state. Their texture may be peat, clay, loam, silt or sand and is often dark grey in colour and soft in consistence, but these materials may also exhibit colours that are dark brown, or medium to pale grey to white; and
- AASS are soil materials which contained RIS such as pyrite that have undergone oxidation. This oxidation results in low pH (that is pH less than 4) and often a yellow (jarosite) and/or orange to red mottling (ferric iron oxides) in the soil profile. Actual ASS contains Actual Acidity, and commonly also contains RIS (the source of Potential Sulfuric Acidity) as well as Retained Acidity.

B. The ASS Planning Maps

The ASS planning maps provide an indication of the relative potential for disturbance of ASS to occur at locations within the council area. These maps do not provide an indication of the actual occurrence of ASS at a site or the likely severity of the conditions.

The maps are divided into five classes dependent upon the type of activities/works that if undertaken, may represent an environmental risk through the development of acidic conditions associated with ASS:

Table 1: Risk Classes

Risk Class	Description
Class 1	All works.
Class 2	All works below existing ground level and works by which the water table is likely to be lowered.
Class 3	Works at depths beyond 1m below existing ground level or works by which the water table is likely to be lowered beyond 1m below existing ground level.
Class 4	Works at depths beyond 2m below existing ground level or works by which the water table is likely to be lowered beyond 2m below existing ground level.
Class 5	Works within 500m of adjacent Class 1, 2, 3, 4 land which are likely to lower the water table below 1m AHD on the adjacent land.

C. The ASS Risk Maps

The ASS risk maps provide an indication of the probability of occurrence of ASS materials at a particular location based on interpretation from geological and soil landscape maps. The maps provide classes based on high probability, low probability, no known occurrence and areas of disturbed terrain (site specific assessment necessary) and the likely depth at which ASS materials are likely to be encountered.

D. Interpretation of ASS Field Tests

Tables A1 and A2 below provide some guidance on the interpretation of pH_F and pH_{FOX} test results, as detailed in the *National Acid Sulfate Soil Guidance: National acid sulfate soils sampling and identification methods manual* (2018):

Table A1: Interpretation of some pH_F test ranges

pH value	Result	Comments
$pH_F \leq 4$, jarosite not observed in the soil layer/horizon	May indicate an AASS indicating previous oxidation of RIS or may indicate naturally occurring, non ASS soils.	Generally not conclusive as naturally occurring, non ASS soils, such as many organic soils (for example peats) and heavily leached soils, often also return $pH_F \leq 4$.
$pH_F \leq 4$, jarosite observed in the soil layer/horizon	The soil material is an AASS.	Jarosite and other iron precipitate minerals in ASS such as schwertmannite require a pH < 4 to form and indicate prior oxidation of RIS.
$pH_F > 7$	Expected in waterlogged, unoxidised, or poorly drained soils.	Marine muds commonly have a pH > 7 which reflects a seawater (pH 8.2) influence. Oxidation of samples with H_2O_2 can help indicate if the soil materials contain RIS.

Source: Adapted from DER (2015a).

Table A2: Interpretation of pH_{FOX} test results

pH value and reaction	Result	Comments
Strong reaction of soil with H_2O_2 (that is X or V)	Useful indicator of the presence of RIS but cannot be used alone	Organic rich substrates such as peat and coffee rock, and soil constituents like manganese oxides, can also cause a reaction. Care must be exercised in interpreting these results. Laboratory analyses are required to confirm if appreciable RIS is present.
pH_{FOX} value at least one unit below field pH_F and strong reaction with H_2O_2 (that is X or V)	May indicate PASS	The difference between pH_F and pH_{FOX} is termed the ΔpH. Generally the larger the ΔpH the more indicative of PASS. The lower the final pH_{FOX} the better the likelihood of an appreciable RIS content. For example, a change from pH_F of 8 to pH_{FOX} of 7 (that is a ΔpH of 1) would not indicate PASS, however, a unit change from pH_F of 3.5 to pH_{FOX} of 2.5 would be indicative of PASS. Laboratory analyses are required to confirm if appreciable RIS is present.
$pH_{FOX} < 3$, large ΔpH and a strong reaction with H_2O_2 (that is X or V)	Strongly indicates PASS	The lower the pH_{FOX} below 3, the greater the likelihood that appreciable RIS is present. A combination of all three parameters – pH_{FOX}, ΔpH and reaction strength – gives the

pH value and reaction	Result	Comments
		best indication of PASS. Laboratory analyses are required to confirm that appreciable RIS is present.
A pH_{FOX} 3–4 and Low, Medium or Strong reaction with H_2O_2	Inconclusive	RIS may be present; however, organic matter may also be responsible for the decrease in pH. Laboratory analyses are required to confirm the presence of RIS.
pH_{FOX} 4–5	Inconclusive	RIS may be present in small quantities, or poorly reactive under rapid oxidation, or the sample may contain shell/ carbonate which neutralises some or all acid produced on oxidation. Equally, the pH_{FOX} value may be due to the production of organic acids with no RIS present. Laboratory analyses are required to confirm if appreciable RIS is present.
pH_{FOX} > 5, small or no ΔpH, but Low, Medium or Strong reaction with H_2O_2	Inconclusive	For neutral to alkaline pHF with shell or white concretions, the fizz test with 1 M HCl can be used to identify the presence of carbonates. Laboratory analyses are required to confirm if appreciable RIS is present and further testing is required to confirm that effective self-neutralising materials are present.

Source: Adapted from DER (2015a).

Appendix E: Borehole Logs

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BOREHOLE LOG

Borehole No. 301 1 / 1

SDUP301: 0-0.2m

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SHARED PATHWAY

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No.: 37756LF **Method:** HAND AUGER **R.L. Surface:** ~50.8 m

Date: 5/8/25 **Datum:** AHD

Plant Type: - **Logged/Checked By:** J.L.O./O.F.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■			■	REFER TO DCP TEST RESULTS SHEET	50	0			FILL: Silty sandy clay, low plasticity, brown and grey brown, fine to coarse grained sand, with concrete fragments and slag, trace of organic matter and root fibres.	w>PL			GRASS COVER
	■										W			APPEARS WELL COMPACTED
	■			■						FILL: Sand, fine to coarse grained, grey.				SCREEN: 10.5kg, 0-0.2m, NO FCF
										FILL: Gravel, fine to coarse grained, grey, igneous.				INSUFFICIENT RETURN FOR BULK SCREEN SAMPLE
						49	1			END OF BOREHOLE AT 0.50 m				HAND AUGER REFUSAL ON OBSTUCTION IN THE FILL
						48	2							
						47	3							
						46	4							
						45	5							
						44	6							

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BOREHOLE LOG

Borehole No. 302

1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SHARED PATHWAY

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No.: 37756LF **Method:** HAND AUGER **R.L. Surface:** ~50.0 m

Date: 5/8/25 **Datum:** AHD

Plant Type: - **Logged/Checked By:** J.L.O./O.F.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■			■						FILL: Silty sand, fine to coarse grained, brown, with fine to coarse grained ironstone and sandstone gravel, concrete fragments, trace of clay fines.	M			GRASS COVER
										END OF BOREHOLE AT 0.20 m				SCREEN: 12.65kg, 0-0.2m, NO FCF
														HAND AUGER REFUSAL ON CONCRETE
						49	1							
						48	2							
						47	3							
						46	4							
						45	5							
						44	6							

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BOREHOLE LOG

Borehole No. 303

1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SHARED PATHWAY

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No.: 37756LF **Method:** HAND AUGER **R.L. Surface:** ~50.3 m

Date: 5/8/25 **Datum:** AHD

Plant Type: - **Logged/Checked By:** J.L.O./O.F.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
▽	■			■	REFER TO DCP TEST RESULTS SHEET	50				FILL: Silty sandy clay, low plasticity, grey brown, fine to coarse grained sand, trace of fine to coarse grained igneous gravel, and root fibres.	w>PL			APPEARS POORLY COMPACTED
										FILL: Sandy clay, low plasticity, brown, trace of concrete fragments, silt fines and slag.				SCREEN: 10.9kg, 0-0.1m, NO FCF
										END OF BOREHOLE AT 0.50 m				SCREEN: 4.35kg(<10L), 0.2-0.5m, NO FCF
						49	1							HAND AUGER REFUSAL ON OBSTRUCTION IN THE FILL
						48	2							
						47	3							
						46	4							
						45	5							
						44	6							

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BOREHOLE LOG

Borehole No. 304

1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SHARED PATHWAY

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No.: 37756LF **Method:** HAND AUGER **R.L. Surface:** ~50.4 m

Date: 5/8/25 **Datum:** AHD

Plant Type: - **Logged/Checked By:** J.L.O./O.F.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■				REFER TO DCP TEST RESULTS SHEET	50	0			FILL: Silty clay, low plasticity, grey brown, fine to coarse grained, with fine to coarse grained ironstone and sandstone gravel, concrete fragments, organic matter and root fibres.	w>PL			APPEARS POORLY COMPACTED
														SCREEN: 10.05kg, 0-0.2m, NO FCF
						49	1			END OF BOREHOLE AT 0.30 m				HAND AUGER REFUSAL ON OBSTRUCTION IN THE FILL
						48	2							
						47	3							
						46	4							
						45	5							
						44	6							

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BOREHOLE LOG

Borehole No. 305 1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SHARED PATHWAY

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No.: 37756LF **Method:** HAND AUGER **R.L. Surface:** ~50.9 m

Date: 5/8/25 **Datum:** AHD

Plant Type: - **Logged/Checked By:** J.L.O./O.F.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■			■						FILL: Silty sandy clay, low plasticity, grey brown, fine to coarse grained sand, with fine to coarse grained igneous gravel, and root fibres.	w~PL w<PL			GRASS COVER SCREEN: 8.95kg(<10L), 0-0.1m, NO FCF
						50	1			as above, but brown, trace of brick and concrete fragments and root fibres. END OF BOREHOLE AT 0.50 m				HAND AUGER REFUSAL ON OBSTRUCTION IN THE FILL
						49	2							
						48	3							
						47	4							
						46	5							
						45	6							
						44								

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BOREHOLE LOG

Borehole No. 306 1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SHARED PATHWAY

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No.: 37756LF **Method:** HAND AUGER **R.L. Surface:** ~51.0 m

Date: 5/8/25 **Datum:** AHD

Plant Type: - **Logged/Checked By:** J.L.O./O.F.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION					REFER TO DCP TEST RESULTS SHEET					FILL: Silty sandy clay, low plasticity, brown, fine to medium grained sand, trace of fine to coarse grained ironstone gravel, and root fibres.	w<PL			APPEARS POORLY COMPACTED
											w>PL		270	
										FILL: Silty clay, low to medium plasticity, light grey, red brown and brown.			230	SCREEN: 10.45kg, 0-0.3m, NO FCF
										FILL: Sandy clay, low plasticity, grey brown, fine to medium grained sand, with siltstone, trace of fine to coarse grained ironstone and sandstone gravel, and concrete fragments.			240	SCREEN: 5.5kg(<10L), 0.5-0.75m, NO FCF
						50	1							GEOFABRIC AT 0.5m DEPTH
						49	2			END OF BOREHOLE AT 0.75 m				HAND AUGER REFUSAL ON OBSTRUCTION IN THE FILL
						48	3							
						47	4							
						46	5							
						45	6							

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BOREHOLE LOG

Borehole No. 307

1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SHARED PATHWAY

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No.: 37756LF **Method:** HAND AUGER **R.L. Surface:** ~50.5 m

Date: 5/8/25 **Datum:** AHD

Plant Type: - **Logged/Checked By:** J.L.O./O.F.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■			■		50				FILL: Silty sandy clay, low plasticity, grey brown and brown, fine to coarse grained sand, trace of ironstone gravel, concrete fragments and root fibres.	w~PL			GRASS COVER
										as above, but light grey brown and brown, fine to coarse grained sand, trace of fine to coarse grained ironstone and siltstone gravel, concrete fragments and root fibres.				SCREEN: 10.35kg, 0-0.1m ,NO FCF
														GEO FABRIC AT 0.3m DEPTH
														SCREEN: 6.55kg(<10L), 0.4-0.6m, NO FCF
						49	1			END OF BOREHOLE AT 0.60 m				HAND AUGER REFUSAL ON OBSTRUCTION IN THE FILL
						48	2							
						47	3							
						46	4							
						45	5							
						44	6							

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BOREHOLE LOG

Borehole No. 308

1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SHARED PATHWAY

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No.: 37756LF **Method:** HAND AUGER **R.L. Surface:** ~51.6 m

Date: 5/8/25 **Datum:** AHD

Plant Type: - **Logged/Checked By:** J.L.O./O.F.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION	■			■	REFER TO DCP TEST RESULTS SHEET	51	0			FILL: Silty sandy clay, low plasticity, brown, fine to medium grained sand, trace of organic matter and root fibres.	w~PL			APPEARS POORLY COMPACTED
										FILL: Sandy clay, low plasticity, light grey brown and grey brown, with silt fines, trace of fine to coarse grained ironstone and sandstone gravel, and slag.	w>PL			SCREEN: 10.10kg, 0-0.1m, NO FCF
						50	1			END OF BOREHOLE AT 0.50 m				HAND AUGER REFUSAL ON OBSTRUCTION IN THE FILL
						49	2							
						48	3							
						47	4							
						46	5							
						45	6							

ENVIRONMENTAL LOGS EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 *'Geotechnical Site Investigations'*. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤ 25	≤ 12
Soft (S)	> 25 and ≤ 50	> 12 and ≤ 25
Firm (F)	> 50 and ≤ 100	> 25 and ≤ 50
Stiff (St)	> 100 and ≤ 200	> 50 and ≤ 100
Very Stiff (VSt)	> 200 and ≤ 400	> 100 and ≤ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable – soil crumbles	

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the

structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) *'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'*.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N > 30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N_c' on the borehole logs, together with the number of blows per 150mm penetration.

LOGS

The borehole or test pit logs presented herein are an interpretation of the subsurface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible to justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.

SYMBOL LEGENDS

SOIL


FILL


TOPSOIL


CLAY (CL, CI, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CI, CH)


SILTY CLAY (CL, CI, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CI, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML, MH)


PEAT AND HIGHLY ORGANIC SOILS (Pt)

ROCK


CONGLOMERATE


SANDSTONE


SHALE/MUDSTONE


SILTSTONE


CLAYSTONE


COAL


LAMINITE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

OTHER MATERIALS


BRICKS OR PAVERS


CONCRETE


ASPHALTIC CONCRETE

CLASSIFICATION OF COARSE AND FINE GRAINED SOILS

Major Divisions		Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Classification	
Coarse grained soil (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 4$ $1 < C_c < 3$
		GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		GM	Gravel-silt mixtures and gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
		GC	Gravel-clay mixtures and gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
	SAND (more than half of coarse fraction is smaller than 2.36mm)	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	$C_u > 6$ $1 < C_c < 3$
		SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
		SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	N/A
		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	

Major Divisions		Group Symbol	Typical Names	Field Classification of Silt and Clay			Laboratory Classification
				Dry Strength	Dilatancy	Toughness	% < 0.075mm
ine grained soils (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT and CLAY (low to medium plasticity)	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
		CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY (high plasticity)	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
		CH	Inorganic clay of high plasticity	High to very high	None	High	Above A line
		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
	Highly organic soil	Pt	Peat, highly organic soil	–	–	–	–

Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity $Cu > 4$ and the coefficient of curvature $1 < C_c < 3$. Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_U = \frac{D_{60}}{D_{10}} \qquad and \qquad C_C = \frac{(D_{30})^2}{D_{10}\, D_{60}}$$

Where D_{10}, D_{30} and D_{60} are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

NOTES:

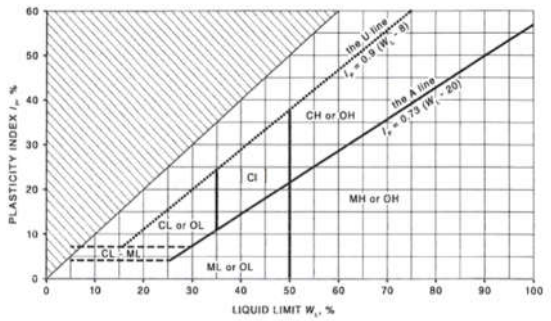
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

2 Where the grading is determined from laboratory tests, it is defined by coefficients of curvature (C_c) and uniformity (C_u) derived from the particle size distribution curve.

3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

4 The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.

Modified Casagrande Chart for Classifying Silts and Clays according to their Behaviour



LOG SYMBOLS

Log Column	Symbol	Definition
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.
		Extent of borehole/test pit collapse shortly after drilling/excavation.
		Groundwater seepage into borehole or test pit noted during drilling or excavation.
Samples	ES	Sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos analysis.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
	PFAS	Soil sample taken over depth indicated, for analysis of Per- and Polyfluoroalkyl Substances.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	w > PL $w \approx$ PL w < PL $w \approx$ LL w > LL	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. Moisture content estimated to be near liquid limit. Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D M W	DRY – runs freely through fingers. MOIST – does not run freely but no free water visible on soil surface. WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS S F St VSt Hd Fr ( )	VERY SOFT – unconfined compressive strength ≤ 25kPa. SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa. FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa. STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa. VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa. HARD – unconfined compressive strength > 400kPa. FRIABLE – strength not attainable, soil crumbles. Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ( )	**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)** VERY LOOSE ≤ 15 / 0 – 4 LOOSE > 15 and ≤ 35 / 4 – 10 MEDIUM DENSE > 35 and ≤ 65 / 10 – 30 DENSE > 65 and ≤ 85 / 30 – 50 VERY DENSE > 85 / > 50 Bracketed symbol indicates estimated density based on ease of drilling or other assessment.

Log Column	Symbol	Definition
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Twin pronged tungsten carbide bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.
	Soil Origin	The geological origin of the soil can generally be described as: RESIDUAL – soil formed directly from insitu weathering of the underlying rock. No visible structure or fabric of the parent rock. EXTREMELY WEATHERED – soil formed directly from insitu weathering of the underlying rock. Material is of soil strength but retains the structure and/or fabric of the parent rock. ALLUVIAL – soil deposited by creeks and rivers. ESTUARINE – soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents. MARINE – soil deposited in a marine environment. AEOLIAN – soil carried and deposited by wind. COLLUVIAL – soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits. LITTORAL – beach deposited soil.

Classification of Material Weathering

Term		Abbreviation		Definition
Residual Soil		RS		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely Weathered		XW		Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
Highly Weathered	Distinctly Weathered (Note 1)	HW	DW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately Weathered		MW		The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly Weathered		SW		Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh		FR		Rock shows no sign of decomposition of individual minerals or colour changes.

NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: *'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores'*. There is some change in rock strength.

Rock Material Strength Classification

Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Guide to Strength	
			Point Load Strength Index $Is_{(50)}$ (MPa)	Field Assessment
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium Strength	M	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High Strength	H	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

Appendix F: Laboratory Reports & COC Documents

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CERTIFICATE OF ANALYSIS 387835

Client Details

Client	JK Environments
Attention	Vittal Boggaram
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E37757B Rouse Hill**
Number of Samples	12 Soil
Date samples received	06/08/2025
Date completed instructions received	06/08/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	13/08/2025
Date of Issue	13/08/2025

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Diego Bigolin, Inorganics Supervisor
Nancy Zhang, Laboratory Manager, Sydney
Tabitha Roberts, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

Texture and Salinity*						
Our Reference		387835-1	387835-2	387835-3	387835-4	387835-5
Your Reference	UNITS	BH301	BH302	BH303	BH304	BH305
Depth		0-0.2	0-0.1	0-0.2	0-0.2	0-0.1
Date Sampled		05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/08/2025	08/08/2025	08/08/2025	08/08/2025	08/08/2025
Date analysed	-	08/08/2025	08/08/2025	08/08/2025	08/08/2025	08/08/2025
Electrical Conductivity 1:5 soil:water	µS/cm	170	110	170	190	1,900
Texture Value	-	9.0	9.0	8.0	7.0	9.0
Texture	-	CLAY LOAM	CLAY LOAM	LIGHT MEDIUM CLAY	MEDIUM CLAY	CLAY LOAM
ECe	dS/m	<2	<2	<2	<2	17
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	HIGHLY SALINE

Texture and Salinity*						
Our Reference		387835-6	387835-7	387835-8	387835-9	387835-10
Your Reference	UNITS	BH305	BH306	BH306	BH307	BH307
Depth		0.3-0.5	0-0.3	0.5-0.75	0.1-0.3	0.5-0.6
Date Sampled		05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/08/2025	08/08/2025	08/08/2025	08/08/2025	08/08/2025
Date analysed	-	08/08/2025	08/08/2025	08/08/2025	08/08/2025	08/08/2025
Electrical Conductivity 1:5 soil:water	µS/cm	300	90	190	150	220
Texture Value	-	9.0	9.0	8.0	9.0	7.0
Texture	-	CLAY LOAM	CLAY LOAM	LIGHT MEDIUM CLAY	CLAY LOAM	MEDIUM CLAY
ECe	dS/m	2.7	<2	<2	<2	<2
Class	-	SLIGHTLY SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity*			
Our Reference		387835-11	387835-12
Your Reference	UNITS	BH308	BH308
Depth		0-0.1	0.4-0.5
Date Sampled		05/08/2025	05/08/2025
Type of sample		Soil	Soil
Date prepared	-	08/08/2025	08/08/2025
Date analysed	-	08/08/2025	08/08/2025
Electrical Conductivity 1:5 soil:water	µS/cm	240	160
Texture Value	-	9.0	9.0
Texture	-	CLAY LOAM	CLAY LOAM
ECe	dS/m	2.1	<2
Class	-	SLIGHTLY SALINE	NON SALINE

Misc Inorg - Soil						
Our Reference		387835-1	387835-2	387835-3	387835-4	387835-5
Your Reference	UNITS	BH301	BH302	BH303	BH304	BH305
Depth		0-0.2	0-0.1	0-0.2	0-0.2	0-0.1
Date Sampled		05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/08/2025	08/08/2025	08/08/2025	08/08/2025	08/08/2025
Date analysed	-	08/08/2025	08/08/2025	08/08/2025	08/08/2025	08/08/2025
pH 1:5 soil:water	pH Units	7.6	8.4	8.0	8.3	7.1
Chloride, Cl 1:5 soil:water	mg/kg	<10	<10	<10	10	73
Sulphate, SO4 1:5 soil:water	mg/kg	28	10	49	84	4,600
Resistivity in soil*	ohm m	57	88	60	52	5.3

Misc Inorg - Soil						
Our Reference		387835-6	387835-7	387835-8	387835-9	387835-10
Your Reference	UNITS	BH305	BH306	BH306	BH307	BH307
Depth		0.3-0.5	0-0.3	0.5-0.75	0.1-0.3	0.5-0.6
Date Sampled		05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/08/2025	08/08/2025	08/08/2025	08/08/2025	08/08/2025
Date analysed	-	08/08/2025	08/08/2025	08/08/2025	08/08/2025	08/08/2025
pH 1:5 soil:water	pH Units	8.3	7.3	8.2	8.2	9.2
Chloride, Cl 1:5 soil:water	mg/kg	26	20	<10	<10	20
Sulphate, SO4 1:5 soil:water	mg/kg	270	10	130	22	150
Resistivity in soil*	ohm m	34	110	52	66	45

Misc Inorg - Soil			
Our Reference		387835-11	387835-12
Your Reference	UNITS	BH308	BH308
Depth		0-0.1	0.4-0.5
Date Sampled		05/08/2025	05/08/2025
Type of sample		Soil	Soil
Date prepared	-	08/08/2025	08/08/2025
Date analysed	-	08/08/2025	08/08/2025
pH 1:5 soil:water	pH Units	7.2	8.3
Chloride, Cl 1:5 soil:water	mg/kg	10	<10
Sulphate, SO4 1:5 soil:water	mg/kg	10	44
Resistivity in soil*	ohm m	42	62

CEC					
Our Reference		387835-1	387835-4	387835-7	387835-9
Your Reference	UNITS	BH301	BH304	BH306	BH307
Depth		0-0.2	0-0.2	0-0.3	0.1-0.3
Date Sampled		05/08/2025	05/08/2025	05/08/2025	05/08/2025
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	13/08/2025	13/08/2025	13/08/2025	13/08/2025
Date analysed	-	13/08/2025	13/08/2025	13/08/2025	13/08/2025
Exchangeable Ca	meq/100g	29	32	15	29
Exchangeable K	meq/100g	0.4	0.6	0.3	0.4
Exchangeable Mg	meq/100g	1.1	1.3	1.0	1
Exchangeable Na	meq/100g	0.2	0.4	<0.1	<0.1
Cation Exchange Capacity	meq/100g	31	34	16	30

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25oC in accordance with APHA 22nd ED 2510 and Rayment & Lyons. Resistivity is calculated from Conductivity (non NATA). Resistivity (calculated) may not correlate with results otherwise obtained using Resistivity-Current method, depending on the nature of the soil being analysed.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-123	Determined using a "Texture by Feel" method.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-OES analytical finish.

QUALITY CONTROL: Texture and Salinity*						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			08/08/2025	[NT]	[NT]	[NT]	[NT]	08/08/2025	[NT]
Date analysed	-			08/08/2025	[NT]	[NT]	[NT]	[NT]	08/08/2025	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	387835-3
Date prepared	-			08/08/2025	2	08/08/2025	08/08/2025		08/08/2025	08/08/2025
Date analysed	-			08/08/2025	2	08/08/2025	08/08/2025		08/08/2025	08/08/2025
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	2	8.4	8.4	0	101	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	2	<10	<10	0	93	98
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	2	10	10	0	101	82
Resistivity in soil*	ohm m	1	Inorg-002	<1	2	88	77	13	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	10	08/08/2025	08/08/2025		[NT]	[NT]
Date analysed	-			[NT]	10	08/08/2025	08/08/2025		[NT]	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	10	9.2	8.8	4	[NT]	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	[NT]	10	20	10	67	[NT]	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	[NT]	10	150	150	0	[NT]	[NT]
Resistivity in soil*	ohm m	1	Inorg-002	[NT]	10	45	47	4	[NT]	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	387835-7
Date prepared	-			13/08/2025	9	13/08/2025	13/08/2025		13/08/2025	13/08/2025
Date analysed	-			13/08/2025	9	13/08/2025	13/08/2025		13/08/2025	13/08/2025
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	9	29	28	4	97	#
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	9	0.4	0.4	0	98	94
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	9	1	0.9	11	92	95
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	9	<0.1	<0.1	0	101	89

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

Report Comments

CEC - # High spike recovery was obtained for this sample. The sample was re-digested and re-spiked and the high recovery was confirmed. This is due to matrix interferences. However, an acceptable recovery was obtained for the LCS.

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SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Vittal Boggaram

Sample Login Details

Your reference	E37757B Rouse Hill
Envirolab Reference	387835
Date Sample Received	06/08/2025
Date Instructions Received	06/08/2025
Date Results Expected to be Reported	13/08/2025

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	12 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	17
Cooling Method	None
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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Sample ID	Texture and Salinity*	Misc Inorg - Soil	CEC
BH301-0-0.2	✓	✓	✓
BH302-0-0.1	✓	✓	
BH303-0-0.2	✓	✓	
BH304-0-0.2	✓	✓	✓
BH305-0-0.1	✓	✓	
BH305-0.3-0.5	✓	✓	
BH306-0-0.3	✓	✓	✓
BH306-0.5-0.75	✓	✓	
BH307-0.1-0.3	✓	✓	✓
BH307-0.5-0.6	✓	✓	
BH308-0-0.1	✓	✓	
BH308-0.4-0.5	✓	✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E37757B Date Results Required: STANDARD Page: 1 of 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Vittal Boggaram vboggaram@jkenvironments.com.au

Location:	Rouse Hill, Shared Pathway Site	Sample Preserved in Esky on Ice
Sampler:	VR	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	Sample Description	pH	EC	ECe (texture)	Sulphate	Chloride	Resistivity	CEC					
5/08/2025	1	BH301	0-0.2	P	Fill: Silty Sandy Clay	X	X	X	X	X	X	X					
5/08/2025	2	BH302	0-0.1	P	Fill: Silty Sand	X	X	X	X	X	X						
5/08/2025	3	BH303	0-0.2	P	Fill: Silty Sandy Clay	X	X	X	X	X	X						
5/08/2025	4	BH304	0-0.2	P	Fill: Silty Sandy Clay	X	X	X	X	X	X	X					
5/08/2025	5	BH305	0-0.1	P	Fill: Silty Sandy Clay	X	X	X	X	X	X						
5/08/2025	6	BH305	0.3-0.5	P	Fill: Silty Sandy Clay	X	X	X	X	X	X						
5/08/2025	7	BH306	0-0.3	P	Fill: Silty Sandy Clay	X	X	X	X	X	X	X					
5/08/2025	8	BH306	0.5-0.75	P	Fill: Sandy Clay	X	X	X	X	X	X						
5/08/2025	9	BH307	0.1-0.3	P	Fill: Silty Sandy Clay	X	X	X	X	X	X	X					
5/08/2025	10	BH307	0.5-0.6	P	Fill: Silty Sandy Clay	X	X	X	X	X	X						
5/08/2025	11	BH308	0-0.1	P	Fill: Silty Sandy Clay	X	X	X	X	X	X						
5/08/2025	12	BH308	0.4-0.5	P	Fill: Sandy Clay	X	X	X	X	X	X						

ENVIROLAB GROUP
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 387835
Date Received: 6/8/25
Time Received: 1510
Received By: VG
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag			
Relinquished By: VB	Date: 6/08/2025	Time: 12:00	Received By: ENS SYD	Date: 6/8/25

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CERTIFICATE OF ANALYSIS 387828

Client Details

Client	JK Environments
Attention	Vittal Boggaram
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E37757B Rouse Hill**
Number of Samples	12 Soil
Date samples received	06/08/2025
Date completed instructions received	06/08/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	13/08/2025
Date of Issue	13/08/2025

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Nick Sarlamis, Assistant Operation Manager

Authorised By
Nancy Zhang, Laboratory Manager

sPOCAS field test						
Our Reference		387828-1	387828-2	387828-3	387828-4	387828-5
Your Reference	UNITS	BH301	BH302	BH303	BH304	BH305
Depth		0-0.2	0-0.1	0-0.2	0-0.2	0-0.1
Date Sampled		05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/08/2025	06/08/2025	06/08/2025	06/08/2025	06/08/2025
Date analysed	-	11/08/2025	11/08/2025	11/08/2025	11/08/2025	11/08/2025
pH_F (field pH test)	pH Units	8.2	8.2	8.2	8.6	7.9
pH_{FOX} (field peroxide test)	pH Units	5.2	6.3	7.6	6.4	6.0
Reaction Rate*	-	Volcanic reaction	Low reaction	Volcanic reaction	Low reaction	Low reaction

sPOCAS field test						
Our Reference		387828-6	387828-7	387828-8	387828-9	387828-10
Your Reference	UNITS	BH305	BH306	BH306	BH307	BH307
Depth		0.3-0.5	0-0.3	0.5-0.75	0.1-0.3	0.5-0.6
Date Sampled		05/08/2025	05/08/2025	05/08/2025	05/08/2025	05/08/2025
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/08/2025	06/08/2025	06/08/2025	06/08/2025	06/08/2025
Date analysed	-	11/08/2025	11/08/2025	11/08/2025	11/08/2025	11/08/2025
pH_F (field pH test)	pH Units	8.5	7.9	8.4	8.3	8.6
pH_{FOX} (field peroxide test)	pH Units	6.5	5.6	6.3	6.2	5.3
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test			
Our Reference		387828-11	387828-12
Your Reference	UNITS	BH308	BH308
Depth		0-0.1	0.4-0.5
Date Sampled		05/08/2025	05/08/2025
Type of sample		Soil	Soil
Date prepared	-	06/08/2025	06/08/2025
Date analysed	-	11/08/2025	11/08/2025
pH_F (field pH test)	pH Units	8.0	8.6
pH_{FOX} (field peroxide test)	pH Units	5.5	6.2
Reaction Rate*	-	Low reaction	Low reaction

Method ID	Methodology Summary
Inorg-063	pH- measured using pH meter and electrode. Soil is oxidised with Hydrogen Peroxide or extracted with water. To ensure accurate results these tests are recommended to be done in the field as pH may change with time thus these results may not be representative of true field conditions.

QUALITY CONTROL: sPOCAS field test						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			06/08/2025	[NT]	[NT]	[NT]	[NT]	06/08/2025	[NT]
Date analysed	-			11/08/2025	[NT]	[NT]	[NT]	[NT]	11/08/2025	[NT]
pH_F (field pH test)	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	99	[NT]
pH_{FOX} (field peroxide test)	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	99	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

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SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Vittal Boggaram

Sample Login Details

Your reference	E37757B Rouse Hill
Envirolab Reference	387828
Date Sample Received	06/08/2025
Date Instructions Received	06/08/2025
Date Results Expected to be Reported	13/08/2025

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	12 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	9
Cooling Method	None
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
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customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	sPOCAS field test
BH301-0-0.2	✓
BH302-0-0.1	✓
BH303-0-0.2	✓
BH304-0-0.2	✓
BH305-0-0.1	✓
BH305-0.3-0.5	✓
BH306-0-0.3	✓
BH306-0.5-0.75	✓
BH307-0.1-0.3	✓
BH307-0.5-0.6	✓
BH308-0-0.1	✓
BH308-0.4-0.5	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E37757B Date Results Required: STANDARD Page: 1 of 1	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Vittal Boggaram vboggaram@jkenvironments.com.au

Location:	Rouse Hill, Shared Pathway Site					Sample Preserved in Esky on Ice										
Sampler:	VR					Tests Required										
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	Sample Description	SCr Suite	pH field test (pHF apHFOX)									
5/08/2025	1	BH301	0-0.2	P	Fill: Silty Sandy Clay		X									
5/08/2025	2	BH302	0-0.1	P	Fill: Silty Sand		X									
5/08/2025	3	BH303	0-0.2	P	Fill: Silty Sandy Clay		X									
5/08/2025	4	BH304	0-0.2	P	Fill: Silty Sandy Clay		X									
5/08/2025	5	BH305	0-0.1	P	Fill: Silty Sandy Clay		X									
5/08/2025	6	BH305	0.3-0.5	P	Fill: Silty Sandy Clay		X									
5/08/2025	7	BH306	0-0.3	P	Fill: Silty Sandy Clay		X									
5/08/2025	8	BH306	0.5-0.75	P	Fill: Sandy Clay		X									
5/08/2025	9	BH307	0.1-0.3	P	Fill: Silty Sandy Clay		X									
5/08/2025	10	BH307	0.5-0.6	P	Fill: Silty Sandy Clay		X									
5/08/2025	11	BH308	0-0.1	P	Fill: Silty Sandy Clay		X									
5/08/2025	12	BH308	0.4-0.5	P	Fill: Sandy Clay		X									

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag			
Relinquished By: VB	Date: 06/08/25	Time: 12:00	Received By:	Date:

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 387828

Date Received: 6/08/25
Time Received: 1500
Received By: TT
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 387828-A

Client Details

Client	JK Environments
Attention	Victoria Reain
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E37757B Rouse Hill**
Number of Samples	Additional analysis
Date samples received	06/08/2025
Date completed instructions received	14/08/2025

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client unless as indicated below in the method summaries. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	21/08/2025
Date of Issue	21/08/2025

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Priya Samarawickrama, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

Acid Sulphate Soil Suite					
Our Reference		387828-A-1	387828-A-6	387828-A-8	387828-A-10
Your Reference	UNITS	BH301	BH305	BH306	BH307
Depth		0-0.2	0.3-0.5	0.5-0.75	0.5-0.6
Date Sampled		05/08/2025	05/08/2025	05/08/2025	05/08/2025
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	06/08/2025	06/08/2025	06/08/2025	06/08/2025
Date analysed	-	15/08/2025	15/08/2025	15/08/2025	15/08/2025
pH $_{kcl}$	pH units	8.2	8.7	8.6	9.1
s-TAA pH 6.5	%w/w S	<0.01	<0.01	<0.01	<0.01
TAA pH 6.5	moles H^+ /t	<5	<5	<5	<5
a-Chromium Reducible Sulfur	moles H^+ /t	5	15	12	8
Chromium Reducible Sulfur	%w/w	0.008	0.02	0.02	0.01
S_{KCl}	%w/w S	[NT]	[NT]	[NT]	[NT]
S_{HCl}	%w/w S	[NT]	[NT]	[NT]	[NT]
S_{NAS}	%w/w S	[NT]	[NT]	[NT]	[NT]
ANC_{BT}	% $CaCO_3$	1.6	1.4	1.2	1.3
s-ANC_{BT}	%w/w S	0.51	0.43	0.38	0.42
s-Net Acidity excluding ANC	%w/w S	0.0080	0.024	0.020	0.012
a-Net Acidity excluding ANC	moles H^+ /t	5.0	15	12	7.5
Liming rate excluding ANC	kg $CaCO_3$ /t	<0.75	1.1	0.94	<0.75
s-Net Acidity including ANC	%w/w S	<0.005	<0.005	<0.005	<0.005
a-Net Acidity including ANC	moles H^+ /t	<5	<5	<5	<5
Liming rate including ANC	kg $CaCO_3$ /t	<0.75	<0.75	<0.75	<0.75

Method ID	Methodology Summary
Inorg-068	Determination of Acid Sulphate Soil analysis - a sample is analysed by traditional titration method and ICP-OES analysis. Based on Acid Sulfate Soils Laboratory Methods Guidelines, latest edition. Ideally samples should be received in the laboratory at <4oC. Please refer to SRA for sample temperature on receipt. Samples should also ideally be received within 24 hrs of sampling, otherwise there is the potential for oxidation to occur (as indicated by the lowering of the pH). Freezing the samples may help mitigate the potential for oxidation. There is no documented official holding time for frozen samples, we have assigned an arbitrary 180 days to frozen samples. Neutralising value (NV) of 100% is assumed for liming rate. Net Acidity with ANC calculation should only be used when corroborated by other data that demonstrates the soil material does not experience acidification during complete oxidation under field conditions. The recommendation that the SHCL concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCL results reported.

QUALITY CONTROL: Acid Sulphate Soil Suite						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			06/08/2025	6	06/08/2025	06/08/2025		06/08/2025	[NT]
Date analysed	-			15/08/2025	6	15/08/2025	15/08/2025		15/08/2025	[NT]
pH $_{kcl}$	pH units		Inorg-068	[NT]	6	8.7	8.8	1	98	[NT]
s-TAA pH 6.5	%w/w S	0.01	Inorg-068	<0.01	6	<0.01	<0.01	0	[NT]	[NT]
TAA pH 6.5	moles H^+ /t	5	Inorg-068	<5	6	<5	<5	0	101	[NT]
a-Chromium Reducible Sulfur	moles H^+ /t	3	Inorg-068	<3	6	15	15	0	[NT]	[NT]
Chromium Reducible Sulfur	%w/w	0.005	Inorg-068	<0.005	6	0.02	0.02	0	96	[NT]
S_{KCl}	%w/w S	0.005	Inorg-068	<0.005	6	[NT]	[NT]		[NT]	[NT]
S_{HCl}	%w/w S	0.005	Inorg-068	<0.005	6	[NT]	[NT]		[NT]	[NT]
S_{NAS}	%w/w S	0.005	Inorg-068	<0.005	6	[NT]	[NT]		[NT]	[NT]
ANC_{BT}	% $CaCO_3$	0.05	Inorg-068	<0.05	6	1.4	1.4	0	98	[NT]
s-ANC_{BT}	%w/w S	0.05	Inorg-068	<0.05	6	0.43	0.45	5	[NT]	[NT]
s-Net Acidity excluding ANC	%w/w S	0.005	Inorg-068	<0.005	6	0.024	0.024	0	[NT]	[NT]
a-Net Acidity excluding ANC	moles H^+ /t	5	Inorg-068	<5	6	15	15	0	[NT]	[NT]
Liming rate excluding ANC	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	6	1.1	1.1	0	[NT]	[NT]
s-Net Acidity including ANC	%w/w S	0.005	Inorg-068	<0.005	6	<0.005	<0.005	0	[NT]	[NT]
a-Net Acidity including ANC	moles H^+ /t	5	Inorg-068	<5	6	<5	<5	0	[NT]	[NT]
Liming rate including ANC	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	6	<0.75	<0.75	0	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Air volumes are typically provided by customers (often as flow rate(s) and sampling time(s) and/or simply volumes) sampled or exposure times (determines 'volume' passive badges are exposed to)). Hence in such circumstances the volume measurement is inevitably not covered by Envirolab's NATA accreditation. An exception may occur where Envirolab Newcastle does the sampling where accreditation exists for certain types of sampling and hence volume determination(s). Note air volumes are often used to determine concentrations for dust and/or analyses on filters, sorbents and in impingers. For canister sampling, the air volume is covered by Envirolab's NATA accreditation.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

For Dust Deposit Gauge (DDG) analysis the sampling, sampling period and funnel exposure area do not fall under Envirolab's NATA accreditation (unless the Newcastle laboratory where responsible for the sampling), hence the annotation on the DDG units of reporting.

Urine Analysis - The BEI values listed are taken from the 2022 edition of "TLVs and BEIs Threshold Limits" by ACGIH.

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SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Victoria Reain

Sample Login Details

Your reference	E37757B Rouse Hill
Envirolab Reference	387828-A
Date Sample Received	06/08/2025
Date Instructions Received	14/08/2025
Date Results Expected to be Reported	21/08/2025

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	Additional analysis
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	9
Cooling Method	None
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
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Sample ID	Acid Sulphate Soil Suite	On Hold
BH301-0-0.2	✓	
BH302-0-0.1		✓
BH303-0-0.2		✓
BH304-0-0.2		✓
BH305-0-0.1		✓
BH305-0.3-0.5	✓	
BH306-0-0.3		✓
BH306-0.5-0.75	✓	
BH307-0.1-0.3		✓
BH307-0.5-0.6	✓	
BH308-0-0.1		✓
BH308-0.4-0.5		✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Anna Bui

From: Victoria Reain <VReain@jkenvironments.com.au>
Sent: Thursday, 14 August 2025 3:10 PM
To: Envirolab Sydney Sample Receipt
Cc: Vittal Boggaram
Subject: 387828 - Additional SCr analysis
Attachments: 387828-COC.pdf

Hi Team,

Can we please request additional analysis for SCr testing on the below samples please on standard turnaround (Job Number: 387828 / JKE: E37757B Rouse Hill, Shared Pathway Site):

- BH301 (0-0.2) (lab ref: 1)
- BH305 0.3-0.5) (lab ref: 6)
- BH306 (0.5-0.75) (lab ref: 8)
- BH307 (0.5-0.6) (lab ref: 10)

ELS REF: 387828-A
TAT: STANDARD
DUE: 21/8/25
AB

Any issues please let us know. Thank you.

Regards
Victoria Reain
Environmental Scientist

T: +61 2 9888 5000
D: +61 491 052 833
E: VReain@jkenvironments.com.au
www.jkenvironments.com.au

PO Box 976
NORTH RYDE BC NSW 1670
115 Wicks Road
MACQUARIE PARK NSW 2113

JKEnvironments

Appendix G: Fieldwork Document

JKEnvironments

PID FIELD CALIBRATION FORM

Client:	NSW Health Infastructure
Project:	Detailed Site Investigation
Location:	Proposed Rouse Hill Hospital
Job Number:	E37757B

PID			
Make: Honeywell	Model: PGM7300	Unit: PID - 3	Date of last factory calibration: 19/02/25
Date of calibration: 6/8/25		Name of Calibrator: AR / VR	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: 100.1 ppm		Error in measured reading: ± 0.1 ppm	
Measured reading Acceptable (Yes/No): Yes			
PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			
PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			
PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			
PID			
Make:	Model:	Unit:	Date of last factory calibration:
Date of calibration:		Name of Calibrator:	
Calibration gas: Iso-butylene		Calibration Gas Concentration: 100.0 ppm	
Measured reading: ppm		Error in measured reading: ± ppm	
Measured reading Acceptable (Yes/No):			

Appendix H: Report Explanatory Notes

STANDARD SAMPLING PROCEDURE (SSP)

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by JKE.

The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

A. Groundwater Sampling

Groundwater samples are more sensitive to contamination than soil samples and therefore adhesion to this protocol is particularly important to obtain reliable, reproducible results. The recommendations detailed in AS/NZS 5667.1:1998 are considered to form a minimum standard.

The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed groundwater monitoring wells.

- After monitoring well installation, at least three bore volumes should be pumped from the monitoring wells (well development) to remove any water introduced during the drilling process and/or the water that is disturbed during installation of the monitoring well. This should be completed prior to purging and sampling.
- Groundwater monitoring wells should then be left to recharge for at least three days before purging and sampling. Prior to purging or sampling, the condition of each well should observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.
- Take the groundwater level from the collar of the piezometer/monitoring well using an electronic dip meter. The collar level should be taken (if required) during the site visit using a dumpy level and staff.
- Purging and sampling of piezometers/monitoring wells is done on the same site visit when using micro-purge (or other low flow) techniques.
- Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:
  - Micropore filtration system or Stericup single-use filters (for heavy metals samples);
  - Filter paper for Micropore filtration system; Bucket with volume increments;
  - Sample containers: teflon bottles with 1 ml nitric acid, 75mL glass vials with 1 mL hydrochloric acid, 1 L amber glass bottles;
  - Bucket with volume increments;
  - Flow cell;
  - pH/EC/Eh/T meters;
  - Plastic drums used for transportation of purged water;
  - Esky and ice;
  - Nitrile gloves;
  - Distilled water (for cleaning);
  - Electronic dip meter;
  - Low flow pump pack and associated tubing; and

- Groundwater sampling forms.

- If single-use stericup filtration is not used, clean the Micropore filtration system thoroughly with distilled water prior to use and between each sample. Filter paper should be changed between samples. 0.45um filter paper should be placed below the glass fibre filter paper in the filtration system.
- Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.
- Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.
- Groundwater samples are obtained from the monitoring wells using low flow/micro-purge sampling equipment to reduce the disturbance of the water column and loss of volatiles.
- During pumping to purge the well, the pH, temperature, conductivity, dissolved oxygen, redox potential and groundwater levels are monitored (where possible) using calibrated field instruments to assess the development of steady state conditions. Steady state conditions are generally considered to have been achieved when the difference in the pH measurements was less than 0.2 units and the difference in conductivity was less than 10%.
- All measurements are recorded on specific data sheets.
- Once steady state conditions are considered to have been achieved, groundwater samples are obtained directly from the pump tubing and placed in appropriate glass bottles, BTEX vials or plastic bottles.
- All samples are preserved in accordance with water sampling requirements detailed in the NEPM 2013 and placed in an insulated container with ice. Groundwater samples are preserved by immediate storage in an insulated sample container with ice as outlined in the report text.
- Record the sample on the appropriate log in accordance with AS1726:1993. At the end of each water sampling complete a chain of custody form.

B. <u>Decontamination Procedures for Groundwater Sampling Equipment</u>

- All equipment associated with the groundwater sampling procedure (other than single-use items) should be decontaminated between every sampling location.
- The following equipment and materials are required for the decontamination procedure:
  - Phosphate free detergent;
  - Potable water;
  - Distilled water; and
  - Plastic Sheets or bulk bags (plastic bags).
- Fill one bucket with clean potable water and phosphate free detergent, and one bucket with distilled water.
- Flush potable water and detergent through pump head. Wash sampling equipment and pump head using brushes in the bucket containing detergent until all materials attached to the equipment are removed.
- Flush pump head with distilled water.
- Change water and detergent solution after each sampling location.
- Rinse sampling equipment in the bucket containing distilled water.
- Place cleaned equipment on clean plastic sheets.
- If all materials are not removed by this procedure that equipment should not be used until it has been thoroughly cleaned

QA/QC DEFINITIONS

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)[23] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (H. Keith 1991)[24].

A. Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection limit (MDL) for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations.

"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit" Keith 1991.

B. Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD). Acceptable targets for precision in this report will be less than 50% RPD for concentrations greater than ten times the PQL, less than 75% RPD for concentrations between five and ten times the PQL and less than 100% RPD for concentrations that are less than five times the PQL.

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured. The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes.

The proximity of an averaged result to the true value, where all random errors have been statistically removed. Accuracy is measured by percent recovery. Acceptable limits for accuracy generally lie between 70% to 130% recoveries. Certain laboratory methods may allow for values that lie outside these limits.

D. Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

[23] US EPA, (1994). *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[24] Keith., H, (1991). *Environmental Sampling and Analysis, A Practical Guide*

E. Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms; Sample receipt form;
- All sample results reported; All blank data reported;
- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

F. Comparability

Comparability is the evaluation of the similarity of conditions (eg. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

G. Blanks

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling and analysis.

H. Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

I. Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

J. Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$