REPORT TO

HEALTH INFRASTRUCTURE

ON

DETAILED (STAGE 2) SITE INVESTIGATION

FOR

COOMA HOSPITAL KEY WORKER ACCOMMODATION DEVELOPMENT - STAGE 2

AT

COOMA HOSPITAL, BENT STREET, COOMA, NSW

Date: 21 December 2022
Ref: E30596PTrpt3

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Executive Summary

Health Infrastructure ('the client') commissioned JK Geotechnics (JKG) to undertake a Detailed (Stage 2) Site Investigation (DSI) for the proposed Cooma Hospital Key Worker Accommodation Development – Stage 2 at Cooma Hospital, Bent Street, Cooma, NSW ('the site'). The purpose of the investigation is to make an assessment of site contamination conditions to establish whether remediation is required in the context of the proposed development, with regards to Chapter 4 (Clause 4.6) of State Environmental Planning Policy (Resilience and Hazards) 20211 (formerly known as SEPP55). The site location is shown on Figure 1 and the site boundary is shown on Figure 2, attached in the appendices. The site is located in the central east section of the wider hospital property.

JKG's environmental division (Environmental Investigation Services - EIS) has previously undertaken an Environmental Site Assessment (ESA) of the wider hospital property. A summary of relevant information from this investigation has been included in Section 2. A Sampling Analysis Quality Plan (SAQP) was prepared for the DSI (Ref: E30596PT-SAQP2, dated 15 November 2022). The SAQP is attached in the appendices.

The proposed development for this stage of works includes construction of a two storey, 12 unit block with indoor and outdoor shared space, which is proposed to be positioned in the central east of the existing hospital property (refer to Figure 2). The development is to be utilised for worker accommodation. Selected development plans are provided in the appendices.

The primary aim of the DSI is to characterise the soil contamination conditions in order to assess site risks in relation to contamination and establish whether remediation is required. A secondary aim is to provide preliminary waste classification data for off-site disposal of soil waste which may be generated during the proposed development works.

The DSI objectives are to:

- Provide an appraisal of the past site use(s) based on a review of limited historical records;
- Assess the soil contamination conditions;
- Assess the potential risks posed by contamination to the receptors identified in the Conceptual Site Model (CSM);
- Provide a preliminary waste classification for the in-situ soil; and
- Assess whether the site is suitable or can be made suitable (via remediation) for the proposed development, from a contamination viewpoint; and
- Assess whether further intrusive investigation and/or remediation is required.

The scope of work included the following:

- Review of existing and new site information, including background and site history information from various sources outlined in the report;
- Review and update the CSM;
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The review of site information and a site inspection identified the following as potential contamination sources at the site: imported fill material; use of pesticides; and hazardous building materials in former site buildings (and in existing hospital buildings off-site).

Soil sampling for the DSI was undertaken from eight test pit locations across the site. Fill was encountered to depths of between approximately 0.4m below ground level (BGL) to 1.5mBGL and comprised silty clayey sand or silty sandy clay with inclusions of granite, igneous and quartz gravel, concrete, brick, and ceramic fragments, fibre cement fragments (FCF), clay nodules, sand, ash and root fibres. The fill was underlain by either natural residual soils and/or granite bedrock. Staining and odours were not identified during fieldwork. FCF/asbestos containing materials (ACM) was encountered in fill in one of the eight locations during fieldwork.

[1] *State Environmental Planning Policy (Resilience and Hazards) 2021* (NSW) (referred to as SEPP Resilience and Hazards 2021)

A selection of soil samples was analysed for the contaminants of potential concern (CoPC) identified in the CSM. Asbestos as ACM was encountered at a concentration that was above the health-based SAC in fill soil in one test pit (TP205). ACM was also encountered in one surficial FCF (FCF2).

Based on the Tier 1 risk assessment, the level of contamination identified at the site was assessed to pose a potential risk in the current site configuration and in the context of the proposed development. A Remediation Action Plan (RAP) is required to document the procedure for remediating the site. As a duty of care, and to meet the requirements under Clause 429 of the Work Health and Safety Regulation (2017), an Asbestos Management Plan (AMP) for asbestos in/on soil should be prepared and implemented.

Remediation of the site is required to address the asbestos contamination in fill. We consider that the site can be made suitable for the proposed development provided that the following recommendations are implemented:

1. Prepare an AMP (for asbestos in/on soil) to manage the site;
2. Preparation and implementation of a RAP; and
3. Preparation of a validation report on completion of remediation.

The preliminary waste classifications are documented in Section 9.

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

Ambient Background Concentrations	**ABC**
Added Contaminant Limits	**ACL**
Asbestos Containing Material	**ACM**
Area of Environmental Concern	**AEC**
Australian Height Datum	**AHD**
Acid Sulfate Soil	**ASS**
Below Ground Level	**BGL**
Benzo(a)pyrene Toxicity Equivalent Factor	**BaP TEQ**
Benzene, Toluene, Ethylbenzene, Xylene	**BTEX**
Cation Exchange Capacity	**CEC**
Contaminated Land Management	**CLM**
Contaminant(s) of Potential Concern	**CoPC**
Chain of Custody	**COC**
Conceptual Site Model	**CSM**
Dial Before You Dig	**DBYD**
Data Quality Indicator	**DQI**
Data Quality Objective	**DQO**
Detailed (Stage 2) Site Investigation	**DSI**
Ecological Investigation Level	**EIL**
Ecological Screening Level	**ESL**
Environment Protection Authority	**EPA**
Health Investigation Level	**HILs**
Health Screening Level	**HSL**
International Organisation of Standardisation	**ISO**
JK Environments	**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**
Polycyclic Aromatic Hydrocarbons	**PAH**
Polychlorinated Biphenyls	**PCBs**
Photo-ionisation Detector	**PID**
Protection of the Environment Operations	**POEO**
Practical Quantitation Limit	**PQL**
Quality Assurance	**QA**
Quality Control	**QC**
Remediation Action Plan	**RAP**
Relative Percentage Difference	**RPD**
Site Assessment Criteria	**SAC**
Sampling, Analysis and Quality Plan	**SAQP**
State Environmental Planning Policy	**SEPP**
Site Specific Assessment	**SSA**
Source, Pathway, Receptor	**SPR**
Specific Contamination Concentration	**SCC**
Standard Penetration Test	**SPT**
Trip Blank	**TB**
Total Recoverable Hydrocarbons	**TRH**
Trip Spike	**TS**
Upper Confidence Limit	**UCL**
Volatile Organic Compounds	**VOC**

World Health Organisation	**WHO**
Work Health and Safety	**WHS**

Units

Metres BGL	**mBGL**
Metres	**m**
Milligrams per Kilogram	**mg/kg**
Milligrams per Litre	**mg/L**
Parts Per Million	**ppm**
Percentage	**%**
Percentage weight for weight	**%w/w**

1 INTRODUCTION

Health Infrastructure ('the client') commissioned JK Geotechnics (JKG) to undertake a Detailed (Stage 2) Site Investigation (DSI) for the proposed Cooma Hospital Key Worker Accommodation Development – Stage 2 at Cooma Hospital, Bent Street, Cooma, NSW ('the site'). The purpose of the investigation is to make an assessment of site contamination conditions to establish whether remediation is required in the context of the proposed development, with regards to Chapter 4 (Clause 4.6) of State Environmental Planning Policy (Resilience and Hazards) 2021[2] (formerly known as SEPP55).

The site location is shown on Figure 1 and the site boundary is shown on Figure 2, attached in the appendices. The site is located in the central east section of the wider hospital property.

JKG's environmental division (Environmental Investigation Services - EIS) has previously undertaken an Environmental Site Assessment (ESA) of the wider hospital property. A summary of relevant information from this investigation has been included in Section 2.

A Sampling Analysis Quality Plan (SAQP) was prepared for the DSI (Ref: E30596PT-SAQP2, dated 15 November 2022)[3]. The SAQP is attached in the appendices.

1.1 Proposed Development Details

The proposed development for this stage of works includes construction of a two storey, 12 unit block with indoor and outdoor shared space, which is proposed to be positioned in the central east of the existing hospital property (refer to Figure 2). The development is to be utilised for worker accommodation.

Selected development plans are provided in the appendices.

1.2 Aims and Objectives

The primary aim of the DSI is to characterise the soil contamination conditions in order to assess site risks in relation to contamination and establish whether remediation is required. A secondary aim is to provide preliminary waste classification data for off-site disposal of soil waste which may be generated during the proposed development works.

The DSI objectives are to:

- Provide an appraisal of the past site use(s) based on a review of limited historical records;
- Assess the soil contamination conditions;
- Assess the potential risks posed by contamination to the receptors identified in the Conceptual Site Model (CSM);
- Provide a preliminary waste classification for the in-situ soil; and

[2] *State Environmental Planning Policy (Resilience and Hazards) 2021* (NSW) (referred to as SEPP Resilience and Hazards 2021)

[3] JKG, (2022). Report *to Health Infrastructure on Sampling, Analysis and Quality Plan (SAQP) for Detailed (Stage 2) Site Investigation at Key Worker Accommodation Development Stage 2, Cooma Hospital, Bent Street, Cooma, NSW*. (Report ref: E30596PT-SAQP2, dated 15 November 2022) (referred to as SAQP)

- Assess whether the site is suitable or can be made suitable (via remediation) for the proposed development, from a contamination viewpoint; and
- Assess whether further intrusive investigation and/or remediation is required.

1.3 Scope of Work

The DSI was prepared generally in accordance with a JKG proposal (Ref: EP57659PT) of 3 November 2022 and written acceptance from the client of 14 November 2022 (Ref: HI22443, Purchase Order 44981103). The scope of work included the following:

- Review of existing and new site information, including background and site history information from various sources outlined in the report;
- Review and update the CSM;
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The scope of work included review of the existing project information and preparation of an SAQP with regards to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)[4], SEPP Resilience and Hazards 2021 and other guidelines made under or with regards to the Contaminated Land Management Act (1997)[5]. A list of reference documents/guidelines is included in the appendices.

[4] National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).* (referred to as NEPM 2013)

[5] Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

2 SITE INFORMATION

2.1 Previous Investigations

We undertook an Environmental Site Assessment (ESA) across the wider hospital property (including the site), in 2017. The ESA included a review of site history information and soil sampling from 40 borehole locations across the wider hospital property, including one location within the site. Fill (i.e. historically imported soils, or soils placed during prior earthworks) in these locations was indicated to be >0.32m in depth.

The ESA identified the following potential contamination sources/AEC relevant to the proposed development area that was investigated:

1. Fill material (imported material);
2. Use of pesticides; and
3. Hazardous building materials in existing and former buildings.

The ESA did not encounter elevated concentrations of the contaminants of concern in the soil samples analysed for the investigation and all results were below the SAC. The report concluded that the risk posed by the AEC to the receptors was relatively low. At the time of the ESA, the wider hospital was considered to be suitable for the proposed hospital redevelopment, provided that:

1. The environmental consultant was notified of any unexpected finds (e.g. buried structures, fibre cement fragments, discoloured or odorous soil etc) encountered between sampling locations (particularly beneath buildings) so that appropriate action could be taken; and
2. All hazardous materials (e.g. asbestos cement) were removed from buildings/structures prior to demolition.

It is also noted that a Lotsearch report was purchase in September 2022 for the Stage 1 development located approximately 60m to the north of the site on the wider hospital property. Given the proximity of the site to the Stage 1 area, information presented in the Lotsearch report has been considered and documented throughout the report as it is applicable to the site.

2.2 Site Identification

Table 2-1: Site Identification

Site Address:	Bent Street, Cooma, NSW
Lot & Deposited Plan:	Part of Lot 2 in DP1161366
Current Land Use:	Hospital grounds (landscaped/paved areas outside existing building footprints)
Proposed Land Use:	Continued use as part of the hospital grounds for key worker accommodation
Local Government Authority (LGA):	Snowy Monaro regional Council
Current Zoning:	SP2: Infrastructure

Site Area (m^2) (approx.):	875
Geographical Location (decimal degrees) (approx. centre of site):	Latitude: -36.2413421 Longitude: 149.1306185
Site Plans:	Appendix A

2.3 Site Location and Regional Setting

The site is located within the central east section of the wider hospital property which is within a predominantly residential area of Cooma. The site is bound by the Monaro Highway to the east and Victoria Street to the north. The site is located approximately 200m to the west of Cooma Creek.

2.4 Topography

The regional topography is characterised by undulating terrain that generally falls towards Cooma Creek to the north and north-east of the site and wider hospital property. The site slopes gently towards the east and parts of the site appear to have been levelled to account for the slope and accommodate the existing development.

2.5 Site Description Summary

A walkover inspection of the site was undertaken by JK Environments (JKE) personnel on 18 November 2022 (JKE is the environmental division of JKG). The inspection was limited to accessible areas of the site and immediate surrounds. Selected site photographs obtained during the inspection are attached in the appendices.

A summary of the inspection findings is outlined in the following subsections:

2.5.1 Current Site Use and/or Indicators of Former Site Use

At the time of the inspection, the site comprised a section of grassed landscaped garden area in the hospital grounds. Additionally, in the west of the site, an area was slightly raised (0.2m to 0.4m) and a chain linked fence enclosed this area. This area was indicated to formerly be utilised for storage (gas bottles).

2.5.2 Buildings, Structures and Roads

Part of the western enclosed area of the site was concrete paved, otherwise the site was entirely unpaved and grass covered. Two large concrete plinths and metal framework was within the enclosed area (assumed to be former storage bays). To the west of the enclosed area was a section of asphaltic concrete paved carpark.

2.5.3 Boundary Conditions, Soil Stability and Erosion

The boundary of the site was entirely unfenced. No evidence of erosion was observed during the site inspection. Some fill soil was visible at the interface between the paved area and grass covered areas.

2.5.4 Presence of Drums/Chemical Storage and Waste

Several stacked fibre cement panels (suspected asbestos containing material) were stored in the enclosed area (refer to photographs in appendices).

No evidence of drums/chemicals or other waste were observed on the site during the site inspection.

2.5.5 Evidence of Cut and Fill

Fill soils (i.e. containing brick and tile fragments and igneous gravels) were observed in areas of exposed soils during the site inspection (generally along the southern area). The level of the enclosed former storage area in comparison to the adjacent paved carpark (which was to the west) also indicated that some filling may have occurred on site.

2.5.6 Visible or Olfactory Indicators of Contamination (odours, spills etc)

Several fibre cement fragments (FCF), assumed to contain asbestos, were encountered on the site surface during the inspection (refer to Figure 2 and the photographs in the appendices). It appeared these were associated with the soils, rather than damage to the stored fibre cement panels. Two representative samples of FCF were analysed (FCF1 and FCF2), results are discussed in Section 8.4.

No other visible or olfactory indicators of contamination were observed during the site inspection.

2.5.7 Drainage and Services

Surface water at the site would be expected to infiltrate the unpaved site surface, with excess flow direction being towards to the east in keeping with the localised fall of the site.

2.5.8 Sensitive Environments

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

2.5.9 Landscaped Areas and Visible Signs of Plant Stress

The site was predominantly grass covered, with medium trees in a row along the east of the site and along the south. The vegetation appeared to be in good condition during the site inspection with no evidence of dieback or stress observed.

2.5.10 Surrounding Land Use

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

- North – grassed open space on the wider hospital property;
- South – asphaltic concrete paved driveway and grassed open space on the wider hospital property;
- East – grassed open space on the wider hospital property with the Monaro Highway and residential properties beyond; and
- West – asphaltic concrete paved carpark on the wider hospital property.

JKE did not observe any land uses in the immediate surrounds that were identified as potential contamination sources for the site.

2.6 Underground Services

The 'Before You Dig' (BYD) plans and utilities plan provided by the client were reviewed in order to establish whether any major underground services exist at the site or in the immediate vicinity that could act as a preferential pathway for contamination migration. Major services were not identified at the site that may act as preferential pathways for contamination migration.

3 SUMMARY OF GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology and Soil/Bedrock Conditions

Regional geological maps indicated that the site is underlain by Cooma Granodiorite, which typically consists of biotite granite, foliated granite, leucogranite, diorite and tonalitic gneiss.

The previous investigations encountered shallow granite bedrock across the site and wider hospital property from depths of approximately 0.4mBGL to 2mBGL.

The site is not located in an acid sulfate soil (ASS) risk area according to the risk maps prepared by the Department of Land and Water Conservation.

3.1.1 Hydrogeology and Groundwater

Hydrogeological information reviewed for the investigation indicated that the regional aquifer on-site and in the areas immediately surrounding the site includes fractured or fissured, extensive aquifers of low to moderate productivity. There was a total of 48 registered bores within 2km of the site. The nearest registered bore was 130m cross-gradient to the north-east of the site and was registered for water supply purposes. All other bores were over 775m from the site and none were down-gradient.

There is a reticulated water supply in the area and consumption of groundwater is not expected to occur.

Considering the local topography, groundwater is anticipated to flow towards the north and north-east in sympathy with the topography and towards the nearest down gradient water body.

The closest surface water body is Cooma Creek located approximately 200m to the east of the site at its closest point. This is down-gradient and is a potential receptor.

4 SITE HISTORY INFORMATION

Existing and obtained site history information for the site has been summarised below and supporting information is attached in the appendices.

4.1 Review of Historical Aerial Photographs

Historical aerial photographs were reviewed for the investigation. The information was sourced from the Lotsearch report. We have reviewed the photographs and summarised relevant information in the following table:

Table 4-1: Summary of Historical Aerial Photographs

Year	Details
1944	**On-site:** The site appeared to be largely vacant and grassed, with some larger trees around the perimeter . **Off-site:** A small structure/shed was located just beyond the northern corner of the site(it is possible that this structure encroached partially onto the site). The site was to the immediate south and east of the main hospital buildings. The Monaro Highway was visible further to the east. Several other small and large hospital out buildings were also present on the wider hospital property. The surrounds of the wider hospital appeared to comprise a mix of residential and vacant lots.
1960	**On-site:** The western part of the site was occupied by part of a large, rectangular-shaped building. The eastern part of the site appeared grassed and vacant. **Off-site:** Extensive development of the wider hospital property was visible with several large buildings now present to the west. Further residential development of the land to the east and north was also visible.
1967 1977	The site and surrounding features appeared generally similar to the previous photograph.
1985	**On-site:** The site now appeared to be vacant with no visible buildings present. A row of three (gas) tanks was visible in the south-west section of the site. **Off-site:** Redevelopment of the wider hospital property was visible with some buildings no longer present and new buildings and structures in their place (generally to the west of the site). Further residential development of the land to the east and north was also visible.
1998	**On-site:** One larger (gas) tank was now present in the west of the site with a concrete/paved rectangular outline around this area (consistent with the enclosed storage area). The remainder of the site generally appeared to comprise grass covered landscaped areas including large trees along the south and several small trees in the east. **Off-site:** Some buildings to the north and north-west of the site were no longer present on the wider hospital property and paved car parks and internal roads were visible to the immediate west and south of the site.
2002 2011 2016 2020	The site and surrounding features appeared generally similar to the previous photograph.

4.2 Review of Historical Land Title Records

Historical land title records were reviewed for the investigation. The record search was undertaken by InfoTrack. Copies of the title records are attached in the appendices. The title records indicate the following:

- Between 1904 and 1962 the site was owned by numerous individuals as the Trustees for Crown Grant for a Hospital Site; and
- From 1962 to 2019 the site was owned by The Cooma District Hospital (now the Southern Area Health Service) and the Greater Southern Area Health Service; and
- In 2019 the Health Administration Corporation took ownership and is the current owner.

The historical land title records did not identify any particular land uses which could have resulted in significant contamination.

4.3 NSW EPA and Department of Defence Records

A review of the NSW EPA and Department of Defence databases was undertaken for the PSI. Information from the following databases were sourced from the Lotsearch report:

- Records maintained in relation to contaminated land under Section 58 of the CLM Act 1997;
- Records of sites notified in accordance with the Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)[6];
- Licensed activities under the Protection of the Environment Operations Act (1997)[7];
- Sites being investigated under the NSW EPA per-and polyfluoroalkyl substances (PFAS) investigation program;
- Sites being investigated by the Department of Defence for PFAS contamination; and
- Sites being managed by the Department of Defence for PFAS contamination.

The search included the site and surrounding areas in the report buffer. A summary of the information is provided below:

Table 4-2: NSW EPA and Department of Defence Records

Records	On-site	Off-site
Records under Section 58 of the CLM Act 1997	None	One property (former shell service station) was listed within the report buffer. This property was located over 675m to the north and down/cross-gradient of the site and is therefore not considered to represent an off-site source of contamination.
Records under the Duty to Report Contamination under Section 60 of the CLM Act 1997	None	There were six properties listed in the report buffer. Five of these properties were existing or former service stations (including the one listed above) and one

[6] NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997.* (referred to as Duty to Report Contamination)

[7] Protection of the Environment Operations Act 1997 (NSW) (referred to as POEO Act 1997)

Records	On-site	Off-site
		was a Mobil depot. All properties were located over 675m to the north, north-east or north-west and cross or down-gradient of the site. Due to the distance and topographical locations, these properties are not considered to represent off-site sources of contamination.
Licences under the POEO Act 1997	The site and wider hospital property are listed under a delicenced activity for waste generation or storage. This activity is considered unlikely to pose a contamination risk to the site or represent a source of contamination in the context of the DSI.	Current and historical licenses were identified for several properties within the report buffer, including railway systems and the application of herbicides along waterways. However, these activities are considered unlikely to pose a contamination risk to the site or represent and off-site source of contamination.
Records relating to the NSW EPA PFAS Investigation Program	None	None
Records relating to the Department of Defence PFAS management and investigation programs	None	None

4.4 Historical Business Directory and Additional Lotsearch Information

Historical business records and other relevant information were reviewed for the investigation. The information was sourced from the Lotsearch report and summarised in the following table:

Table 4-3: Historical Business Directory and other Records

Records	On-site	Off-site
Historical dry cleaners, motor garages and service stations	None	One dry cleaner was listed within 125m cross-gradient of the site and two motor garages/service stations were listed within 435m down-gradient of the site. Due to the distance and topographical locations, these properties are not considered to represent off-site sources of contamination.
Other historical businesses that could represent potential sources of contamination	None	None
National waste management site database	None	None

Records	On-site	Off-site
National liquid fuel facilities	None	There were five facilities listed in the report buffer. These properties have been previously discussed in Table 4-2 and are not considered to represent offsite sources of site contamination.
Mapped heritage items	The site and wider hospital property are listed as a Local heritage item. This is not considered to have any relevance in the context of the DSI.	Various heritage items were mapped in the report buffer. These are not considered to have any relevance in the context of the DSI objectives.
Mapped ecological constraints	None	Various ecological items were mapped in the report buffer. These are not considered to have any relevance in the context of the PSI objectives.
Mapped naturally occurring asbestos	None	None

4.5 Summary of Site History Information

A time line summary of the historical land uses and activities is presented in the following table. The information presented in the table is based on a weight of evidence assessment of the site history documentation and observations made by JKE.

Table 4-4: Summary of Historical Land Uses / Activities

Year(s)	On-site - Potential Land Use / Activities	Off-site - Potential Land Use / Activities
Circa 1858 to 1960	• Vacant, landscaped portion of wider hospital property.	• Wider hospital property; and • Predominantly residential properties, and vacant lots.
1944-1960	• Construction of hospital building across west portion of the site; • Use of hazardous building materials in structure; and • Use of pesticides around building and site.	• On-going hospital and residential land uses.
1960-2022	• Demolition of building (1960-1985); and • Minor filling across site for levelling purposes following demolition and for construction of the gas storage area.	• On-going hospital and residential land uses.

4.6 Integrity of Site History Information

The majority of the site history information was obtained from government organisations as outlined in the relevant sections of this report. The veracity of the information from these sources is considered to be relatively high. A certain degree of information loss can be expected given the lack of specific land use details over time. We have relied upon the Lotsearch report and have not independently verified any information contained within. However, it is noted that the Lotsearch report is generated based on databases maintained by various government agencies and is expected to be reliable.

Whilst the Lotsearch report was purchased for the Stage 1 Cooma Hospital development and shows the Stage 1 boundary, the information contained within the report is still relevant to the site (Stage 2) and has been interpreted accordingly for the purpose of this report.

5 SUMMARY OF CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. An iteration of the CSM for the site is presented in the following table and is based on the site information (including the site inspection information) and the review of site history information including previous investigation findings.

Table 5-1: Review of CSM

Contaminant source(s) and contaminants of concern	**Potential contamination sources/contaminating activities:** historically imported fill soil; use of pesticides around and beneath buildings; and hazardous building materials from former demolition works. **Contaminants of potential concern (CoPC)**: Soil: heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.
Affected media	For the purpose of the DSI, fill/soil. The potential for groundwater impacts to pose a risk to the receptors will be considered initially under the DSI scope based on the soil results (i.e. an assessment will be made regarding whether the soils represent a potential source of groundwater contamination via processes such as leaching). Site-related sources of groundwater contamination have not been identified to date.
Receptor identification	Human receptors include site occupants/users (including adult workers, and adult and children visitors), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users. Ecological receptors include terrestrial organisms and plants within unpaved areas (including any proposed landscaped areas).
Exposure pathways and mechanisms	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, BTEX and naphthalene [a PAH compound]). The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Potential exposure pathways for ecological receptors include primary contact and ingestion. Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens, inhalation of airborne asbestos fibres and dust during soil disturbance, or inhalation of vapours within enclosed spaces such as buildings. The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into the proposed building (either from soil contamination or volatilisation of contaminants from groundwater); and • Contact (dermal, ingestion or inhalation) with exposed soils in landscaped areas and/or unpaved areas, or with soils/dust during construction works.

6 SUMMARY SAMPLING, ANALYSIS AND QUALITY PLAN

JK prepared a stand-alone SAQP for the DSI, which is attached in Appendix H. The SAQP can be summarised as follows:

- Data Quality Objectives (DQOs) were developed to define the type and quality of data required to achieve the project objectives outlined in Section 1.2;
- Soil samples were obtained from eight test pit locations (TP201 to TP208), as shown on the attached Figures 2 and 3. The locations were generally positioned for site coverage due to access limitations imposed by the extent of underground services, although a grid-like sample spacing was attempted; and
- Soil samples were obtained using an excavator on 18 November 2022, with samples obtained directly from the test pit walls and/or the excavator bucket.

There were no substantial deviations to the SAQP. Please refer to the SAQP attached in Appendix H for further information.

6.1 Laboratory Analysis

Samples were analysed by an appropriate, NATA Accredited laboratory using the analytical methods detailed in Schedule B(3) of NEPM 2013. Reference should be made to the laboratory reports attached in the appendices for further details.

Table 6-1: Laboratory Details

Samples	Laboratory	Report Reference
All primary soil samples and field QA/QC samples, including soil intra-laboratory duplicates, trip blanks and trip spikes	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	311057 and 311057-A
Inter-laboratory duplicates for soil samples	Envirolab Services Pty Ltd VIC, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	34681

7 SITE ASSESSMENT CRITERIA (SAC)

The SAC were derived from the NEPM 2013 and other guidelines as discussed in the following sub-sections. The guideline values for individual contaminants are presented in the attached report tables and further explanation of the various criteria adopted is provided in the appendices.

7.1 Soil

Soil data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013) as outlined below.

7.1.1 Human Health

- Health Investigation Levels (HILs) for a 'residential with accessible soils' exposure scenario (HIL-A). Whilst this is overly conservative given the proposed use is for worker accommodation which is expected to include adults and would be expected to occur over a shorter duration than a typical residential-type scenario, the approach is considered reasonable compared to applying the other available Tier 1 HILs;
- Health Screening Levels (HSLs) for a 'low-high density residential' exposure scenario (HSL-A & HSL-B). HSLs were calculated based on conservative assumptions including a 'sand' type and a depth interval of 0m to 1m;
- HSLs for direct contact presented in the CRC Care Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document (2011)[8]; and
- Asbestos was assessed on the basis of presence/absence and against the HSL-A criteria. A summary of the asbestos criteria is provided in the table below:

Table 7-1: Details for Asbestos SAC

Guideline	Applicability
Asbestos in Soil	The HSL-A criteria were adopted for the assessment of asbestos in soil. The SAC adopted for asbestos were derived from the NEPM 2013 and are based on the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2021)[9]. The SAC include the following: • No visible asbestos at the surface/in the top 10cm of soil; • <0.01% w/w bonded asbestos containing material (ACM) in soil; and • <0.001% w/w asbestos fines/fibrous asbestos (AF/FA) in soil. Concentrations for bonded ACM concentrations in soil are based on the following equation which is presented in Schedule B1 of NEPM (2013): **% w/w asbestos in soil =** $\frac{\text{**\% asbestos content x bonded ACM (kg)**}}{\text{Soil volume (L) x soil density (kg/L)}}$ However, we are of the opinion that the actual soil volume in a 10L bucket varies considerably due to the presence of voids, particularly when assessing cohesive soils. Therefore, each bucket sample was weighed using electronic scales and the above equation was adjusted as follows (we note that the units have also converted to grams):

[8] Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC Care), (2011). Technical Report No. 10 - *Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document*

[9] Western Australian (WA) Department of Health (DoH), (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. (referred to as WA DoH 2021)

Guideline	Applicability
	% w/w asbestos in soil = $\frac{\text{**% asbestos content x bonded ACM (g)**}}{\text{Soil weight (g)}}$

7.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for an 'urban residential and public open space' (URPOS) exposure scenario. These have only been applied to the top 2m of soil as outlined in NEPM (2013). The criterion for benzo(a)pyrene has been increased from the value presented in NEPM (2013) based on the Canadian Soil Quality Guidelines[10];
- ESLs were adopted based on the soil type;
- EILs for selected metals in sample TP201 (0-0.1m) were calculated using the laboratory reported site-specific parameters for pH and cation exchange capacity (CEC) of 7.5 and 42 respectively; and
- EILs for selected metals for all other samples were calculated based on the most conservative added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013) and published ambient background concentration (ABC) values presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)[11]. This method is considered to be adequate for the Tier 1 screening.

7.1.3 Management Limits for Petroleum Hydrocarbons

Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) were considered.

7.1.4 Waste Classification

Data for the waste classification assessment were assessed in accordance with the Waste Classification Guidelines, Part 1: Classifying Waste (2014)[12] as outlined in the following table:

Table 7-2: Waste Categories

Category	Description
General Solid Waste (non-putrescible)	• If Specific Contaminant Concentration (SCC) ≤ Contaminant Threshold (CT1) then Toxicity Characteristics Leaching Procedure (TCLP) not needed to classify the soil as general solid waste; and • If TCLP ≤ TCLP1 and SCC ≤ SCC1 then treat as general solid waste.
Restricted Solid Waste (non-putrescible)	• If SCC ≤ CT2 then TCLP not needed to classify the soil as restricted solid waste; and • If TCLP ≤ TCLP2 and SCC ≤ SCC2 then treat as restricted solid waste.
Hazardous Waste	• If SCC > CT2 then TCLP not needed to classify the soil as hazardous waste; and • If TCLP > TCLP2 and/or SCC > SCC2 then treat as hazardous waste.

[10] Canadian Council of Ministers of the Environment, (1999). *Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)* (referred to as the Canadian Soil Quality Guidelines)

[11] Olszowy, H., Torr, P., and Imray, P., (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4*. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

[12] NSW EPA, (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* (referred to as Waste Classification Guidelines 2014)

Category	Description
Virgin Excavated Natural Material (VENM)	Natural material (such as clay, gravel, sand, soil or rock fines) that meet the following: • That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial mining or agricultural activities; • That does not contain sulfidic ores or other waste; and • Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette.

8 RESULTS

8.1 Summary of Data (QA/QC) Evaluation

The data evaluation is presented in the appendices. In summary, we are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

8.2 Subsurface Conditions

A summary of the subsurface conditions encountered during the investigation is presented in the following table. Reference should be made to the test pit logs attached in the appendices for further details.

Table 8-1: Summary of Subsurface Conditions

Profile	Description
Fill	Fill was encountered at the surface in all test pits and extended to depths of approximately 0.4mBGL to 1.5mBGL. The fill typically comprised silty clay and silty sandy gravel with inclusions of granite, igneous and quartz gravel, concrete, brick, and ceramic fragments, clay nodules, sand, ash and root fibres. FCF were encountered in fill in TP205. No odours or staining were recorded in the fill material during field work. FCF/ACM was encountered in the fill material in TP205 during fieldwork.
Natural Soil	Silty clay residual soil was encountered beneath fill material in TP203, TP207 and TP208 from depths of approximately 0.4mBGL to 0.7mBGL. No odours or staining were recorded in the natural soils during field work.
Bedrock	Granite bedrock was encountered beneath the fill in TP201, TP202, TP204, TP205, and TP206 from depths of between 0.5mBGL to 1.5mBGL. Neither odours nor staining were recorded in the bedrock during fieldwork.
Groundwater	All test pits remained dry on completion of excavation and a short time after.

8.3 Field Screening

A summary of the field screening results is presented in the following table:

Table 8-2: Summary of Field Screening

Aspect	Details
PID Screening of Soil Samples for VOCs	PID soil sample headspace readings are presented in attached report tables and the COC documents attached in the appendices. All results were between 0ppm and 3.4ppm equivalent isobutylene, which indicate a lack of significant PID detectable VOCs.
Bulk Screening for Asbestos	The bulk field screening results are summarised in the attached report Table S5. ACM was encountered in TP205 (0.1-0.6m) and TP205 (1.0-1.5m). The calculated asbestos concentrations of 0.0294%w/w and 0.0590%w/w were greater than the HSL-A SAC of 0.01%w/w. All remaining results were below the SAC (FCF was not encountered in any other bulk field screening samples).

8.4 Soil Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 7.1. Individual SAC are shown in the report tables attached in the appendices. A summary of the results is presented below:

8.4.1 Human Health and Environmental (Ecological) Assessment

Table 8-3: Summary of Soil Laboratory Results – Human Health and Environmental (Ecological)

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	14	<4	0	0	-
Cadmium	14	<0.4	0	NSL	-
Chromium (total)	14	65	0	0	-
Copper	14	59	0	0	-
Lead	14	60	0	0	-
Mercury	14	0.4	0	NSL	-
Nickel	14	59	0	0	-
Zinc	14	97	0	0	-
Total PAHs	14	<0.05	0	NSL	-
Benzo(a)pyrene	14	<0.05	NSL	0	-
Carcinogenic PAHs (as BaP TEQ)	14	<0.5	0	NSL	-
Naphthalene	14	<1	0	NSL	-
DDT+DDE+DDD	8	<0.1	0	NSL	-
DDT	8	<0.1	NSL	0	-
Aldrin and dieldrin	8	<0.1	0	NSL	-
Chlordane	8	<0.1	0	NSL	-
Heptachlor	8	<0.1	0	NSL	-
Chlorpyrifos (OPP)	8	<0.1	0	NSL	-
PCBs	8	<0.1	0	NSL	-

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
TRH F1	14	<25	0	0	-
TRH F2	14	<50	0	0	-
TRH F3	14	<100	0	0	-
TRH F4	14	<100	0	0	-
Benzene	14	<25	0	0	-
Toluene	14	<50	0	0	-
Ethylbenzene	14	<100	0	0	-
Xylenes	14	<100	0	0	-
Asbestos (in soil) (%w/w)	8	ACM >7mm = <0.01%w/w AF/FA = <0.001%w/w	0 0	NA	
Asbestos in fibre cement	5	Asbestos detected	NSL	NSL	Asbestos was detected in three FCF analysed, samples FCF2, TP205-FCF1 (0.1-0.6) and TP205-FCF3 (1.0-1.5).

Notes:

N: Total number (primary samples)

NSL: No set limit

NL: Not limiting

8.4.2 Waste Classification Assessment

The laboratory results were assessed against the criteria presented in Section 7.1.4. A summary of the results is presented in the following table:

Table 8-4: Summary of Soil Laboratory Results Compared to CT and SCC Criteria

Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
Arsenic	14	0	0	-
Cadmium	14	0	0	-
Chromium	14	0	0	-
Copper	14	NSL	NSL	-
Lead	14	0	0	-
Mercury	14	0	0	-

Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
Nickel	14	1	0	The nickel concentration exceeded the CT1 criterion in one fill soil sample collected from TP201 (0-0.1m).
Zinc	14	NSL	NSL	-
TRH (C_6-C_9)	14	0	0	-
TRH (C_{10}-C_{36})	14	0	0	-
BTEX	14	0	0	-
Total PAHs	14	0	0	-
Benzo(a)pyrene	14	0	0	-
OCPs & OPPs	8	0	0	-
PCBs	8	0	0	-
Asbestos in soil	8	-	-	Asbestos was not detected in any soil samples analysed.
Asbestos in material	5	-	-	Asbestos was detected in three of the FCF samples analysed samples FCF2, TP205-FCF1 (0.1-0.6) and TP205-FCF3 (1.0-1.5).

N: Total number (primary samples)

NSL: No set limit

Table 8-5: Summary of Soil Laboratory Results Compared to TCLP Criteria

Analyte	N	N > TCLP Criteria	Comments
Nickel	1	0	TCLP nickel analysis occurred on the sample that reported a nickel concentration >CT1.

N: Total number (primary samples)

9 PRELIMINARY WASTE CLASSIFICATION ASSESSMENT

9.1 Waste Classification of Fill

Based on the results of the waste classification assessment, and at the time of reporting, the fill material is assigned a preliminary classification of **General Solid Waste (non-putrescible) containing Special Waste (asbestos)**.

Once the excavation details/work methods and anticipated waste quantities are known, the requirements for further waste classification should be assessed and JKE should be contacted to discuss the requirements for any further inspections, analysis and/or reporting. The extent of sampling in fill has been comprehensive and we anticipate that confirmation of the above waste classification for fill may be limited to inspections of the site/waste during the works and/or preparation of a cover letter to document these inspections and the final waste quantity.

9.2 Classification of Natural Soil and Bedrock

Based on the scope of work undertaken for this assessment, and at the time of reporting, JKE is of the opinion that the natural bedrock at the site would meet the definition of **VENM** for off-site disposal or re-use purposes. However, the VENM classification would need to be confirmed by validation sampling/analysis and an asbestos clearance, following removal of the overlying fill. VENM would be considered suitable for re-use on-site (from a contamination viewpoint), or alternatively, VENM could be beneficially re-used off-site.

10 DISCUSSION

10.1 Contamination Sources/AEC and Potential for Site Contamination

Based on the scope of work undertaken for this investigation, we identified the following potential contamination sources/AEC:

1. Fill material (imported material);
2. Use of pesticides around buildings and site; and
3. Hazardous building materials from former demolition works.

Considering the above, and based on a qualitative assessment of various lines of evidence as discussed throughout this report, we are of the opinion that there is a potential for site contamination. The soil data collected for the investigation is discussed further in the following subsection, as part of the Tier 1 risk assessment.

10.2 Tier 1 Risk Assessment and Review of CSM

For a contaminant to represent a risk to a receptor, the following three conditions must be present:

1. Source – The presence of a contaminant;
2. Pathway – A mechanism or action by which a receptor can become exposed to the contaminant; and
3. Receptor – The human or ecological entity which may be adversely impacted following exposure to contamination.

If one of the above components is missing, the potential for adverse risks is relatively low.

10.2.1 Soil

10.2.1.1 Asbestos

Asbestos as ACM was detected in fill soil at concentrations that were above the SAC (refer to Figure 3). All visible FCF/ACM (excluding the stacked/stored fibre cement sheets) encountered during the site work was removed by JKE. The source of the asbestos is considered likely to be associated with either imported fill material which was encountered to varying depths across the site and/or waste generated during historical demolition activities at the site that was subsequently mixed in with the fill/soil matrix during previous site levelling works.

Demolition rubble and other anthropogenic inclusions were encountered in a majority of the test pits excavated for the DSI and as such asbestos impacts at the site are considered likely to be widespread in fill/soil (albeit, the asbestos appears largely to be present at concentrations below the SAC based on the data to date given that a SAC exceedance was only encountered in TP205).

As the site is predominantly unpaved and the ACM was encountered at the surface and in the shallow fill/soil, there is considered to be a potentially complete SPR linkage to human receptors under the current site configuration. As a duty of care, and to meet the requirements under Clause 429 of the Work Health and Safety Regulation (2017), an Asbestos Management Plan (AMP) (for asbestos in/on soil) should be prepared and implemented to manage the site until development occurs.

It is noted that the land use-based SAC for asbestos are not protective of human health in an occupational exposure scenario during construction/earthworks. Disturbance of fill containing asbestos will need to be managed appropriately during the construction process so that risks are low and acceptable.

Remediation of asbestos in/on soil will be required as part of the proposed development. In the context of the proposed development, it is anticipated that remediation of asbestos in/on soil would occur during construction as part of the earthworks, and this will be captured under the requirements of a Remediation Action Plan (RAP). Remediation of the asbestos must be confirmed via appropriate validation methods outlined in the RAP.

10.2.1.2 Other CoPC

Elevated concentrations of the other CoPC were not encountered above the adopted SAC in the soil samples analysed and therefore are not considered to pose a risk to the receptors at the concentrations reported to date. Organic CoPC were largely not detected above the PQLs and heavy metals concentrations were very low. These results were generally consistent with previous findings across the wider hospital property.

The DSI did not identify soil contamination that was deemed to pose a risk to groundwater and there were no historical point sources of groundwater contamination identified on site or in close proximity.

10.3 Decision Statements

The decision statements are addressed below:

Does the historical information identify potential contamination sources/AEC at the site?

Yes, as noted in Section 10.1.

Are any results above the SAC?

Yes, asbestos (as ACM) was reported above the health-based SAC in fill/soil. ACM was also encountered at the ground surface.

Do potential risks associated with contamination exist, and if so, what are they?

Asbestos was assessed to pose a potential risk to current and future site users if adequate risk mitigation and management do not occur.

Is further investigation / remediation required?

Yes. Remediation is required in relation to asbestos in fill.

Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

We are of the opinion that the site can be made suitable for the proposed development outlined in Section 1.1, subject to remediation.

10.4 Data Gaps

Technically, for delineation of known asbestos in soil, sampling should be undertaken at twice the minimum sampling density recommended in the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2021)[13] as (endorsed in NEPM 2013). This data gap was only identified as a result of finding asbestos during the DSI.

Undertaking additional sampling to meet this density will not change the need for remediation of the site as there is already a SAC exceedance at one location and the fill containing building/demolition waste is widespread. Spatially, the occurrence of asbestos is also considered to be widespread based on the extent of fill impacted by demolition waste and the occurrence of surficial ACM/FCF in the south of the site and buried asbestos in TP205 in the more central section of the site. On this basis, additional works to address this data gap is not recommended.

[13] Western Australian (WA) Department of Health (DoH), (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. (referred to as WA DoH 2021)

11 CONCLUSIONS AND RECOMMENDATIONS

The DSI included a review of site information, a site inspection, and soil sampling from eight test pit locations across the site. Imported fill material, use of pesticides, and hazardous building materials were identified as potential contamination sources at the site.

Fill was encountered to depths of between approximately 0.4m below ground level (BGL) to 1.5mBGL and comprised silty clayey sand or silty sandy clay with inclusions of granite, igneous and quartz gravel, concrete, brick, and ceramic fragments, fibre cement fragments (FCF), clay nodules, sand, ash and root fibres. The fill was underlain by either natural residual soils and/or granite bedrock. Staining and odours were not identified during fieldwork. FCF/asbestos containing materials (ACM) was encountered in one of the eight locations during fieldwork, and also at the ground surface in the southern area of the site.

A selection of soil samples was analysed for the contaminants of potential concern (CoPC) identified in the CSM. Asbestos as ACM was encountered above the health-based SAC in fill soil in one test pit (TP205). ACM was also encountered in one surficial FCF (FCF2).

As a duty of care, and to meet the requirements under Clause 429 of the Work Health and Safety Regulation (2017), an AMP (for asbestos in/on soil) should be prepared and implemented.

Based on the Tier 1 risk assessment, the level of contamination identified at the site was assessed to pose a potential risk in the current site configuration and in the context of the proposed development. A RAP is required to document the procedure for remediating the site.

Remediation of the site is required to address the asbestos contamination in fill. We consider that the site can be made suitable for the proposed development provided that the following recommendations are implemented:

1. Prepare an AMP (for asbestos in/on soil) to manage the site;
2. Preparation and implementation of a RAP; and
3. Preparation of a validation report on completion of remediation.

At this stage, we consider that, provided the above recommendations are addressed, there is no requirement to report any site contamination to the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015). This is to be reassessed following implementation of the recommendations.

JKG considers that the report objectives outlined in Section 1.2 have been addressed.

12 LIMITATIONS

The report limitations are outlined below:

- JKG accepts no responsibility for any unidentified contamination 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;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- 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 JKG proposal; and terms of contract between JKG 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;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- 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, JKG has not undertaken any verification process, except where specifically stated in the report;
- JKG 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;
- JKG accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- JKG 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. JKG should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- 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.

Important Information About This Report

These notes have been prepared by JKG 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 JKG 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.

JKG will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the investigation. If the subject site is sold, ownership of the investigation report should be transferred by JKG to the new site owners who will be informed of the conditions and limitations under which the investigation was undertaken. No person should apply an investigation 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 investigation 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 investigations 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 investigation 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.

Investigation Limitations

Although information provided by a site investigation can reduce exposure to the risk of the presence of contamination, no environmental site investigation can eliminate the risk. Even a rigorous professional investigation 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 Investigations by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an investigation 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 Investigation Report

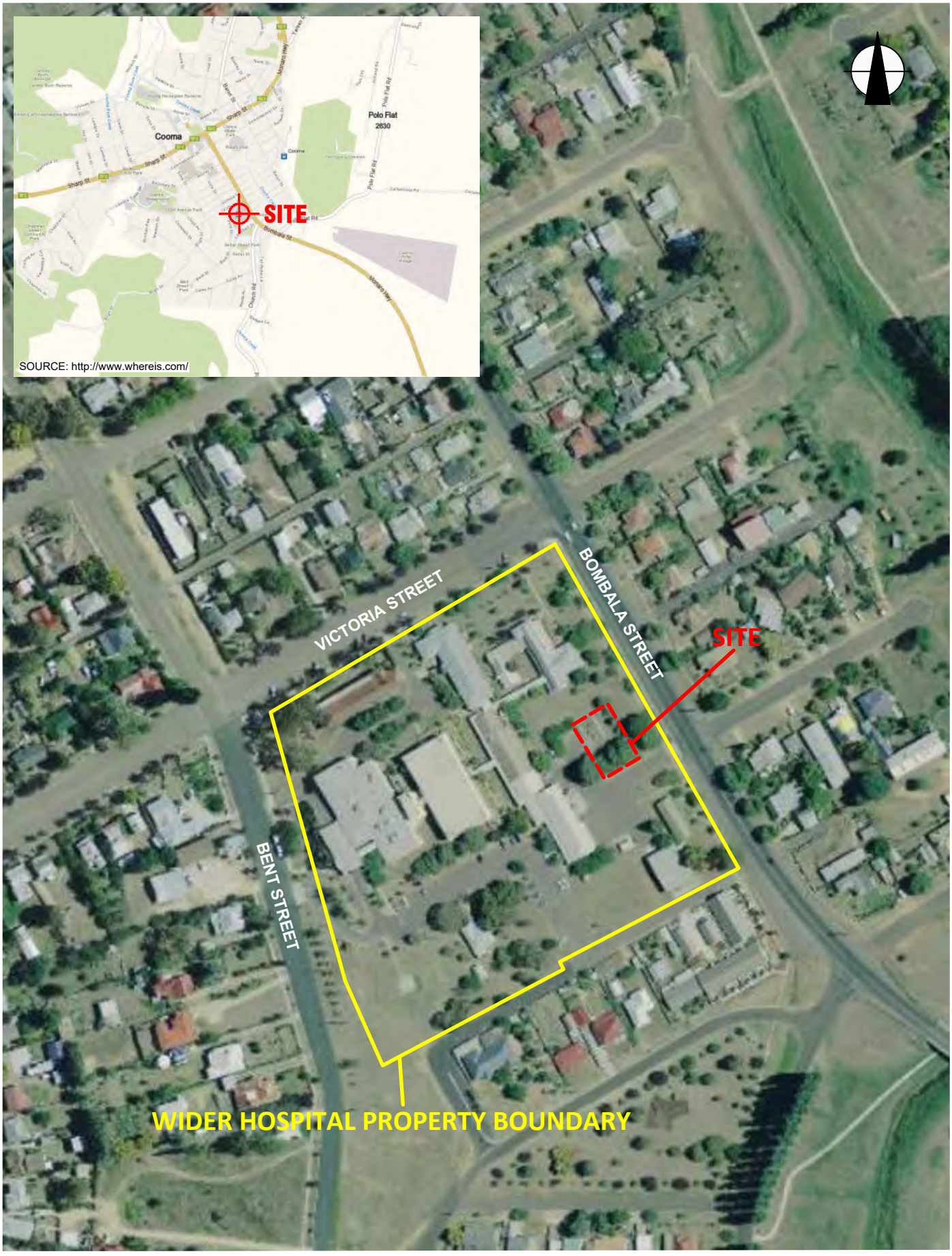
Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other 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 investigation. 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 investigation. 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 investigation 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 investigation 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 investigation, 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.SIX.NSW.GOV.AU

This plan should be read in conjunction with the JK Geotechnics report.

Title: **SITE LOCATION PLAN**

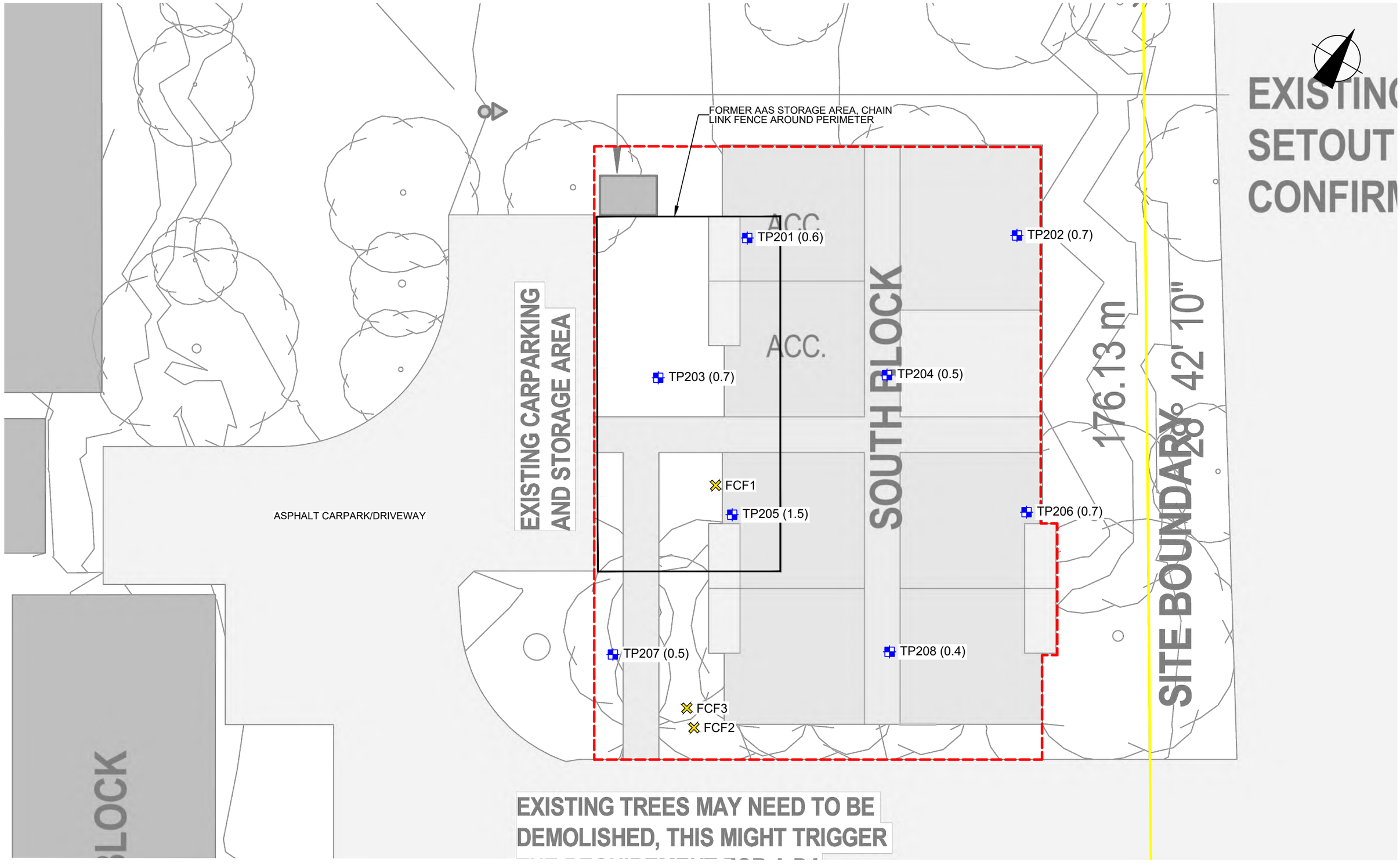
Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Report No: E30596PT

Figure No: 1

JKGeotechnics

PLOT DATE: 15/11/2022 11:10:57 AM DWG FILE: K:\5C EIS JOBS\30000'S\E30596K COOMA HOSPITAL\CAD\E30596PTE30596PT.DWG



LEGEND

APPROXIMATE SITE BOUNDARY	
APPROXIMATE WIDER PROPERTY BOUNDARY	
TP201 (Fill Depth)	TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
FCF(Surface)	FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)

0 2 4 6 8 10

SCALE 1:200 @A3 METRES

This plan should be read in conjunction with the JK Geotechnics report.

Title: **SAMPLE LOCATION PLAN**

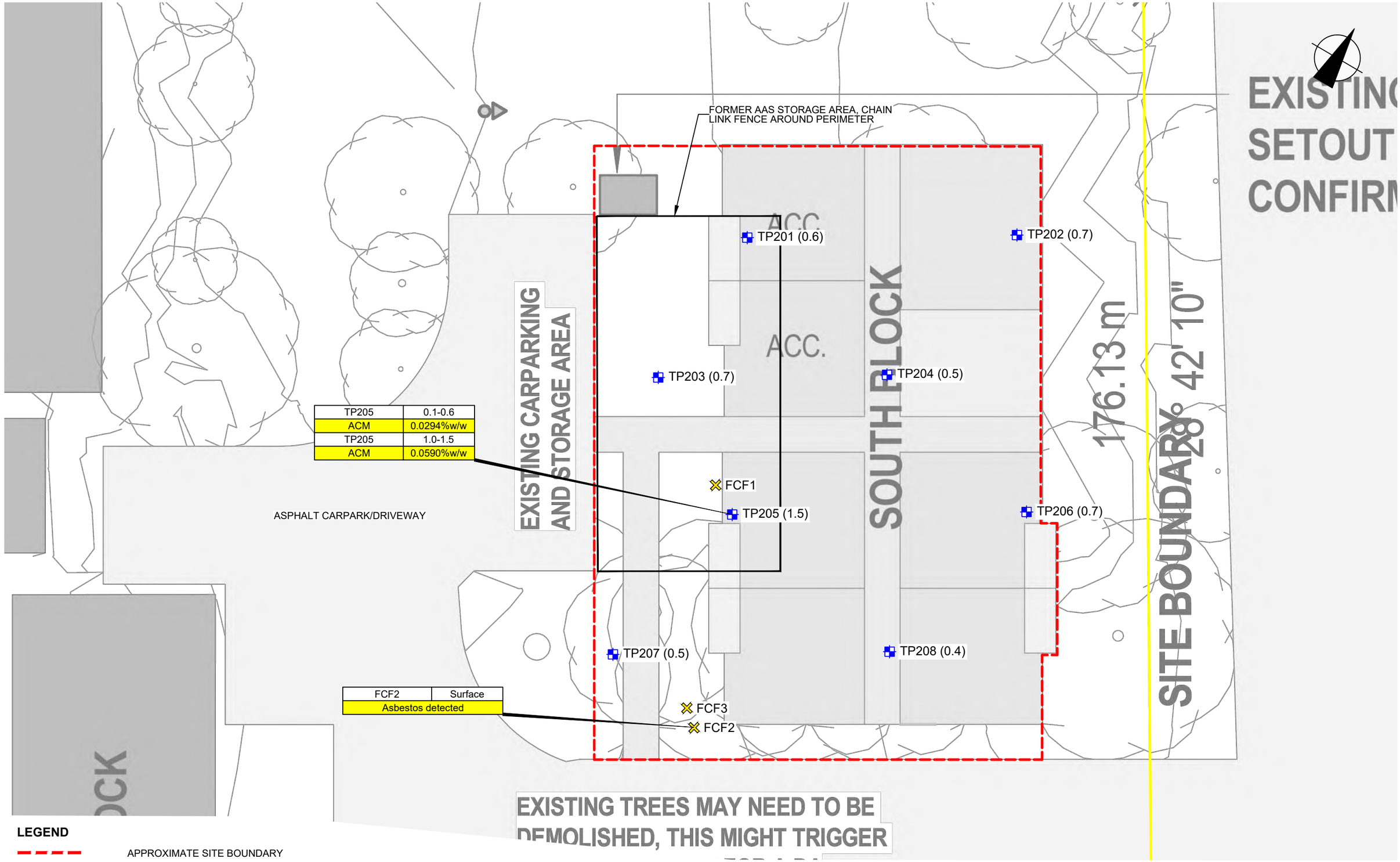
Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Report No: E30596PT

Figure No: 2

JKGeotechnics

PLOT DATE: 13/12/2022 3:46:38 PM DWG FILE: K:\5C EIS JOBS\30000\SIE30596K COOMA HOSPITAL\CAD\E30596PT\E30596PT.DWG



LEGEND

	APPROXIMATE SITE BOUNDARY
	APPROXIMATE WIDER PROPERTY BOUNDARY
TP201 (Fill Depth)	TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)
FCF(Surface)	FIBRE CEMENT FRAGMENT LOCATION, NUMBER AND DEPTH (Surface/m)
SAMPLE ID / DEPTH (metres) CHEMICAL / CONCENTRATION	SOIL/SURFACE SAMPLE EXCEEDANCE
	SOIL/SURFACE CONTAMINATION ABOVE SAC FOR HUMAN HEALTH RISK

0 2 4 6 8 10
SCALE 1:200 @A3 METRES

This plan should be read in conjunction with the JK Geotechnics report.

Title: **SAC EXCEEDANCE PLAN**

Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Report No: E30596PT

Figure No: 3

JKGeotechnics

PLOT DATE: 13/12/2022 3:47:05 PM DWG FILE: K:\SC EIS JOBS\30000\SIE30596K COOMA HOSPITAL\CAD\E30596PT\E30596PT.DWG

Appendix B: Site Information and Site History Information

Proposed Development Plans

Proposed
Cooma Stage 2

SOUTH BLOCK - GROUND

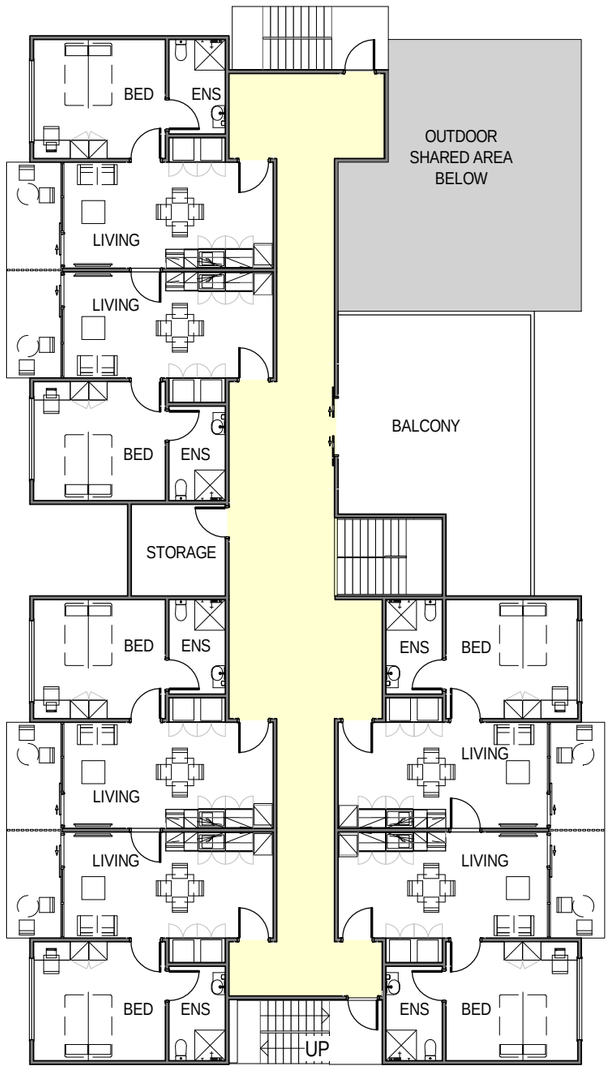
Project Number **10599**

COOMA KWA

Scale **1 : 200@A3** Date **26/07/22** Drawing Number **A20-002**

SILVER THOMAS HANLEY

DATE: 26/07/2022 5:35:19 PM



Proposed
Cooma Stage 2

SOUTH BLOCK - LEVEL 01

Project Number **10599**

COOMA KWA

Scale **1 : 200@A3** Date **26/07/22** Drawing Number **A20-003**

SILVER THOMAS HANLEY

DATE: 26/07/2022 5:35:13 PM

Site Photographs

Project Ref: E30596PT
Site Address: Cooma Hospital, Bent Street, Cooma
Selected Site Photos Dated: 18 November 2022

Photograph 1: Looking north through enclosed former storage area.

Photograph 2: Looking north east across site.

Photograph 3: Looking south from north-west of site across enclosed former storage area.

Project Ref: E30596PT
Site Address: Cooma Hospital, Bent Street, Cooma
Selected Site Photos Dated: 18 November 2022

Photograph 4: Stored moulded fibre cement sheets.

Photograph 5: FCF2 found in-situ.

Photograph 6: Spoil from TP205 indicating brick, FCF and other anthropogenic inclusions.

Lotsearch Environmental Risk and Planning Report

LOTSEARCH

LOTSEARCH ENVIRO PROFESSIONAL

Date: 05 Sep 2022 10:31:30

Reference: LS035920 EP

Address: Cooma Hospital, Bent Street, Cooma, NSW 2630

Dataset Listing

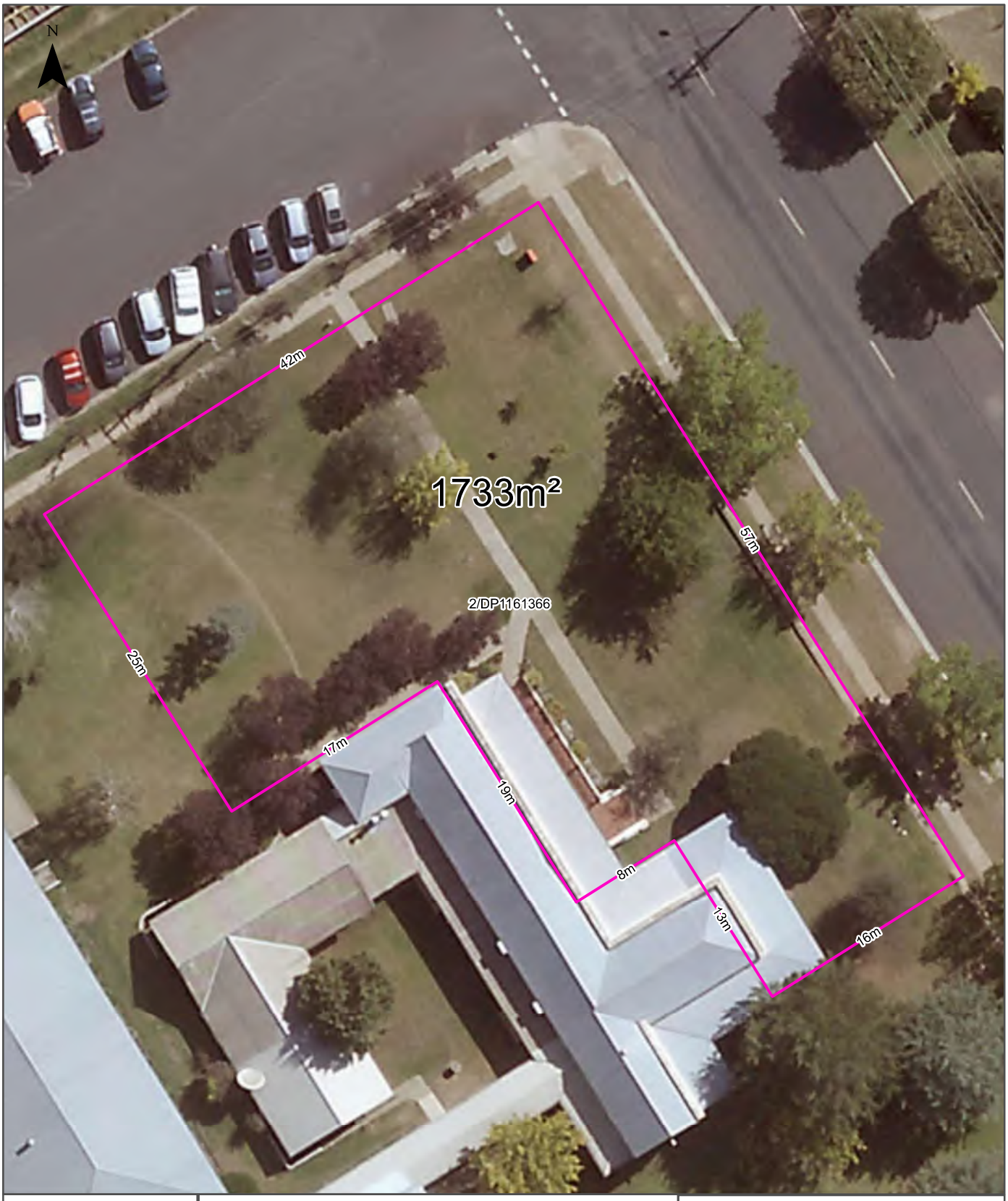
Datasets contained within this report, detailing their source and data currency:

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	17/06/2022	17/06/2022	Quarterly	-	-	-	-
Topographic Data	NSW Department of Customer Service - Spatial Services	22/08/2022	22/08/2022	Annually	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	02/09/2022	10/08/2022	Monthly	1000m	0	0	6
Contaminated Land Records of Notice	Environment Protection Authority	19/08/2022	19/08/2022	Monthly	1000m	0	0	1
Former Gasworks	Environment Protection Authority	02/09/2022	14/07/2021	Quarterly	1000m	0	0	0
National Waste Management Facilities Database	Geoscience Australia	26/05/2022	07/03/2017	Annually	1000m	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	23/08/2022	13/07/2012	Annually	1000m	0	0	5
EPA PFAS Investigation Program	Environment Protection Authority	02/09/2022	14/07/2021	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	02/09/2022	02/09/2022	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	02/09/2022	02/09/2022	Monthly	2000m	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	02/09/2022	02/09/2022	Monthly	2000m	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	02/09/2022	02/09/2022	Quarterly	2000m	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	16/02/2022	13/12/2018	Annually	1000m	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	19/08/2022	19/08/2022	Monthly	1000m	0	0	1
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	19/08/2022	19/08/2022	Monthly	1000m	1	1	1
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	19/08/2022	19/08/2022	Monthly	1000m	0	0	3
UBD Business Directories (Premise & Intersection Matches)	Hardie Grant			Not required	150m	2	6	16
UBD Business Directories (Road & Area Matches)	Hardie Grant			Not required	150m	-	45	167
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500m	0	0	7
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500m	-	3	8
Points of Interest	NSW Department of Customer Service - Spatial Services	18/08/2022	18/08/2022	Quarterly	1000m	0	3	44
Tanks (Areas)	NSW Department of Customer Service - Spatial Services	18/08/2022	18/08/2022	Quarterly	1000m	0	0	0
Tanks (Points)	NSW Department of Customer Service - Spatial Services	18/08/2022	18/08/2022	Quarterly	1000m	0	0	3
Major Easements	NSW Department of Customer Service - Spatial Services	29/08/2022	29/08/2022	Quarterly	1000m	0	0	8
State Forest	Forestry Corporation of NSW	16/08/2022	14/08/2022	Annually	1000m	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	10/02/2022	31/12/2021	Annually	1000m	0	0	0
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	29/08/2022	19/08/2019	Annually	1000m	1	1	1
Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018	NSW Department of Planning, Industry and Environment	28/03/2022	23/02/2018	Annually	1000m	0	0	0
National Groundwater Information System (NGIS) Boreholes	Bureau of Meteorology; Water NSW	24/01/2022	24/01/2022	Annually	2000m	0	0	48

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
NSW Seamless Geology Single Layer: Rock Units	Department of Regional NSW	17/02/2022	01/05/2021	Annually	1000m	1	1	3
NSW Seamless Geology – Single Layer: Trendlines	Department of Regional NSW	17/02/2022	01/05/2021	Annually	1000m	0	0	0
NSW Seamless Geology – Single Layer: Geological Boundaries and Faults	Department of Regional NSW	17/02/2022	01/05/2021	Annually	1000m	0	0	0
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000m	0	0	0
Atlas of Australian Soils	Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES)	19/05/2017	17/02/2011	As required	1000m	1	1	2
Soil Landscapes of Central and Eastern NSW	NSW Department of Planning, Industry and Environment	18/08/2022	27/07/2020	Annually	1000m	1	2	5
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning, Industry and Environment	02/09/2022	12/08/2022	Monthly	500m	0	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000m	1	1	1
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000m	0	0	0
Mining Subsidence Districts	NSW Department of Customer Service - Subsidence Advisory NSW	19/08/2021	05/08/2021	Quarterly	1000m	0	0	0
Current Mining Titles	NSW Department of Industry	02/09/2022	02/09/2022	Monthly	1000m	0	0	0
Mining Title Applications	NSW Department of Industry	02/09/2022	02/09/2022	Monthly	1000m	0	0	0
Historic Mining Titles	NSW Department of Industry	02/09/2022	02/09/2022	Monthly	1000m	7	7	11
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning, Industry and Environment	15/11/2021	07/12/2018	Monthly	1000m	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning, Industry and Environment	15/11/2021	05/11/2021	Monthly	1000m	1	4	52
Commonwealth Heritage List	Australian Government Department of the Agriculture, Water and the Environment	03/06/2022	13/04/2022	Annually	1000m	0	0	0
National Heritage List	Australian Government Department of the Agriculture, Water and the Environment	03/06/2022	13/04/2022	Annually	1000m	0	0	0
State Heritage Register - Curtilages	NSW Department of Planning, Industry and Environment	17/08/2022	11/02/2022	Quarterly	1000m	0	0	1
Environmental Planning Instrument Local Heritage	NSW Department of Planning, Industry and Environment	02/09/2022	26/08/2022	Monthly	1000m	1	4	77
Bush Fire Prone Land	NSW Rural Fire Service	05/09/2022	08/08/2022	Weekly	1000m	0	0	3
Vegetation of Southern Forests	NSW Office of Environment & Heritage	09/12/2014	10/10/2011	Unknown	1000m	0	0	3
Ramsar Wetlands of Australia	Australian Government Department of Agriculture, Water and the Environment	28/03/2022	19/03/2020	Annually	1000m	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Annually	1000m	0	0	2
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000m	0	0	2
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	05/09/2022	05/09/2022	Weekly	10000m	-	-	-

Site Diagram

Cooma Hospital, Bent Street, Cooma, NSW 2630



Legend

- Site Boundary
- Internal Parcel Boundaries

Total Area: 1733m²

Total Perimeter: 198m

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 labeled for increased legibility.

Scale: 0 10 20 Meters

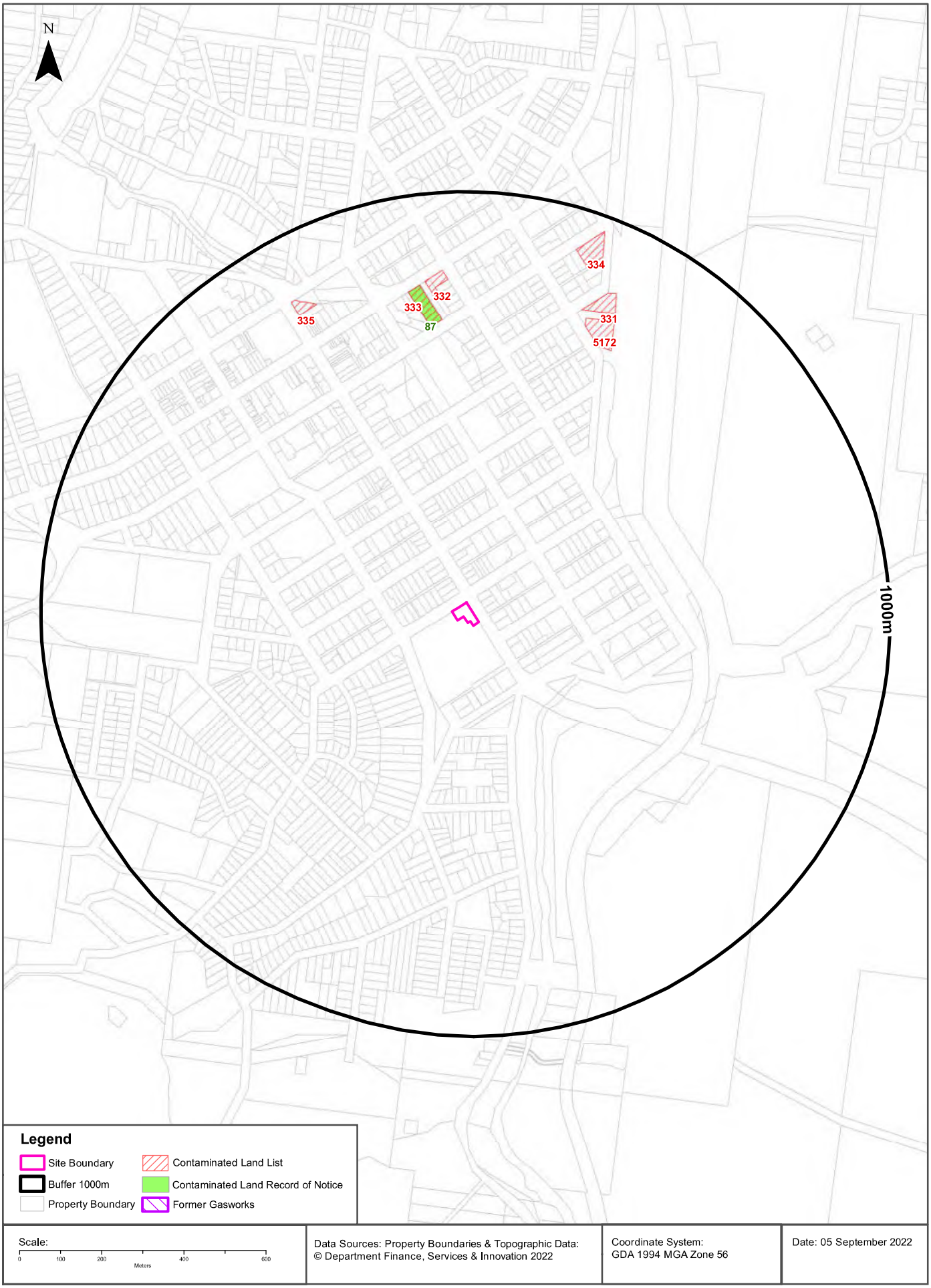
Data Source Aerial Imagery:
© Aerometrex Pty Ltd

Coordinate System:
GDA 1994 MGA Zone 56

Date: 05 September 2022

Contaminated Land

Cooma Hospital, Bent Street, Cooma, NSW 2630



Contaminated Land

Cooma Hospital, Bent Street, Cooma, NSW 2630

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
333	Former Shell Service Station	48-52 Sharp Street	Cooma	Service Station	Contamination formerly regulated under the CLM Act	Current EPA List	Premise Match	677m	North
5172	Former Shell Depot	48-50 Bradley Street	Cooma	Other Petroleum	Regulation under CLM Act not required	Current EPA List	Premise Match	703m	North East
332	Caltex Cooma Service Station	44 Sharp Street, corner Baron STREET	Cooma	Service Station	Regulation under CLM Act not required	Current EPA List	Premise Match	743m	North
331	Former Caltex Cooma Depot	2 Short Street	Cooma	Service Station	Regulation under CLM Act not required	Current EPA List	Premise Match	767m	North East
335	Woolworths Caltex Cooma Service Station	Bombala Street Cnr Massie Street	Cooma	Service Station	Regulation under CLM Act not required	Current EPA List	Premise Match	809m	North West
334	Former Mobil Cooma Depot	2 Commissioner Street	Cooma	Other Petroleum	Regulation under CLM Act not required	Current EPA List	Premise Match	869m	North

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.

EPA site management class	Explanation
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

Cooma Hospital, Bent Street, Cooma, NSW 2630

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
87	Former Shell Service Station	48-52 Sharp Street	Cooma	4 former	3110	Premise Match	677m	North

Contaminated Land Records of Notice Data Source: Environment Protection Authority

Terms of use and disclaimer for Contaminated Land: Record of Notices, please visit http://www.epa.nsw.gov.au/clm/clmdisclaimer.htm

Former Gasworks

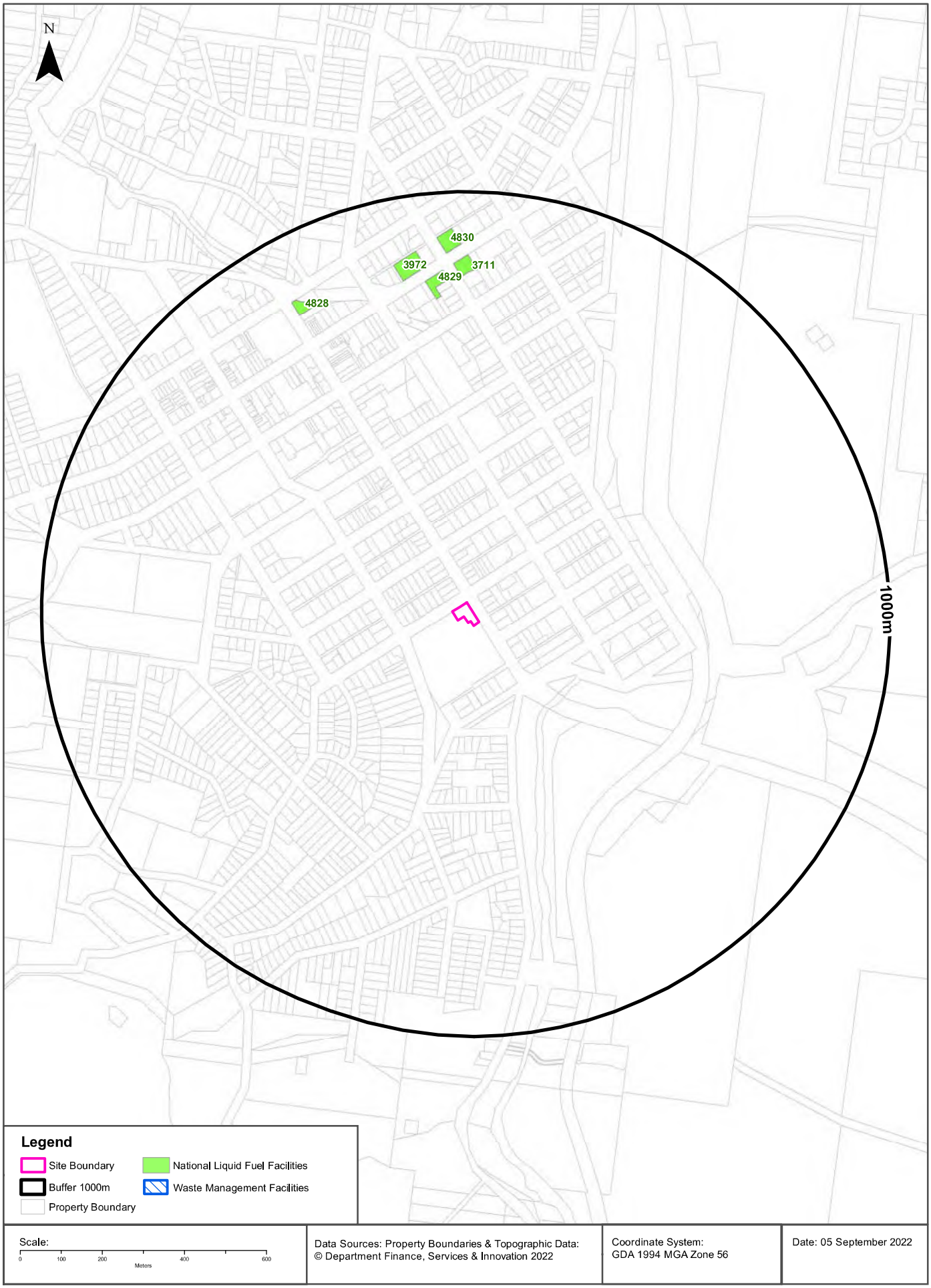
Former Gasworks within the dataset buffer:

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

Former Gasworks Data Source: Environment Protection Authority

Waste Management & Liquid Fuel Facilities

Cooma Hospital, Bent Street, Cooma, NSW 2630



Waste Management & Liquid Fuel Facilities

Cooma Hospital, Bent Street, Cooma, NSW 2630

National Waste Management Site Database

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

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

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
4829	Caltex	Caltex Cooma	44 Sharp Street	Cooma	Petrol Station	Operational		25/07/2011	Premise Match	743m	North
3711	7-Eleven Pty Ltd	Mobil Cooma	40-42 Sharp Street	Cooma	Petrol Station	Operational		13/07/2012	Premise Match	794m	North
3972	Shell	Region	47-51 Sharp Street	Cooma	Petrol Station	Operational		25/07/2011	Premise Match	799m	North
4828	Caltex	Woolworths Caltex Cooma	8 Bombala Street	Cooma	Petrol Station	Operational		25/07/2011	Premise Match	809m	North West
4830	Caltex	Cooma	41 Sharp Street	Cooma	Petrol Station	Operational		25/07/2011	Premise Match	852m	North

PFAS Investigation & Management Programs

Cooma Hospital, Bent Street, Cooma, NSW 2630

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

Cooma Hospital, Bent Street, Cooma, NSW 2630

Defence 3 Year Regional Contamination Investigation Program

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

EPA Other Sites with Contamination Issues

Cooma Hospital, Bent Street, Cooma, NSW 2630

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

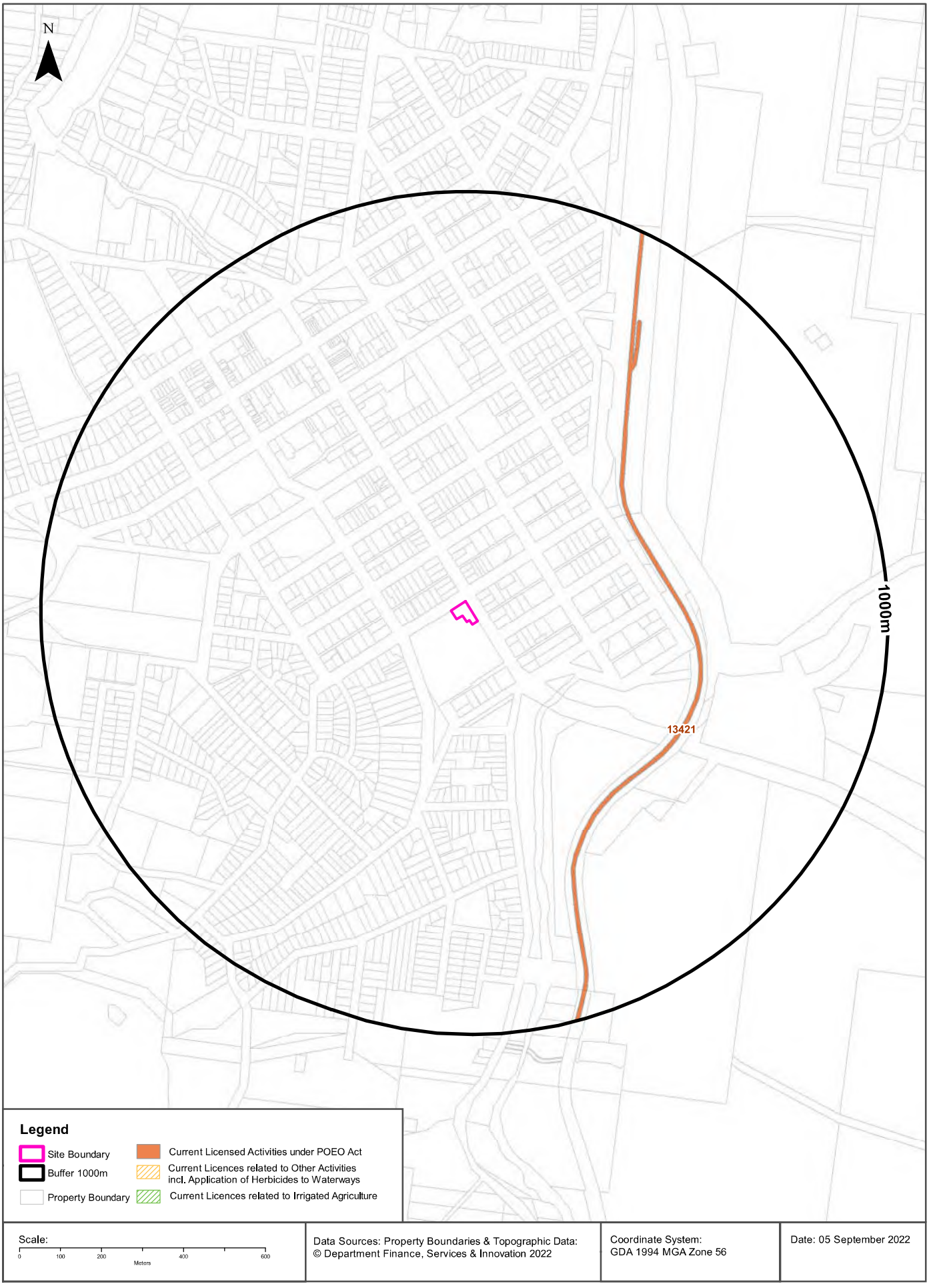
Sites within the dataset buffer:

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

Cooma Hospital, Bent Street, Cooma, NSW 2630



EPA Activities

Cooma Hospital, Bent Street, Cooma, NSW 2630

Licensed Activities under the POEO Act 1997

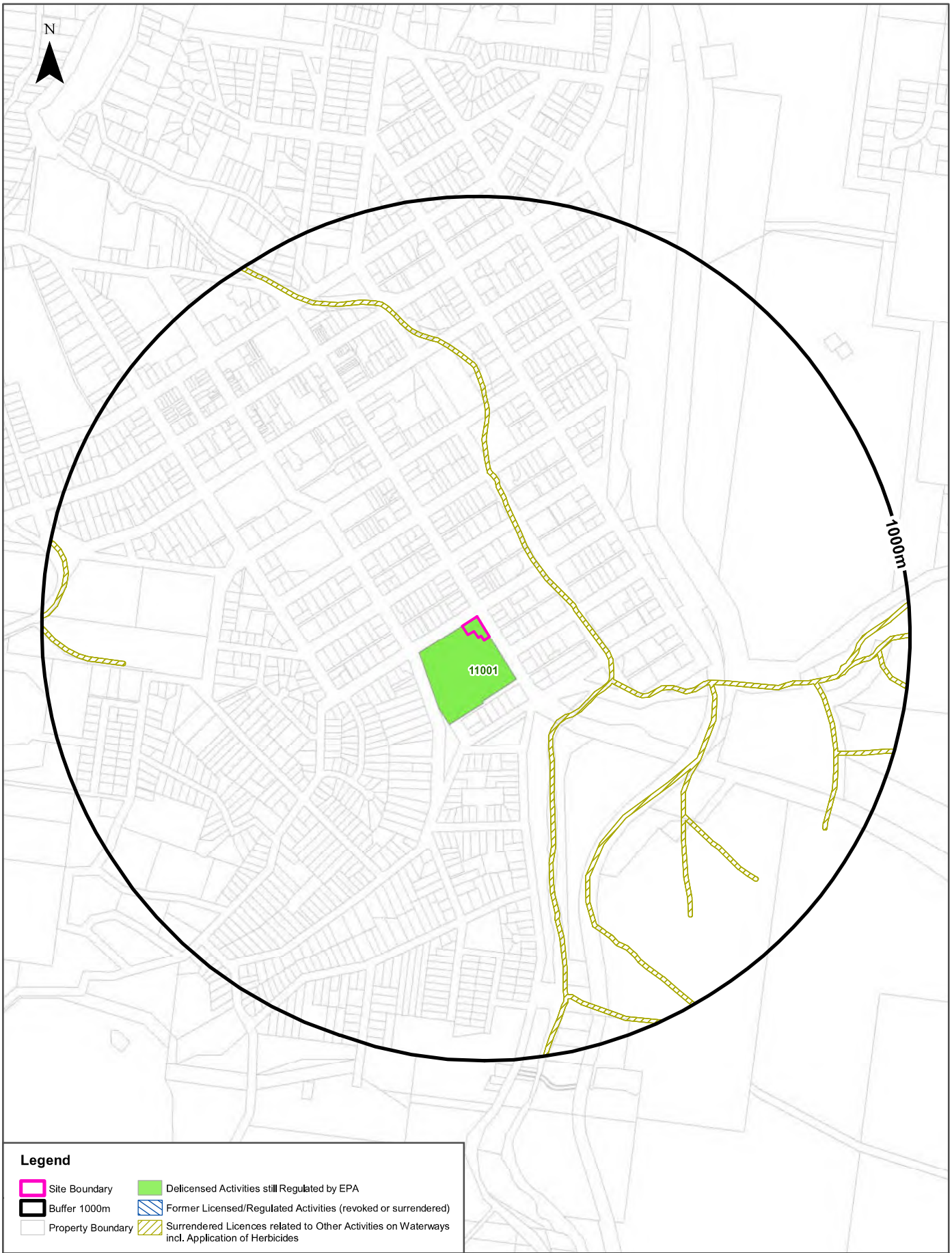
Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
13421	UGL REGIONAL LINX PTY LTD		COUNTRY REGIONAL NETWORK, ORANGE, NSW 2800		Railway systems activities	Network of Features	439m	East

POEO Licence Data Source: Environment Protection Authority

Delicensed & Former Licensed EPA Activities

Cooma Hospital, Bent Street, Cooma, NSW 2630



EPA Activities

Cooma Hospital, Bent Street, Cooma, NSW 2630

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
11001	GREATER SOUTHERN AREA HEALTH SERVICE	COOMA HEALTH SERVICE	Bent Street	COOMA	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	0m	On-site

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
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	183m	South 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	183m	South 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	183m	South East

Former Licensed Activities Data Source: Environment Protection Authority

Historical Business Directories

Cooma Hospital, Bent Street, Cooma, NSW 2630

Historical Business Directories

Cooma Hospital, Bent Street, Cooma, NSW 2630

Business Directory Records 1950-1991
Premise or Road Intersection Matches

Universal Business Directory records from years 1991, 1982, 1970, 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
1	BUILDERS &/OR CONTRACTORS	Architon Construction Co. Pty. Ltd., 2 Bent St. Cooma 2630	585079	1970	Premise Match	0m	On-site
	BUILDERS & CONTRACTORS	Architon Construction Co. Pty. Ltd., 2 Bent St., Cooma	195404	1961	Premise Match	0m	On-site
2	CARRIERS & CARTAGE CONTRACTORS	Anderson's Transport, 96 Bombala St. Cooma 2630	585129	1970	Premise Match	30m	East
3	BUILDERS & CONTRACTORS	Owers, F. E., 35 Victoria St., Cooma	195417	1961	Premise Match	35m	North West
4	PAINTERS, PAPERHANGERS & DECORATORS	Tomkins, W. S., 88 Bombala St., Cooma	195983	1961	Premise Match	56m	North
5	CARRIERS & CARTAGE CONTRACTORS	Woodhouse, C. W., 27 Albert St. Cooma	166128	1950	Premise Match	87m	East
6	PAINTERS, PAPERHANGERS & DECORATORS	Fachin, Elido, 28 Albert St. Cooma 2630	585528	1970	Premise Match	117m	East
	PAINTERS, PAPERHANGERS & DECORATORS	Fachin, Elido, 28 Albert St., Cooma	195978	1961	Premise Match	117m	East
7	DRY CLEANERS & PRESSERS.	Snowy Laundry., 23 Albert St., Cooma 2630	145874	1991	Premise Match	127m	East
	LAUNDRIES SELF SERVICE &/OR LAUNDRETTES.	Snowy Laundry., 23 Albert St., Cooma 2630	146043	1991	Premise Match	127m	East
	LAUNDRIES &/OR LAUNDRETTES	Snowy Laundry, 23 Albert St., Cooma 2630	154741	1982	Premise Match	127m	East
	LAUNDRIES &/OR LAUNDROMATS	Snowy Laundry, 23 Albert St. Cooma 2630	585370	1970	Premise Match	127m	East
8	DRY CLEANERS, PRESSERS & DYERS	Cooma Steam Laundry, 155 Vale St., Cooma	366701	1961	Road Intersection	135m	West
	INSURANCE AGENTS	Cooma Steam Laundry, 155 Vale St., Cooma	366705	1961	Road Intersection	135m	West
	LAUNDRIES	Cooma Steam Laundry, 155 Vale St., Cooma	366895	1961	Road Intersection	135m	West
	INSURANCE AGENTS	Doyle, P. G., 155 Vale St., Cooma	195760	1961	Road Intersection	135m	West

Business Directory Records 1950-1991
Road or Area Matches

Universal Business Directory records from years 1991, 1982, 1970, 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
9	AMBULANCES.	Cooma District Ambulance., Bombala St., Cooma 2630	145721	1991	Road Match	0m
	LIQUOR STORES RETAIL.	Payless Liquor Drive In., Bombala St., Cooma 2630	146051	1991	Road Match	0m
	AMBULANCES	Cooma District Ambulance, Bombala St., Cooma 2630	154461	1982	Road Match	0m
	AGRICULTURAL MACHINERY HIRERS &/OR DEALERS	Baker-Ford Motors Pty. Ltd., Bombala St. Cooma 2630	584991	1970	Road Match	0m
	MOTOR CAR & TRUCK DEALERS-NEW & USED	Baker-Ford Motors Pty. Ltd., Bombala St. Cooma 2630	585448	1970	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Baker-Ford Motors Pty. Ltd., Bombala St. Cooma 2630	585464	1970	Road Match	0m
	MOTOR PAINTERS & PANEL BEATERS	Baker-Ford Motors Pty. Ltd., Bombala St. Cooma 2630	585487	1970	Road Match	0m
	MOTOR TOWING SERVICES	Baker-Ford Motors Pty. Ltd., Bombala St. Cooma 2630	585498	1970	Road Match	0m
	LOCAL BODIES	Cooma District Ambulance, Bombala St. Cooma 2630	585385	1970	Road Match	0m
	HOSPITALS & HEALTH CENTRES	Cooma District Hospital, Bombala St. Cooma 2630	585325	1970	Road Match	0m
	LOCAL BODIES	Cooma Municipal Council, Bombala St. Cooma 2630	585387	1970	Road Match	0m
	GOVERNMENT DEPARTMENTS	Monaro County Council, Bombala St. Cooma 2630	585263	1970	Road Match	0m
	GOVERNMENT DEPARTMENTS	Moriaro Shire Council Bombala St. Cooma 2630	585264	1970	Road Match	0m
	RESTAURANT	Savoy Restaurant, Bombala St. Cooma 2630	585571	1970	Road Match	0m
	FURNITURE & FURNISHINGS	Watson, Robert (Cooma) Pty. Ltd., Bombala St. Cooma 2630	585240	1970	Road Match	0m
	LOCAL BODIES	Cooma District Ambulance, Bombala St., Cooma	195795	1961	Road Match	0m
	HOSPITALS & HEALTH CENTRES	Cooma District Hospital, Bombala St., Cooma	195736	1961	Road Match	0m
	CABARETS, DANCES, RESTAURANTS, ROAD HOUSES	Cortina Restaurant, Bombala St., Cooma	195439	1961	Road Match	0m
	CAFES, TEA ROOMS & COFFEE LOUNGES, ETC.	Cortina Restaurant, Bombala St., Cooma	195452	1961	Road Match	0m
	GOVERNMENT DEPARTMENTS	Monaro County Council, Bombala St,. Cooma	195674	1961	Road Match	0m
	GOVERNMENT DEPARTMENTS	Monaro Shire Council, Bombala St., Cooma	195675	1961	Road Match	0m
	BATTERY DISTRIBUTORS	National Tyre Service, Bombala St., Cooma	195386	1961	Road Match	0m
	AMBULANCES	Ambulance, Bombala St. Cooma	166060	1950	Road Match	0m
	LOCAL BODIES	Cooma District Ambulance, Bombala St. Cooma	166277	1950	Road Match	0m
	HOSPITALS	Cooma District Hospital, Bombala St. Cooma	166252	1950	Road Match	0m
	TRACTOR DEALERS, REPAIRERS & SERVICEMEN	Cooma Investments Pty. Ltd. (Agents Allis-Chalmers Tractors), Bombala St. Cooma	166464	1950	Road Match	0m
	MOTOR CAR & TRUCK DEALERS	Cooma Investments Pty. Ltd. (Agents, G.M.H.), Bombala St. Cooma	166332	1950	Road Match	0m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
9	INSURANCE AGENTS	Cooma Investments Pty. Ltd. (Agents, Security and General Insrnce., Transport and General Insrnce., Govt. Insrnce., Royal Exchange Insrnce.), Bombala St. Cooma	166264	1950	Road Match	0m
	AGRICULTURAL MACHINERY DEALERS	Cooma Investments Pty. Ltd., Bombala St. Cooma	166056	1950	Road Match	0m
	MOTOR ACCESSORIES DEALERS	Cooma Investments Pty. Ltd., Bombala St. Cooma	166323	1950	Road Match	0m
	MOTOR BODY BUILDERS	Cooma Investments Pty. Ltd., Bombala St. Cooma	166326	1950	Road Match	0m
	MOTOR ELECTRICIANS	Cooma Investments Pty. Ltd., Bombala St. Cooma	166338	1950	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Cooma Investments Pty. Ltd., Bombala St. Cooma	166341	1950	Road Match	0m
	MOTOR TOWING SERVICES	Cooma Investments Pty. Ltd., Bombala St. Cooma	166360	1950	Road Match	0m
	MOTOR TRIMMERS	Cooma Investments Pty. Ltd., Bombala St. Cooma	166362	1950	Road Match	0m
	MOTOR PAINTERS & PANEL BEATERS	Cooma Investments Pty., Ltd., Bombala St. Cooma	166356	1950	Road Match	0m
	SHEARING MACHINERY DEALERS	Coona Investments Pty. Ltd. (Agents, Dangar, Gedye and Malloch Ltd.), Bombala St. Cooma	166428	1950	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Hibbard, C. B. L., Bombala St. Cooma	166342	1950	Road Match	0m
	BAKERS-BREAD	Monaro Bakery, Bombala St. Cooma	166068	1950	Road Match	0m
	GOVERNMENT DEPARTMENTS	Monaro Shire Council, Bombala	166228	1950	Road Match	0m
	CAKE SHOPS & PASTRYCOOKS	Peter Pan Cake Shop, Bombala St. Cooma	166119	1950	Road Match	0m
10	HOSPITALS &/OR NURSING HOMES.	Cooma District Hospital., Victoria St., Cooma 2630	146015	1991	Road Match	0m
	HOSPITALS &/OR HEALTH CENTRES	Cooma District Hospital, Victoria St., Cooma 2630	154710	1982	Road Match	0m
	CARRIERS & CARTAGE CONTRACTORS	Anderson, J. W., Victoria St., Cooma	195479	1961	Road Match	0m
	CARRIERS & CARTAGE CONTRACTORS	Anderson and Rees, Victoria St. Cooma	166120	1950	Road Match	0m
11	INSURANCE AGENTS	Johnson, A, H., Bent St. Cooma 2630	585346	1970	Road Match	120m
	BUTCHERS-RETAIL	Grigor, D., Bent St., Cooma	195432	1961	Road Match	120m
	CARRIERS & CARTAGE CONTRACTORS	Jones, H., Bent St., Cooma	195485	1961	Road Match	120m
	DRESSMAKERS & COSTUMIERS	Mann, Madam, Bent St., Cooma	195540	1961	Road Match	120m
	CARPENTERS	Meltzer, W., Bent St., Cooma	195476	1961	Road Match	120m
	GROCERS & GENERAL STOREKEEPERS	Perry's, Bent St., ., Cooma	195697	1961	Road Match	120m
12	SCHOOLS &/OR COLLEGES - PRIVATE &/OR PUBLIC	Brigidine Convent., Vale St., Cooma 2630	146243	1991	Road Match	123m
	LIQUOR STORES RETAIL.	Cooma Cellars., Vale St., Cooma 2630	146047	1991	Road Match	123m
	SCHOOLS &/OR COLLEGES - PRIVATE &/OR PUBLIC	Cooma Public School., Vale St., Cooma 2630	146245	1991	Road Match	123m
	GOVERNMENT DEPARTMENTS.	Court House., Vale St., Cooma 2630	145959	1991	Road Match	123m
	REAL ESTATE AGENTS.	Dalgety Winchcombe F.G.C., 81 Vala St., Cooma 2630	146209	1991	Road Match	123m
	GROCERS &/OR GENERAL STOREKEEPERS.	Woolworths Food Fair., Vale St., Cooma 2630	145975	1991	Road Match	123m
	SCHOOLS &/OR COLLEGES PRIVATE & /OR PUBLIC	Brigidine Convent. Vale St., Cooma 2630	154913	1982	Road Match	123m
	GOVERNMENT DEPARTMENTS	Commonwealth Employment Agency. Court House. Vale St., Cooma 2630	154666	1982	Road Match	123m
	SCHOOLS &/OR COLLEGES PRIVATE & /OR PUBLIC	Cooma Public School. Vale St., Cooma 2630	154915	1982	Road Match	123m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
12	GOVERNMENT DEPARTMENTS	Court House, Vale St., Cooma 2630	154669	1982	Road Match	123m
	AUCTIONEERS, STOCK & STATION AGENTS	A.M.L. & F. Co. Ltd., Vale St. Cooma 2630	585027	1970	Road Match	123m
	STATION & FARM SUPPLIES	A.M.L. & F. Co. Ltd., Vale St. Cooma 2630	585621	1970	Road Match	123m
	SCHOOLS & COLLEGES-PRIVATE & PUBLIC	Brigidine Convent, Vale St. Cooma 2630	585584	1970	Road Match	123m
	ASSOCIATIONS, SOCIETIES, CLUBS & SPORTING BODIES	Cooma Citizens' Club, Vale St. Cooma 2630	585009	1970	Road Match	123m
	ASSOCIATIONS, SOCIETIES, CLUBS & SPORTING BODIES	Cooma Ex-Servicemen's Club, Vale St. Cooma 2630	585010	1970	Road Match	123m
	ASSOCIATIONS, SOCIETIES, CLUBS & SPORTING BODIES	Cooma Pastoral and Agricultural Ass'n, Vale St. Cooma 2630	585013	1970	Road Match	123m
	SCHOOLS & COLLEGES-PRIVATE & PUBLIC	Cooma Public School, Vale St. Cooma 2630	585587	1970	Road Match	123m
	GOVERNMENT DEPARTMENTS	Court House, Vale St. Cooma 2630	585256	1970	Road Match	123m
	DRESS SHOPS & ACCESSORIES	Murphy, P. D. Pty. Ld., Vale St. Cooma 2630	585167	1970	Road Match	123m
	BABY & CHILDREN'S WEAR-RETAIL	Murphy, P. D. Pty. Ltd., Vale St. Cooma 2630	585036	1970	Road Match	123m
	DRAPERS & HABERDASHERS	Murphy, P. D. Pty. Ltd., Vale St. Cooma 2630	585160	1970	Road Match	123m
	GROCERS & SELF SERVICE STORES	Murphy, P. D. Pty. Ltd., Vale St. Cooma 2630	585288	1970	Road Match	123m
	HARDWARE & BUILDERS' SUPPLIES	Murphy, P. D. Pty. Ltd., Vale St. Cooma 2630	585310	1970	Road Match	123m
	MERCERS & MEN'S & BOYS' OUTFITTERS	Murphy, P. D. Pty. Ltd., Vale St. Cooma 2630	585404	1970	Road Match	123m
	OUTFITTERS- LADIES' & CHILDREN'S	Murphy, P. D. Pty. Ltd., Vale St. Cooma 2630	585522	1970	Road Match	123m
	PRODUCE MERCHANTS-GRAIN & SEED-RETAIL	Murphy, P. D. Pty. Ltd., Vale St. Cooma 2630	585547	1970	Road Match	123m
	STATION & FARM SUPPLIES	Murphy, P. D. Pty. Ltd., Vale St. Cooma 2630	585627	1970	Road Match	123m
	WINE & SPIRIT MERCHANTS-RETAIL	Murphy, P. D. Pty. Ltd., Vale St. Cooma 2630	585710	1970	Road Match	123m
	CHAIN STORES	Woolworths Food Fair, Vale St. Cooma 2630	585138	1970	Road Match	123m
	FRUITERERS & GREENGROCERS	Woolworths Food Fair, Vale St. Cooma 2630	585229	1970	Road Match	123m
	GROCERS & SELF SERVICE STORES	Woolworths Food Fair, Vale St. Cooma 2630	585293	1970	Road Match	123m
	AUCTIONEERS, STOCK & STATION AGENTS	A.M.L. & F. Co. Ltd., Vale St., Cooma	195368	1961	Road Match	123m
	INSURANCE AGENTS	A.M.L. & F. Co. Ltd., Vale St., Cooma	195756	1961	Road Match	123m
	STATION & FARM SUPPLIES	A.M.L. & F. Co. Ltd., Vale St., Cooma	196090	1961	Road Match	123m
	TAXIS & HIRE CARS	Bolton, R. L., Vale St., Cooma	196118	1961	Road Match	123m
	SCHOOLS & COLLEGES-PRIVATE & PUBLIC	Brigidine Convent, Vale St., Cooma	196043	1961	Road Match	123m
	TAXIS & HIRE CARS	Bryant, C. I., Vale St., Cooma	196119	1961	Road Match	123m
	CLUBS & SPORTS BODIES	Cooma Pastoral and Agricultural Ass'n, Vale St., Cooma	195502	1961	Road Match	123m
	CLUBS & SPORTS BODIES	Cooma Race Club, Regstd. Office, Vale St., Cooma	195503	1961	Road Match	123m
	FLORISTS-RETAIL	Florist Shoppe, Vale St., Cooma	195605	1961	Road Match	123m
	PHOTOGRAPHIC SUPPLIES	Hoolm, S. Pharmacy, Vale St., Cooma	195990	1961	Road Match	123m
	CABINETMAKERS & FRENCH POLISHERS	McArthur, N., Vale St., Cooma	195444	1961	Road Match	123m
	FURNITURE-OFFICE-RETAIL	McArthur, N., Vale St., Cooma	195661	1961	Road Match	123m

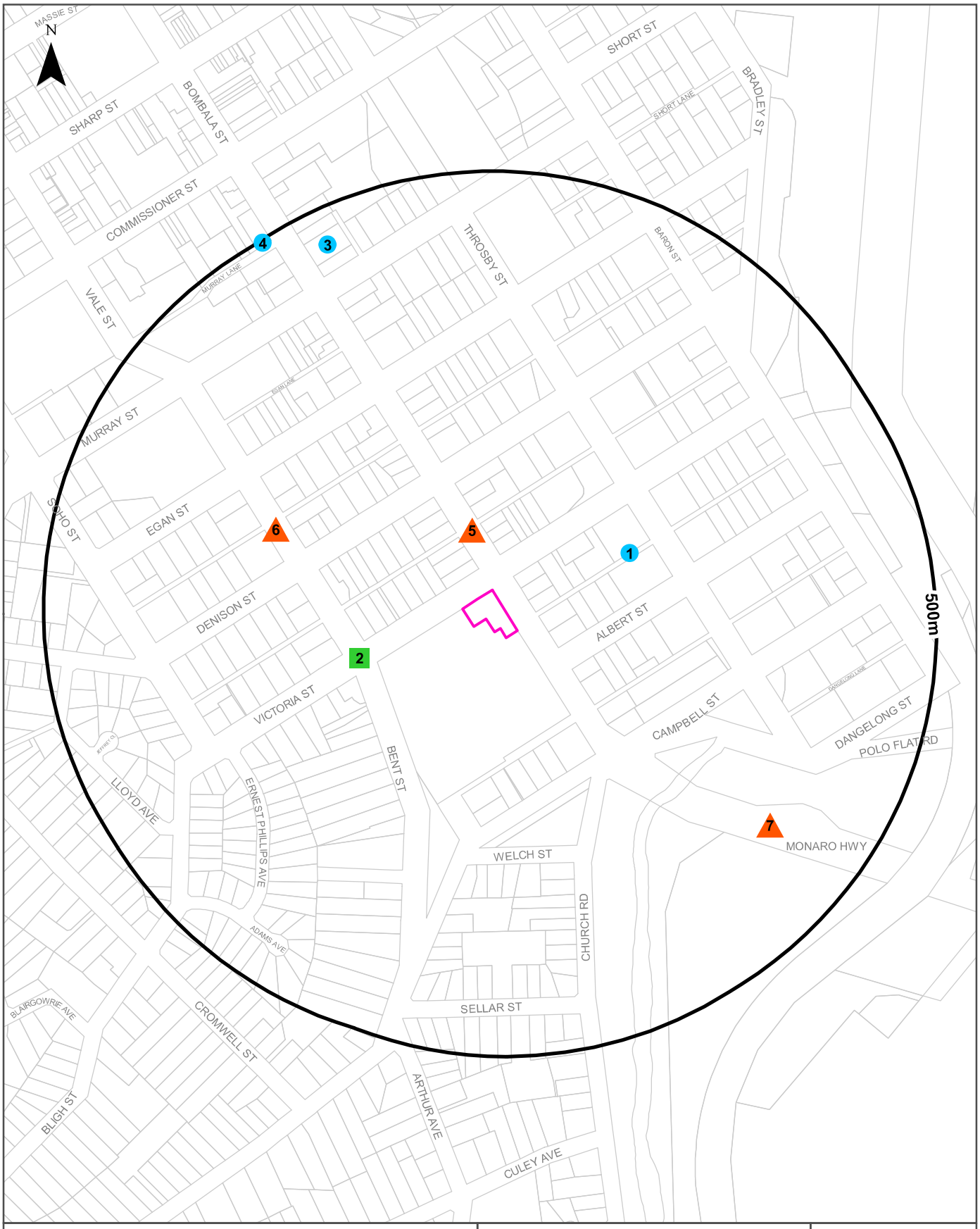
Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
12	SHOP & OFFICE FITTERS	McArthur, N., Vale St., Cooma	196060	1961	Road Match	123m
	REAL ESTATE AGENTS-VALUERS	Montague, Jas. H., Vale St., Cooma	196024	1961	Road Match	123m
	GENERAL MERCHANTS	Murphy P. D. Pty. Ltd., Vale St., Cooma	195663	1961	Road Match	123m
	GROCERS & GENERAL STOREKEEPERS	Murphy, P. D, Pty. Ltd., Vale St., Cooma	195696	1961	Road Match	123m
	BUILDERS' SUPPLIERS	Murphy, P. D. Pty. Ltd,. Vale St., Cooma	195425	1961	Road Match	123m
	WINE & SPIRIT MERCHANTS-RETAIL	Murphy, P. D. Pty. Ltd,. Vale St., Cooma	196182	1961	Road Match	123m
	BABY & CHILDREN'S WEAR-RETAIL	Murphy, P. D. Pty. Ltd., Vale St., Cooma	195375	1961	Road Match	123m
	DELICATESSENS	Murphy, P. D. Pty. Ltd., Vale St., Cooma	195525	1961	Road Match	123m
	DRAPERS-RETAIL	Murphy, P. D. Pty. Ltd., Vale St., Cooma	195536	1961	Road Match	123m
	FOOTWEAR RETAILERS	Murphy, P. D. Pty. Ltd., Vale St., Cooma	195617	1961	Road Match	123m
	HARDWARE DEALERS & IRONMONGERS	Murphy, P. D. Pty. Ltd., Vale St., Cooma	195716	1961	Road Match	123m
	MERCERS & MEN'S & BOYS' OUTFITTERS	Murphy, P. D. Pty. Ltd., Vale St., Cooma	195819	1961	Road Match	123m
	OUTFITTERS- LADIES' & CHILDREN'S	Murphy, P. D. Pty. Ltd., Vale St., Cooma	195969	1961	Road Match	123m
	PRODUCE MERCHANTS-GRAIN & SEED-RETAIL	Murphy, P. D. Pty. Ltd., Vale St., Cooma	196008	1961	Road Match	123m
	STATION & FARM SUPPLIES	Murphy, P. D. Pty. Ltd., Vale St., Cooma	196095	1961	Road Match	123m
	FRUITERERS & GREENGROCERS	Murphy, P. O. Pty. Ltd., Vale St., Cooma	195647	1961	Road Match	123m
	GROCERS & GENERAL STOREKEEPERS	Solomens Store, Vale St., Cooma	195699	1961	Road Match	123m
	FURNITURE & FURNISHINGS-RETAIL	Williams, B. J. and Son, Vale St., Cooma	195660	1961	Road Match	123m
	COMPANY OFFICES	Adaminaby Rural Co-op. Society Ltd., Regstd. Office, Vale St. Cooma	166137	1950	Road Match	123m
	BABY HEALTH CENTRES	Baby Health Centre, Vale St. Cooma	166067	1950	Road Match	123m
	LIBRARIES-LENDING	Book Club Library, Vale St. Cooma	166274	1950	Road Match	123m
	LIBRARIES-LENDING	Cooma Municipal Library, Vale St. Cooma	166276	1950	Road Match	123m
	CLUBS & SPORTS BODIES	Cooma Pastoral and Agricultural Ass'n, Vale St. Cooma	166136	1950	Road Match	123m
	CLUBS & SPORTS BODIES	Cooma Race Club, Regstd. Office, Vale St. Cooma	166135	1950	Road Match	123m
	COMPANY OFFICES	Cooma Rural Co-op. Society Ltd., Regstd. Office, Vale St. Cooma	166138	1950	Road Match	123m
	BUTCHERS-RETAIL	Cooma-Monaro Meat Works, Vale St. Cooma	166109	1950	Road Match	123m
	WOOL BROKERS	Goodwin, R. (Agent, Country Producers Selling Co. Ltd.), Vale St. Cooma	166493	1950	Road Match	123m
	INSURANCE AGENTS	Goodwin, R. (Agent, Queensland Insrnce. Co. Ltd.), Vale St. Cooma	166265	1950	Road Match	123m
	AUCTIONEERS	Goodwin, R., Vale St. Cooma	166063	1950	Road Match	123m
	STOCK & STATION AGENTS	Goodwin, R., Vale St. Cooma	166406	1950	Road Match	123m
	RADIO DEALERS & SERVICEMEN	Klein Radio Service (Agents, Philips, Ferris), Vale St Cooma	166397	1950	Road Match	123m
	ELECTRICAL SUPPLIES & APPLIANCES-RETAIL	Klein Radio Service, Vale St. Cooma	166177	1950	Road Match	123m
	INSURANCE AGENTS	Montague, J. H. (Agent, Phoenix Insrnce. Co.), Vale St. Cooma	166271	1950	Road Match	123m
	AUCTIONEERS	Montague, J. H. Vale St. Cooma	166066	1950	Road Match	123m
	STOCK & STATION AGENTS	Montague, J. H., Vale St. Cooma	166409	1950	Road Match	123m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
12	AGRICULTURAL MACHINERY DEALERS	Murphy P. D. Pty. Ltd. (Agents, International Harvester Co.), Vale St. Cooma	166058	1950	Road Match	123m
	TRACTOR DEALERS, REPAIRERS & SERVICEMEN	Murphy, J. (Agent, international Harvester Co.), Vale St. Cooma	166466	1950	Road Match	123m
	MOTOR OIL & SPIRIT MERCHANTS	Murphy, P. D. Pty. Ltd. (Agents, Atlantic Union Oil Co.), Vale St. Cooma	166349	1950	Road Match	123m
	BUILDERS' SUPPLIES	Murphy, P. D. Pty. Ltd., Vale St. Cooma	166105	1950	Road Match	123m
	DEPARTMENTAL STORES	Murphy, P. D. Pty. Ltd., Vale St. Cooma	166152	1950	Road Match	123m
	DRAPERS-RETAIL	Murphy, P. D. Pty. Ltd., Vale St. Cooma	166158	1950	Road Match	123m
	FOOTWEAR RETAILERS	Murphy, P. D. Pty. Ltd., Vale St. Cooma	166195	1950	Road Match	123m
	FROCK SALONS	Murphy, P. D. Pty. Ltd., Vale St. Cooma	166201	1950	Road Match	123m
	PRODUCE MERCHANTS-RETAIL	Murphy, P. D. Pty. Ltd., Vale St. Cooma	166389	1950	Road Match	123m
	STATION & FARM SUPPLIES	Murphy, P. D. Pty. Ltd., Vale St. Cooma	166444	1950	Road Match	123m
	WINE & SPIRIT MERCHANTS	Murphy, P. D. Pty. Ltd., Vale St. Cooma	166486	1950	Road Match	123m
	COMPANY OFFICES	Nimmitabel Rural Co-op. Society Ltd., Regstd. Office, Vale St. Cooma	166139	1950	Road Match	123m
	TRACTOR DEALERS, REPAIRERS & SERVICEMEN	Norris' Garage (Agent, Ferguson Tractors), Vale St. Cooma	166467	1950	Road Match	123m
	REFRIGERATION DEALERS & SERVICEMEN	Norris' Garage (Agent, Kelvinator), Vale St. Cooma	166415	1950	Road Match	123m
	CYCLE DEALERS, REPAIRERS & ACCESSORIES	Norris' Garage (Agent, Speedwell), Vale St. Cooma	166143	1950	Road Match	123m
	INSURANCE AGENTS	Norris' Garage (Agents, Licences and General Insrnce. Co., London Guarantee Insrnce. Co.), Vale St. Cooma	166272	1950	Road Match	123m
	RADIO DEALERS & SERVICEMEN	Norris' Garage (Agents, Stromberg-Carlson), Vale St Cooma	166400	1950	Road Match	123m
	MOTOR ACCESSORIES DEALERS	Norris' Garage, Vale St. Cooma	166324	1950	Road Match	123m
	MOTOR BODY BUILDERS	Norris' Garage, Vale St. Cooma	166327	1950	Road Match	123m
	MOTOR BUS PROPRIETORS	Norris' Garage, Vale St. Cooma	166329	1950	Road Match	123m
	MOTOR CYCLE DEALERS, REPAIRERS & ACCESSORIES	Norris' Garage, Vale St. Cooma	166336	1950	Road Match	123m
	MOTOR GARAGES & ENGINEERS	Norris' Garage, Vale St. Cooma	166343	1950	Road Match	123m
	MOTOR PAINTERS & PANEL BEATERS	Norris' Garage, Vale St. Cooma	166357	1950	Road Match	123m
	MOTOR TRIMMERS	Norris' Garage, Vale St. Cooma	166363	1950	Road Match	123m
	TYRE DEALERS, RETREADERS & VULCANIZERS	Norris' Garage, Vale St. Cooma	166474	1950	Road Match	123m
	MOTOR OIL & SPIRIT MERCHANTS	Norris, J. A. (Agent, Caltex Oil (Aust.) Pty. Ltd.), Vale St. Cooma	166351	1950	Road Match	123m
	WELDERS-ELECTRIC & OXY	Norris's Garage, Vale St. Cooma	166485	1950	Road Match	123m
	SAWMILLERS	Peters Bros., Vale St. Cooma	166422	1950	Road Match	123m
	TIMBER MERCHANTS	Peters Bros., Vale St. Cooma	166458	1950	Road Match	123m
	GOVERNMENT DEPARTMENTS	Post Office, Vale St. Cooma	166225	1950	Road Match	123m
	MERCERS & GENT.'S OUTFITTERS	Pryces, Sidney, Vale St. Cooma	166296	1950	Road Match	123m
	OUTFITTERS-LADIES' & CHILDREN'S	Pryces, Sidney, Vale St. Cooma	166370	1950	Road Match	123m
	TAILORS-MEN'S & LADIES'	Pryces,Sidney, Vale St. Cooma	166449	1950	Road Match	123m

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
12	INSURANCE AGENTS	Rohr, J. W. (Agent, Cornbill Insrnce. Co. Ltd., Commercial Union Assrnce. Co. Ltd.), Vale St. Cooma	166268	1950	Road Match	123m
	FURNITURE-HOUSEHOLD-RETAIL	Williams, B. J. and Son, Vale St. Cooma	166221	1950	Road Match	123m
13	BUILDERS & CONTRACTORS	Fleming, G., Denison St., Cooma	195411	1961	Road Match	131m
	BUILDERS & BUILDING CONTRACTORS	Campbell, L., Denison St. Cooma	166100	1950	Road Match	131m
	BUILDERS & BUILDING CONTRACTORS	Fleming, G., Denison St. Cooma	166101	1950	Road Match	131m

Dry Cleaners, Motor Garages & Service Stations

Cooma Hospital, Bent Street, Cooma, NSW 2630



Legend

- Site Boundary
- Buffer 500m
- 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 80 160 240 320 Meters

Coordinate System: GDA 1994 MGA Zone 56

Date: 05 September 2022

Data Sources: Reproduced with permission of UBD and Hardie Grant Media Pty Ltd DD 01/08/2018

Historical Business Directories

Cooma Hospital, Bent Street, Cooma, NSW 2630

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

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

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	DRY CLEANERS & PRESSERS.	Snowy Laundry., 23 Albert St., Cooma 2630	145874	1991	Premise Match	127m	North East
2	DRY CLEANERS, PRESSERS & DYERS	Cooma Steam Laundry, 155 Vale St., Cooma	366701	1961	Road Intersection	135m	West
3	MOTOR GARAGES & SERVICE STATIONS	Southern Service Centre., 54 Bombala St., Cooma 2630	146126	1991	Premise Match	439m	North West
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS	Southern Service Centre, 54 Bombala St., Cooma 2630	154827	1982	Premise Match	439m	North West
	MOTOR GARAGES & ENGINEERS	Southern Service Station, 54 Bombala St. Cooma 2630	585476	1970	Premise Match	439m	North West
	MOTOR GARAGES & ENGINEERS	Southern Service Station, 54 Bombala St., Cooma	195907	1961	Premise Match	439m	North West
4	MOTOR GARAGES & SERVICE STATIONS	Kennedy's Discount Tyres., 41 Bombala St., Cooma 2630	146122	1991	Premise Match	493m	North West

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

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

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
5	MOTOR GARAGES & ENGINEERS	Baker-Ford Motors Pty. Ltd., Bombala St. Cooma 2630	585464	1970	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Cooma Investments Pty. Ltd., Bombala St. Cooma	166341	1950	Road Match	0m
	MOTOR GARAGES & ENGINEERS	Hibbard, C. B. L., Bombala St. Cooma	166342	1950	Road Match	0m
6	MOTOR GARAGES & ENGINEERS	Norris' Garage, Vale St. Cooma	166343	1950	Road Match	123m
7	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS	Golden Fleece Monaro, Monaro Highway., Cooma 2630	154820	1982	Road Match	257m
	MOTOR GARAGES & ENGINEERS	East Cooma Service Station, Canberra Rd. Cooma 2630	585470	1970	Road Match	257m
	MOTOR GARAGES & ENGINEERS	Mo-Ro Service Station, Canberra Rd., Cooma	195897	1961	Road Match	257m
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	Mo-Ro Service Station, Canberra Rd., Cooma	195937	1961	Road Match	257m

Aerial Imagery 2020

Cooma Hospital, Bent Street, Cooma, NSW 2630

Aerial Imagery 2016

Cooma Hospital, Bent Street, Cooma, NSW 2630

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0 25 50 75 100 Meters

Aerial Imagery 2011

Cooma Hospital, Bent Street, Cooma, NSW 2630

Scale:	Data Source Aerial Imagery: © 2022 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 02 September 2022

Aerial Imagery 2002

Cooma Hospital, Bent Street, Cooma, NSW 2630

Scale:	Data Source Aerial Imagery: © 2022 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 02 September 2022

0 25 50 75 100 Meters

Aerial Imagery 1998

Cooma Hospital, Bent Street, Cooma, NSW 2630

Aerial Imagery 1985

Cooma Hospital, Bent Street, Cooma, NSW 2630

Aerial Imagery 1977

Cooma Hospital, Bent Street, Cooma, NSW 2630

Aerial Imagery 1967

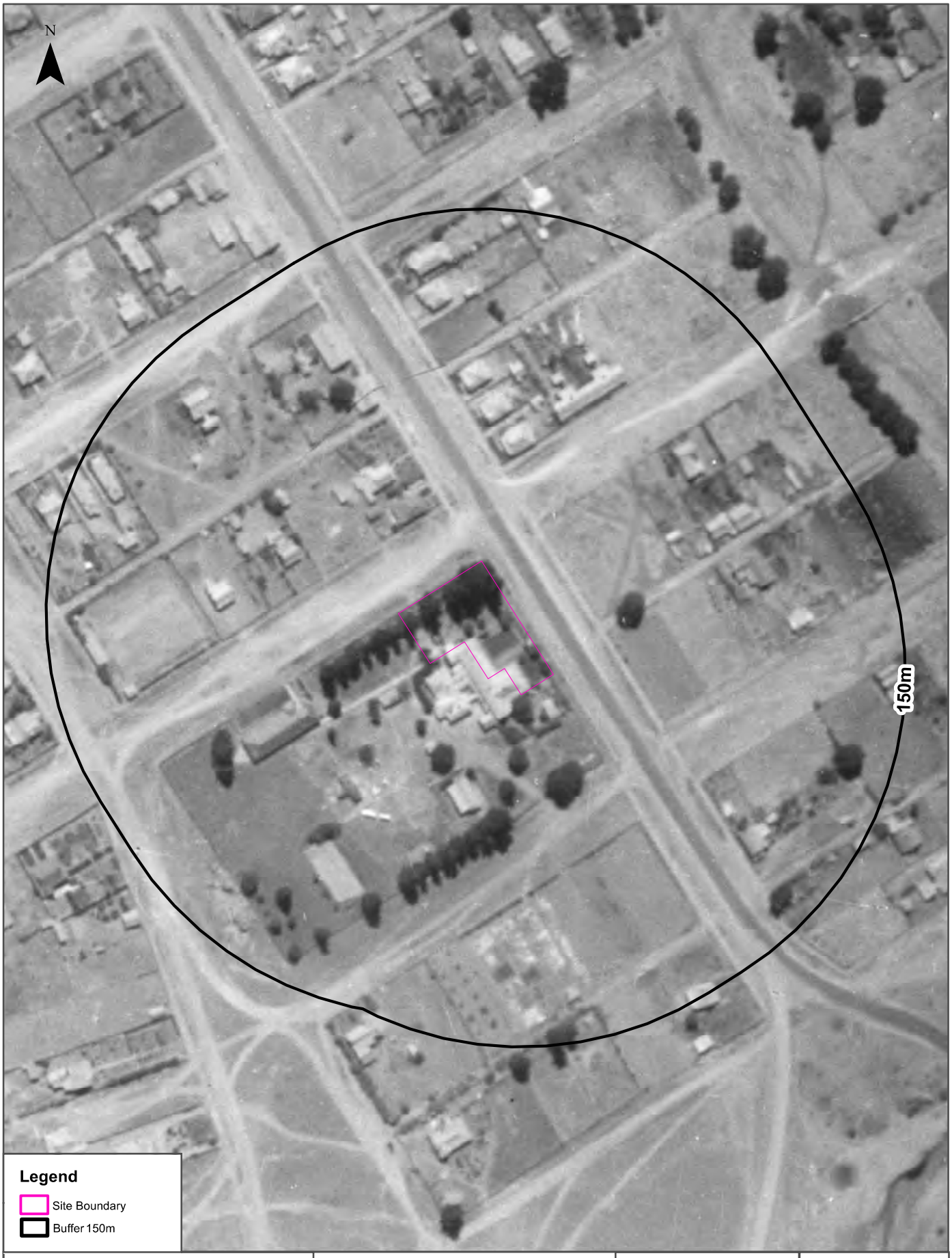
Cooma Hospital, Bent Street, Cooma, NSW 2630

Aerial Imagery 1960

Cooma Hospital, Bent Street, Cooma, NSW 2630

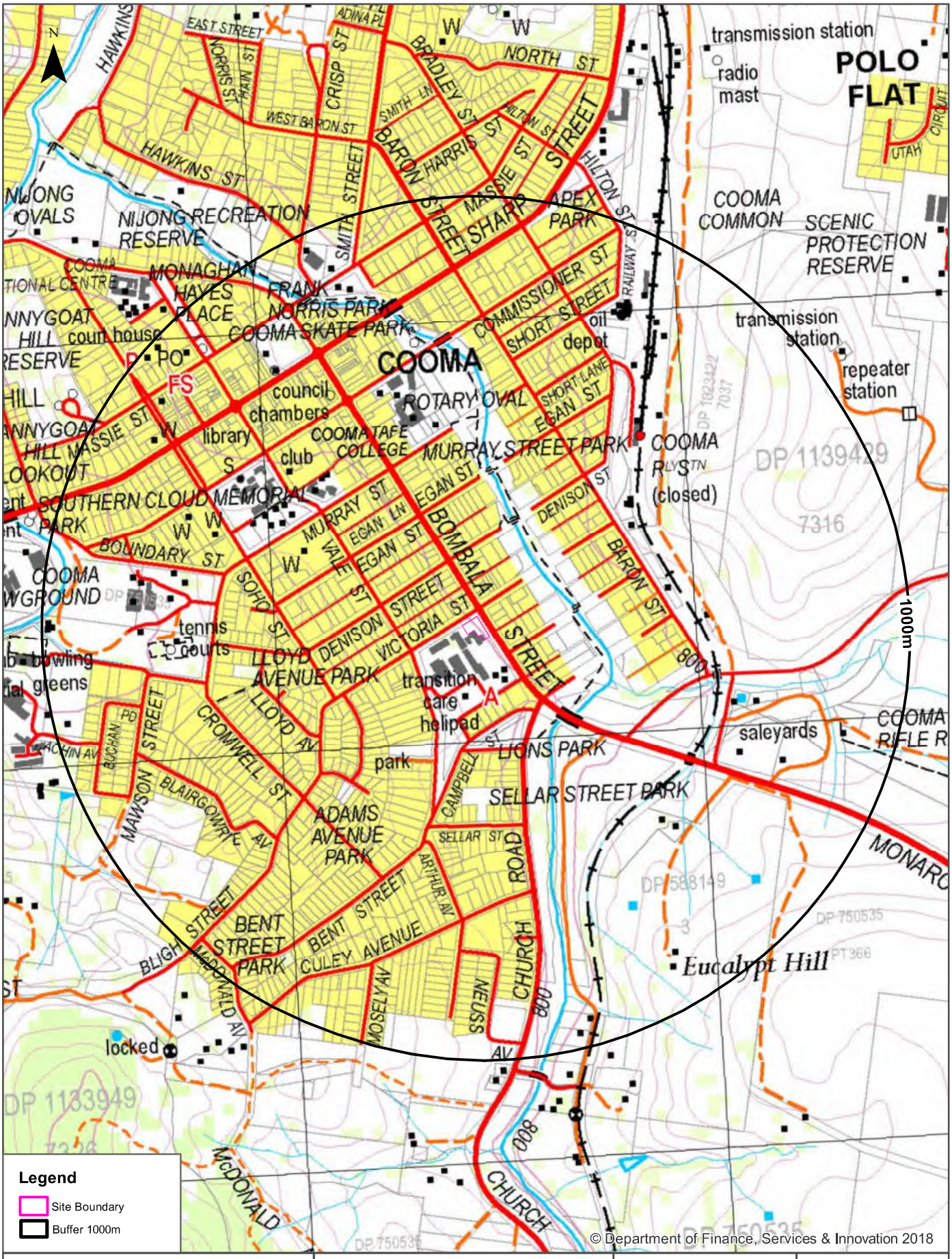
Aerial Imagery 1944

Cooma Hospital, Bent Street, Cooma, NSW 2630



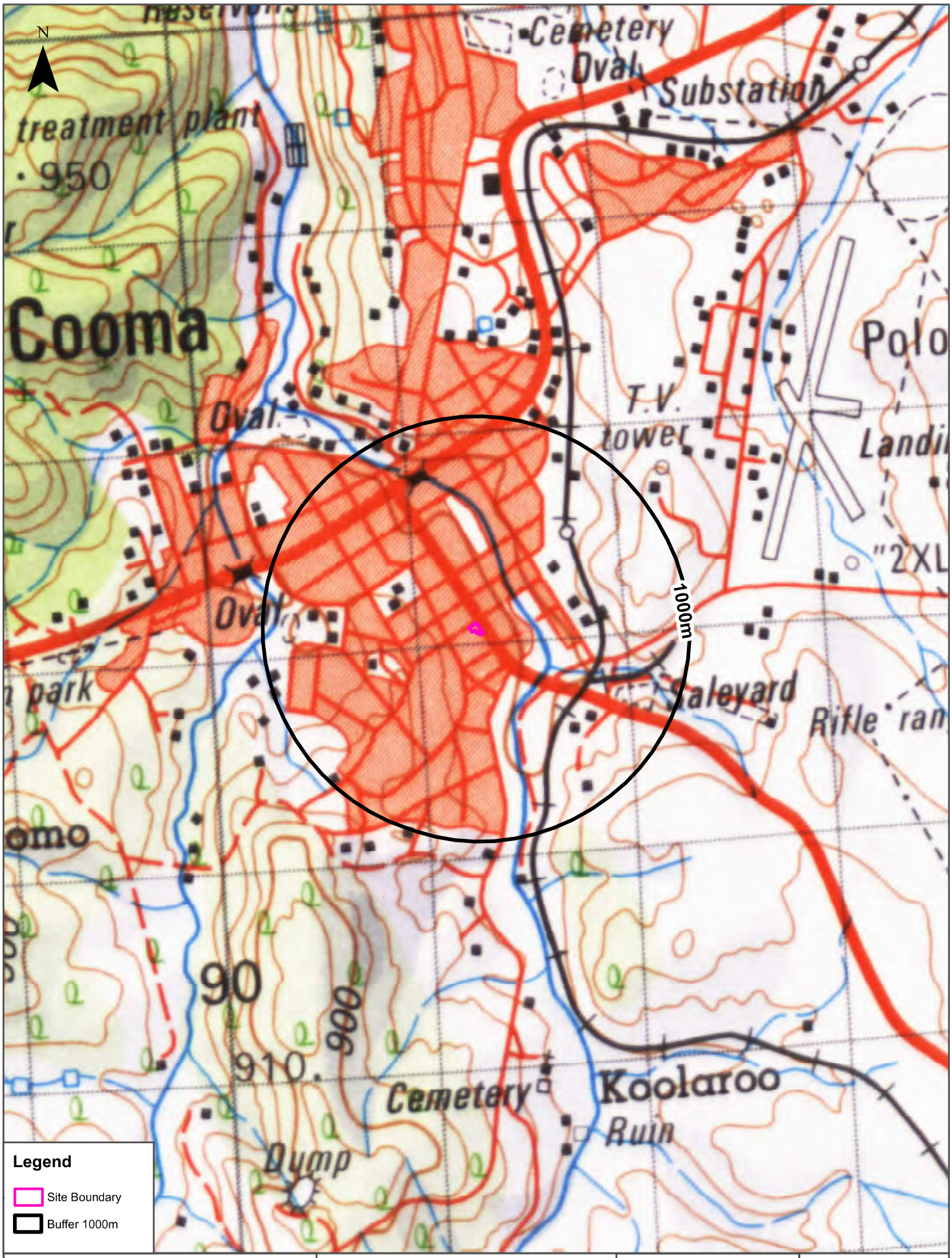
Topographic Map 2015

Cooma Hospital, Bent Street, Cooma, NSW 2630



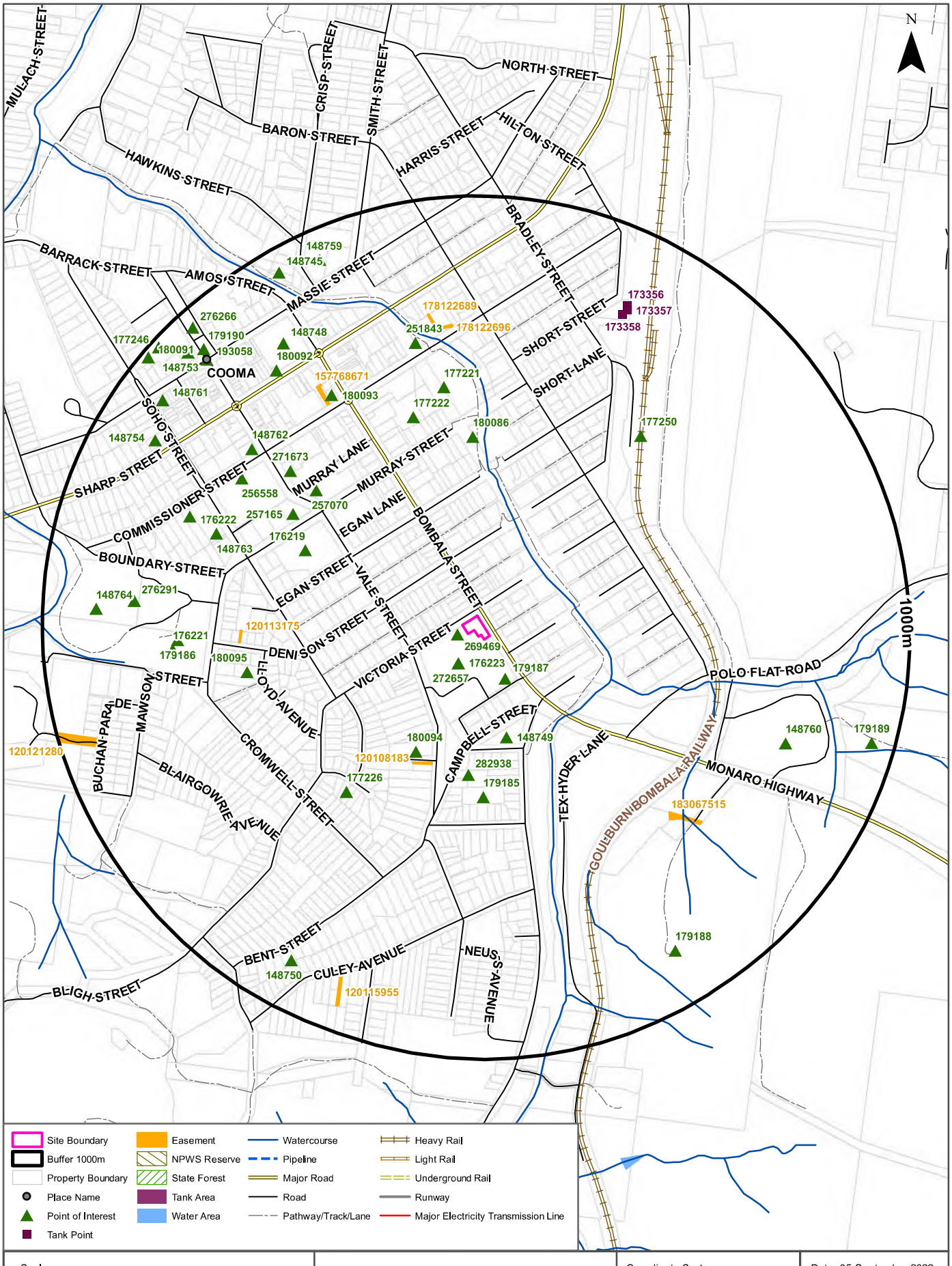
Historical Map 1977

Cooma Hospital, Bent Street, Cooma, NSW 2630



Topographic Features

Cooma Hospital, Bent Street, Cooma, NSW 2630



Site Boundary
Buffer 1000m
Property Boundary
Place Name
Point of Interest
Tank Point
Easement
NPWS Reserve
State Forest
Tank Area
Water Area
Watercourse
Pipeline
Major Road
Road
Pathway/Track/Lane
Heavy Rail
Light Rail
Underground Rail
Runway
Major Electricity Transmission Line

Scale: 0 100 200 400 600 Meters

Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2022

Coordinate System: GDA 1994 MGA Zone 56

Date: 05 September 2022

Topographic Features

Cooma Hospital, Bent Street, Cooma, NSW 2630

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
269469	Community Medical Centre	COOMA COMMUNITY HEALTH CENTRE	22m	West
176223	Integrated Health Service	COOMA HOSPITAL AND HEALTH SERVICE	74m	South West
272657	Nursing Home	SOUTHERN NSW TRANSITIONAL AGED CARE SERVICE	74m	South West
179187	Ambulance Station	COOMA AMBULANCE STATION	106m	South East
148749	Park	LIONS PARK	238m	South
180094	Park	Park	306m	South West
282938	Nursing Home	SOUTHERN NSW TRANSITIONAL AGED CARE SERVICE	324m	South
179185	Park	SELLAR STREET PARK	375m	South
176219	Place Of Worship	CATHOLIC CHURCH	414m	North West
180086	Park	MURRAY STREET PARK	427m	North
257070	Combined Primary-Secondary School	ST PATRICK'S PARISH SCHOOL	474m	North West
177226	Park	ADAMS AVENUE PARK	475m	South West
257165	Combined Primary-Secondary School	ST PATRICK'S PARISH SCHOOL	483m	North West
177222	TAFE College	COOMA TAFE COLLEGE	497m	North
180095	Park	LLOYD AVENUE PARK	524m	West
177221	Sports Field	ROTARY OVAL	550m	North
271673	Club	COOMA EX-SERVICES CLUB	550m	North West
177250	Railway Station	COOMA RAILWAY STATION	579m	North East
148763	Place Of Worship	UNITING CHURCH	624m	West
180093	Local Government Chambers	COOMA-MONARO SHIRE COUNCIL	630m	North West
256558	Primary School	COOMA PUBLIC SCHOOL	631m	North West
148762	Library	COOMA LIBRARY	653m	North West
251843	Sports Court	COOMA SKATE PARK	666m	North
179186	Community Facility	COOMA ROYAL TENNIS CLUB	679m	West
176221	Sports Court	TENNIS COURTS	693m	West
176222	Place Of Worship	ANGLICAN CHURCH	698m	West
148760	Stock Sale Yard	COOMA-MONARO REGIONAL SALEYARDS	749m	East
180092	Tourist Information Centre	COOMA VISITORS CENTRE	751m	North West
276291	Community Facility	COOMA MULTI FUNCTION CENTRE	783m	West
148748	Park	CENTENNIAL PARK	795m	North West
148754	Place Of Worship	UNITING CHURCH	853m	North West

Map Id	Feature Type	Label	Distance	Direction
179188	Homestead	EUCALYPT HILL	870m	South East
148764	Showground	COOMA SHOWGROUND	872m	West
193058	Town	COOMA	878m	North West
148750	Park	BENT STREET PARK	884m	South West
148761	Fire Station	COOMA FIRE STATION	893m	North West
179190	Monument	THE CENOTAPH	901m	North West
148753	Post Office	COOMA POST OFFICE	922m	North West
148759	Swimming Pool	COOMA FESTIVAL SWIMMING POOL	927m	North West
179189	Target Range	COOMA RIFLE RANGE	944m	East
148745	Park	FRANK NORRIS PARK	944m	North West
276266	Park	MONAGHAN HAYES PLACE	957m	North West
177246	Court House	COOMA COURT HOUSE	980m	North West
180091	Police Station	COOMA POLICE STATION	983m	North West

Topographic Features

Cooma Hospital, Bent Street, Cooma, NSW 2630

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
173358	Undefined	Operational		08/05/2001	798m	North East
173357	Undefined	Operational		08/05/2001	812m	North East
173356	Undefined	Operational		08/05/2001	820m	North East

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
120108183	Primary	Undefined		318m	South
120113175	Primary	Undefined		525m	West
183067515	Primary	Right of way	Variable	598m	South East
157768671	Primary	Right of way	6m	614m	North West
178122689	Primary	Right of way	4.57m	688m	North
178122696	Primary	Right of way	4.57m	688m	North
120115955	Primary	Undefined		862m	South
120121280	Primary	Undefined		910m	West

Topographic Features

Cooma Hospital, Bent Street, Cooma, NSW 2630

State Forest

What State Forest exist within the dataset buffer?

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

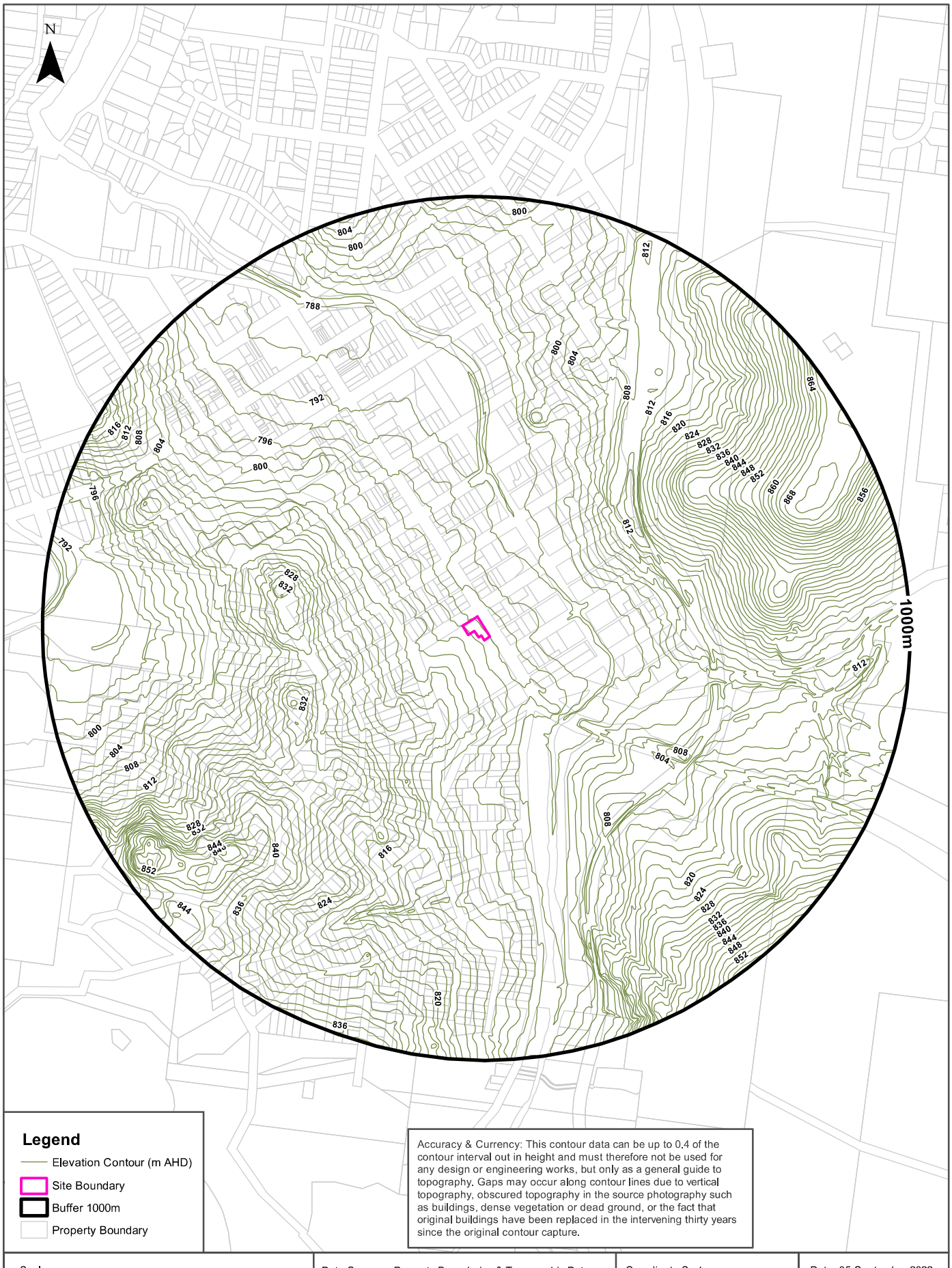
National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

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

Elevation Contours (m AHD)

Cooma Hospital, Bent Street, Cooma, NSW 2630



Hydrogeology & Groundwater

Cooma Hospital, Bent Street, Cooma, NSW 2630

Hydrogeology

Description of aquifers within the dataset buffer:

Description	Distance	Direction
Fractured or fissured, 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 2018

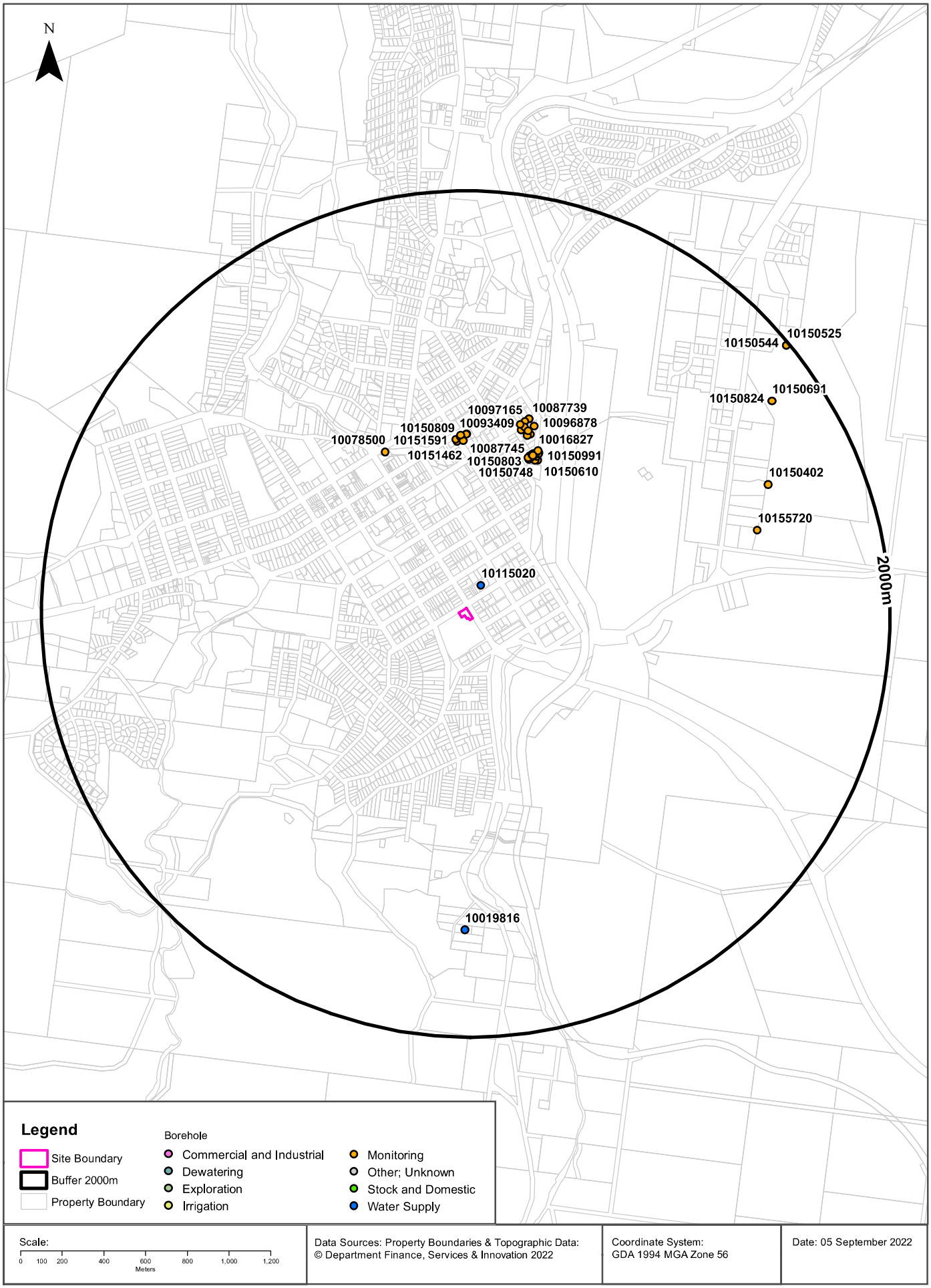
Temporary water restrictions relating to the Botany Sands aquifer within the dataset buffer:

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

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018 Data Source : NSW Department of Primary Industries

Groundwater Boreholes

Cooma Hospital, Bent Street, Cooma, NSW 2630



Hydrogeology & Groundwater

Cooma Hospital, Bent Street, Cooma, NSW 2630

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
10115020	GW403981	Water Supply	Unknown	16/07/1993	30.00		AHD				130m	North East
10150803	GW417508	Monitoring	Functioning	05/08/2012	8.00		AHD				775m	North
10152702	GW417510	Monitoring	Functioning	05/08/2012	8.00		AHD				780m	North
10150993	GW417507	Monitoring	Functioning	05/08/2012	8.00		AHD				783m	North East
10150748	GW417506	Monitoring	Functioning	05/08/2012	8.00		AHD				784m	North East
10152657	GW417504	Monitoring	Functioning	05/08/2012	7.80		AHD				786m	North East
10150610	GW417515	Monitoring	Functioning	04/05/2010	10.00		AHD				787m	North East
10151994	GW417505	Monitoring	Functioning	05/08/2012	8.00		AHD				790m	North
10151462	GW417834	Monitoring	Functioning	24/01/2002	6.00		AHD				798m	North
10152094	GW417513	Monitoring	Functioning	04/05/2010	15.00		AHD				798m	North East
10154947	GW417513	Monitoring	Proposed	04/05/2010	10.00		AHD				798m	North East
10152784	GW417512	Monitoring	Functioning	04/05/2010	10.00		AHD				800m	North East
10151853	GW417830	Monitoring	Unknown	24/03/1999	6.00		AHD				801m	North
10151029	GW417501	Monitoring	Functioning	05/08/2012	7.90		AHD				802m	North East
10151760	GW417502	Monitoring	Functioning	05/08/2012	8.00		AHD				804m	North East
10152792	GW417503	Monitoring	Functioning	05/08/2012	8.00		AHD				806m	North East
10150800	GW417829	Monitoring	Unknown	23/03/1999	1.70		AHD				808m	North
10152056	GW417511	Monitoring	Functioning	04/05/2010	10.00		AHD				808m	North East
10151591	GW417833	Monitoring	Functioning	24/01/2002	6.00		AHD				809m	North
10151217	GW417828	Monitoring	Functioning	23/03/1999	1.50		AHD				813m	North
10151666	GW417827	Monitoring	Functioning	23/03/1999	3.00		AHD				813m	North
10151444	GW417514	Monitoring	Functioning	04/05/2010	13.10		AHD				816m	North East
10150809	GW417831	Monitoring	Unknown	24/03/1999	6.20		AHD				818m	North
10150991	GW417500	Monitoring	Functioning	05/08/2012	8.00		AHD				821m	North East
10151739	GW417825	Monitoring	Functioning	24/03/1999	6.00		AHD				822m	North
10151866	GW417826	Monitoring	Functioning	23/03/1999	6.20		AHD				828m	North
10152876	GW417509	Monitoring	Functioning	05/08/2012	8.00		AHD				828m	North East
10151652	GW417832	Monitoring	Functioning	24/03/1999	6.00		AHD				831m	North
10151140	GW417835	Monitoring	Functioning	11/05/2004	5.80		AHD				833m	North
10078500	GW416195	Monitoring	Functional	10/09/2010	3.00		AHD				842m	North West

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
10087745	GW416334	Monitoring	Functioning	09/08/2011	10.00		AHD				876m	North
10016827	GW416371	Monitoring	Functioning	09/08/2011	11.50		AHD				887m	North
10093409	GW416413	Monitoring	Functioning	06/09/2012	9.60		AHD				893m	North
10064110	GW416318	Monitoring	Functioning	09/08/2011	15.50		AHD				896m	North
10100718	GW416335	Monitoring	Functioning	09/08/2011	14.50		AHD				898m	North
10097892	GW416297	Monitoring	Functioning	08/08/2011	15.00		AHD				910m	North
10109442	GW416408	Monitoring	Functioning	21/02/2012	12.00		AHD				917m	North
10096878	GW416342	Monitoring	Functioning	09/08/2011	13.00		AHD				930m	North
10097165	GW416411	Monitoring	Functioning	21/02/2012	13.00		AHD				937m	North
10087739	GW416412	Monitoring	Functioning	22/02/2012	3.00		AHD				954m	North
10111167	GW416341	Unknown	Functioning	06/11/2013	10.00		AHD				954m	North
10155720	GW116451	Monitoring	Functioning	29/05/2019	18.00		AHD				1430m	East
10019816	GW416423	Water Supply	Functioning	10/01/2013	42.00		AHD		0.100	37.00	1487m	South
10150402	GW116448	Monitoring	Functioning	29/05/2019	12.50		AHD				1556m	North East
10150691	GW116338	Monitoring	Functioning	29/05/2019	11.00		AHD				1770m	North East
10150824	GW116338	Monitoring	Functioning	29/05/2019	11.00		AHD				1770m	North East
10150525	GW116336	Monitoring	Functioning	27/05/2019	13.00		AHD				1986m	North East
10150544	GW116336	Monitoring	Functioning	27/05/2019	13.00		AHD				1986m	North East

Hydrogeology & Groundwater

Cooma Hospital, Bent Street, Cooma, NSW 2630

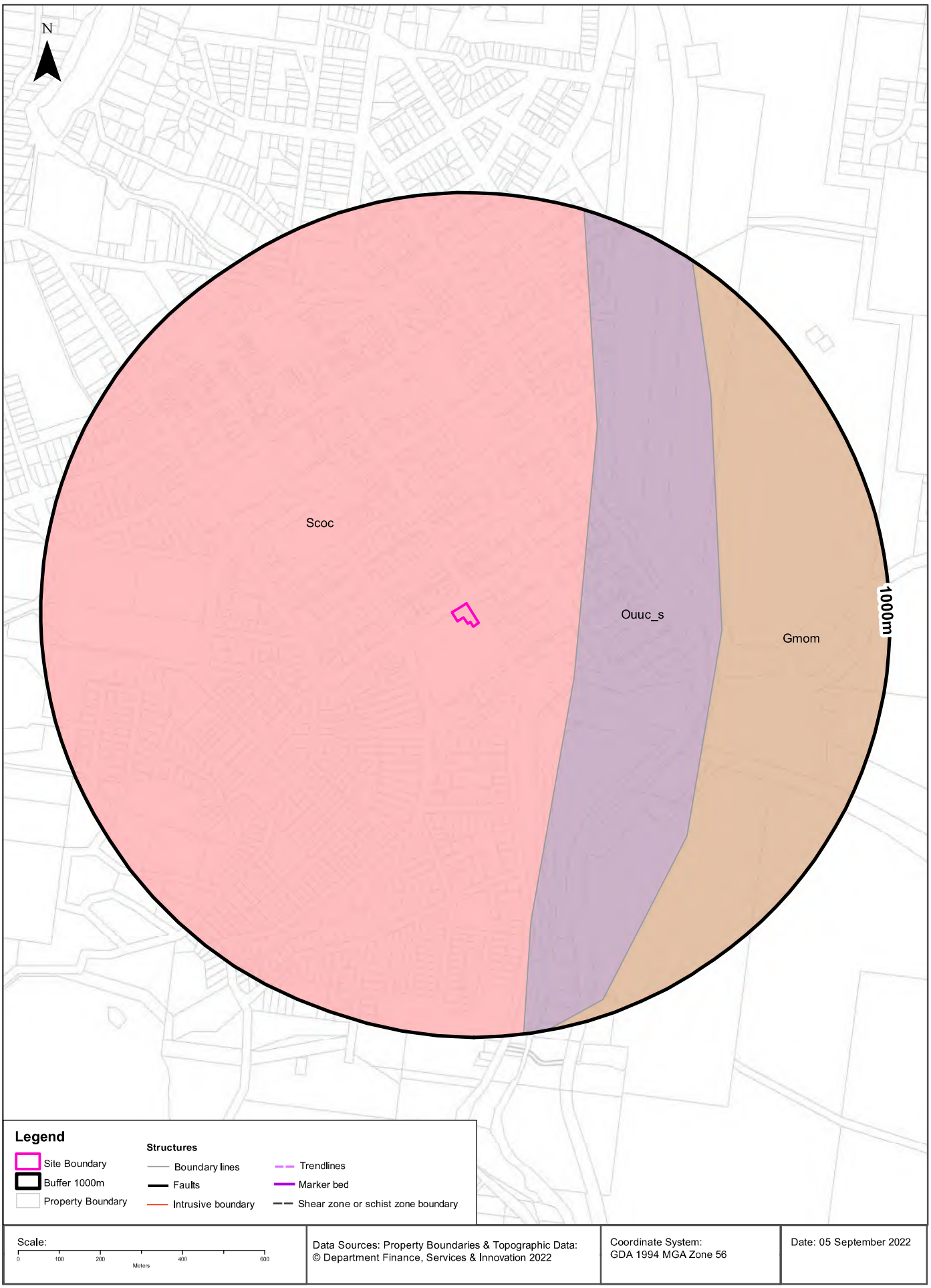
Driller's Logs

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

NGIS Bore ID	Drillers Log	Distance	Direction
10078500	0.00m-0.20m silt, sandy with minor gravel, fine to coarse grained, slightly moist, yellow - fill 0.20m-1.80m clay, firm, slightly moist, medium plasticity, black 1.80m-3.00m silty clay, very stiff, very moist to wet, low plasticity, black, dark brown	842m	North West
10087745	0.00m-0.03m Sand, light brown 0.03m-10.00m Schist, weathered	876m	North
10016827	0.00m-11.50m Schist, weathered	887m	North
10093409	0.00m-0.16m Concrete 0.16m-0.26m Sand, gravelly 0.26m-9.60m Schist	893m	North
10064110	0.00m-0.05m Bitumen at surface 0.05m-0.40m Fill sandy Gravel 0.40m-1.30m Fill,gravelling Sand. 1.30m-15.00m Schist, bedrock	896m	North
10100718	0.00m-0.10m Bitumen at surface 0.10m-0.70m Sand, silty 0.70m-14.50m Schist, weathered	898m	North
10109442	0.00m-0.06m Bitamen 0.06m-12.00m Schist, differing degrees of hardness	917m	North
10096878	0.00m-0.30m Sand, silty, fine grained 0.30m-0.40m Sand, med grained 0.40m-13.00m Schist, weathered grey	930m	North
10097165	0.00m-0.25m Bitamen 0.25m-1.70m Fill 1.70m-4.70m Schist 4.70m-13.00m Silty clay	937m	North
10087739	0.00m-0.05m Bitamen 0.05m-3.00m Schist	954m	North
10111167	0.00m-0.10m Bitamen 0.10m-0.30m Sand, gravelly, med brown 0.30m-10.00m Schist, weathered, grey	954m	North

Geology

Cooma Hospital, Bent Street, Cooma, NSW 2630



Geology

Cooma Hospital, Bent Street, Cooma, NSW 2630

Geological Units

What are the Geological Units within the dataset buffer?

Unit Code	Unit Name	Description	Unit Stratigraphy	Age	Dominant Lithology	Distance
Scoc	Cooma Granodiorite	Biotite granite, foliated granite, leucogranite, diorite, tonalitic gneiss.	Cooma Supersuite/Cooma Suite//Cooma Granodiorite//	Pridoli (base) to Pridoli (top)	Granite	0m
Ouuc_s	Cooma Metamorphic Complex - schist	Mica schist, biotite schist, andalusite-sillimanite bearing schist, orthoclase-cordierite knotted schists.	/Ungrouped Ordovician units//Cooma Metamorphic Complex/Cooma Metamorphic Complex - schist/	Early Ordovician (base) to Early Ordovician (top)	Schist	243m
Gmom	Monaro Volcanics	Medium- to very coarse-grained porphyritic dolerite, massive to vesicular dark blue-grey to black porphyritic basalt, coarse- to very fine-grained. Lacustrine to fluvial unconsolidated sedimentary rocks and silcrete form the sub-basaltic component.	/Monaro Volcanic Complex//Monaro Volcanics//	Ypresian (base) to Rupelian (top)	Dolerite	586m

Linear Geological Structures

What are the Dyke, Sill, Fracture, Lineament and Vein trendlines within the dataset buffer?

Map ID	Feature Description	Map Sheet Name	Distance
No Features			

What are the Faults, Shear zones or Schist zones, Intrusive boundaries & Marker beds within the dataset buffer?

Map ID	Boundary Type	Description	Map Sheet Name	Distance
No Features				

Naturally Occurring Asbestos Potential

Cooma Hospital, Bent Street, Cooma, NSW 2630

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: © State of New South Wales through NSW Department of Industry, Resources & Energy

Atlas of Australian Soils

Cooma Hospital, Bent Street, Cooma, NSW 2630

Soils

Cooma Hospital, Bent Street, Cooma, NSW 2630

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
LL1	Tenosol	Hills and plains--multicyclic erosional landscape of hills and hillocky areas with intervening plain-like areas, the whole traversed and dissected by variously incised stream valleys--some layering of soil materials: (i) relatively higher hills and ranges of loamy soils having an A2 horizon (Um4.2) and yellow-brown earths (Gn2.44) with (Um5.41 and Um5.S1), many stones, and rock outcrops; gullies of (Dr2) and (Dy3.32 and Dy3.42) soils; (ii) relatively lower hills and hillocky areas of hard acidic red soils (Dr2.21) and (Uc6.11), (Um) soils and rock outcrops with (Dy3.4) soils on lower slopes and (Dy3.43) in depressions; (iii) undulating plain-like areas with slopes and benches of red and yellow earths including (Gn2.14, Gn2.15, and Gn2.24); (iv) stream valleys of (Um6.11), some with clay D horizons and other (Uc) and (Um) soils; (v) also remains of various soil materials such as ironstone boulders in various situations. Soil dominance is difficult to assess: the most common soils are likely to be the (D) soils as a group but their variety is such that no single (D) soil can, on present data, be regarded as dominant.	0m	On-site
Md3	Ferrosol	Undulating to hilly dissected tableland with some rounded hills, flat-topped ridges, and small valley plains; a multicyclic erosional landscape: upper slopes generally and ridge tops of red and brown friable earths (Gn3.12 and Gn3.22) with friable neutral red soils (Dr4.12) in association with cracking clays (Ug5.1, especially Ug5.12, Ug5.13, and Ug5.15) on mid and lower slopes, and also some dark friable earths (Gn3.41) on lower slopes, and in association with valley plains of various cracking clays (Ug5.1); hard neutral red soils (Dr2.12) occur on the crests of some hills; stony dark porous loamy soils (Um6.21) occur on some lower hill slopes; also other soils described from the area apparently code as (Dd3.11 and Dd3.12), (Um6.1), and (Ug5.2).	196m	East

Soil Landscapes of Central and Eastern NSW

Cooma Hospital, Bent Street, Cooma, NSW 2630

Soils

Cooma Hospital, Bent Street, Cooma, NSW 2630

Soil Landscapes of Central and Eastern NSW

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

Soil Code	Name	Distance	Direction
8725mba	Murrumbidgee variant a	0m	On-site
8725df	Dry Farm	42m	South West
8725bj	Binjura	260m	North East
8725ma	Maneroo	373m	East
8725mg	Mount Gladstone	776m	South West

Acid Sulfate Soils

Cooma Hospital, Bent Street, Cooma, NSW 2630

Environmental Planning Instrument - Acid Sulfate Soils

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

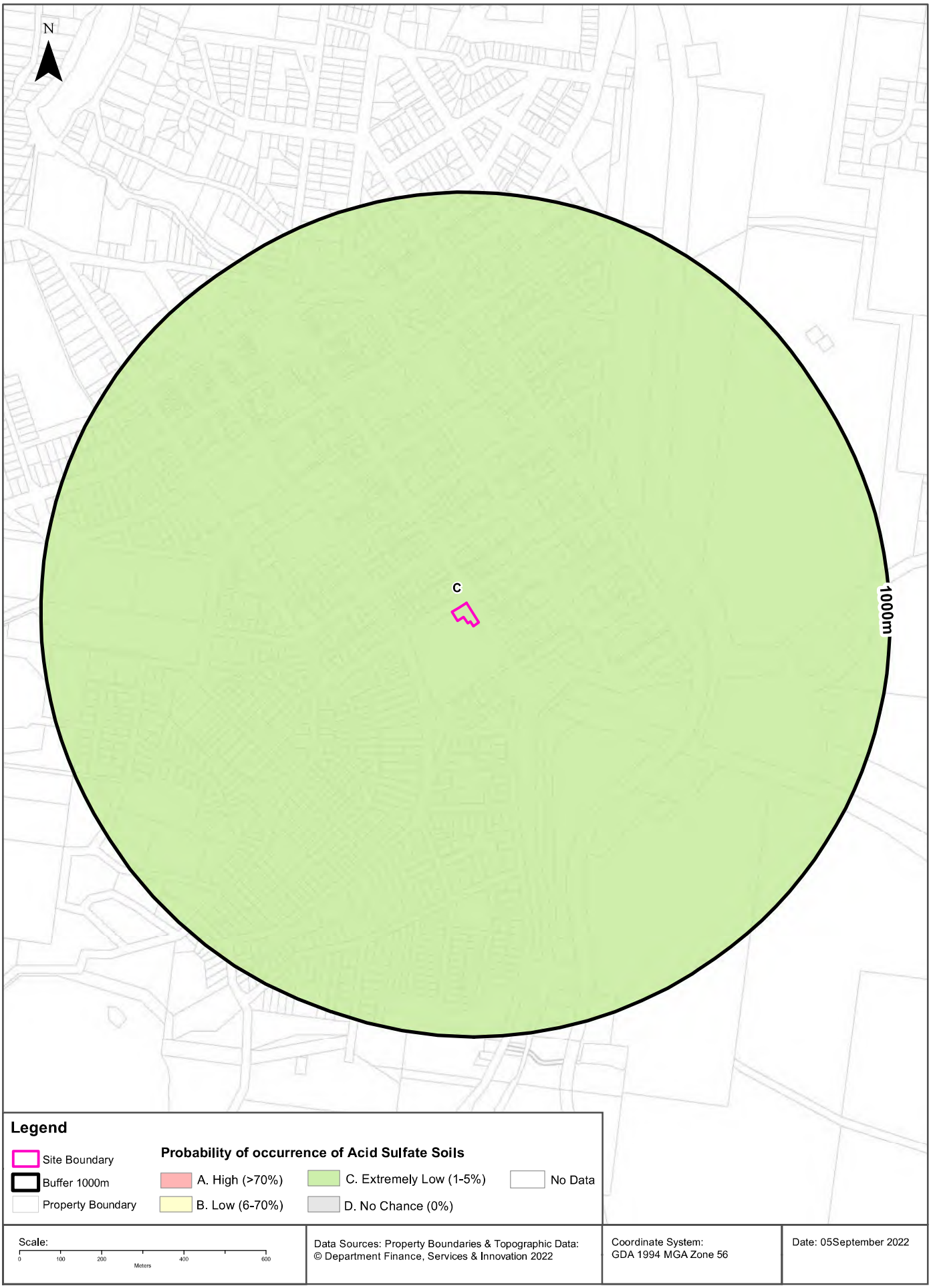
Soil Class	Description	EPI Name
N/A		

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

Cooma Hospital, Bent Street, Cooma, NSW 2630



Acid Sulfate Soils

Cooma Hospital, Bent Street, Cooma, NSW 2630

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

Cooma Hospital, Bent Street, Cooma, NSW 2630

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

No

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

No

What Dryland Salinity assessments are given?

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

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.

Mining

Cooma Hospital, Bent Street, Cooma, NSW 2630

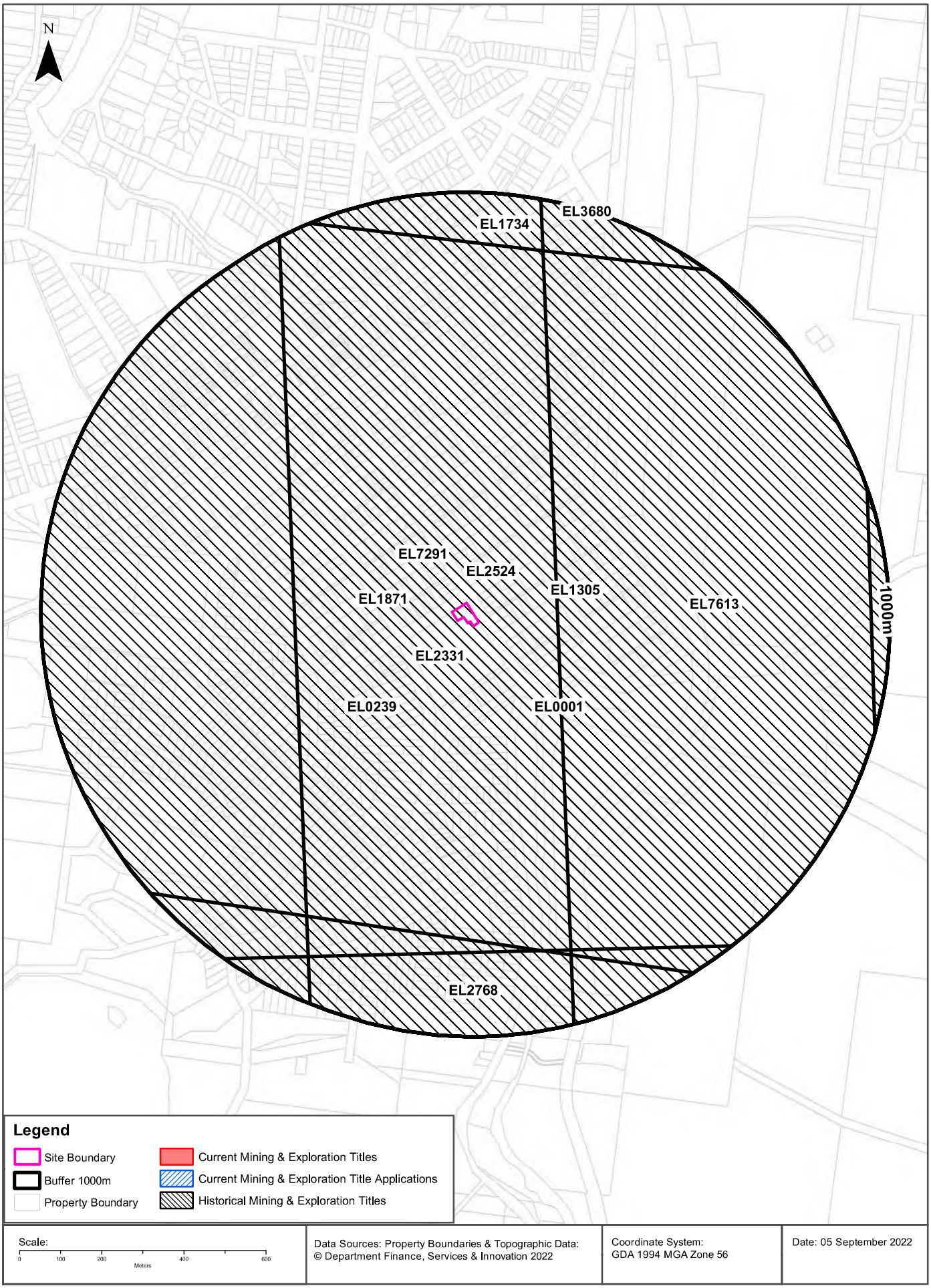
Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

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

Mining & Exploration Titles

Cooma Hospital, Bent Street, Cooma, NSW 2630



Mining

Cooma Hospital, Bent Street, Cooma, NSW 2630

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: © State of New South Wales through NSW Department of Industry

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: © State of New South Wales through NSW Department of Industry

Mining

Cooma Hospital, Bent Street, Cooma, NSW 2630

Historical Mining & Exploration Titles

Historical Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Start Date	End Date	Resource	Minerals	Dist	Dir
EL2524	LACHLAN RESOURCES NL	01 Sep 1985	01 Dec 1988	MINERALS	Au Cu Pb Zn	0m	On-site
EL2331	JONES MINING NL	01 Nov 1984	01 Nov 1985	MINERALS	Au	0m	On-site
EL1871	ESSO EXPLORATION & PRODUCTION AUSTRALIA INC	01 Oct 1981	01 Aug 1983	MINERALS	Pb Zn Cu Au	0m	On-site
EL0239	COMINCO EXPLORATION	01 Feb 1970	01 Feb 1973	MINERALS	Sn W Mo Bi	0m	On-site
EL1305	OCCIDENTAL MINERALS CORPORATION OF AUSTRALIA	01 Feb 1980	01 Feb 1984	MINERALS	Cu Pb Zn Au Ag	0m	On-site
EL0001	ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA LIMITED	01 Mar 1965	01 Sep 1966	MINERALS	Cu Pb Zn	0m	On-site
EL7291	VOLCAN AUSTRALIA CORPORATION PTY LTD	13 Feb 2009	13 Feb 2013	MINERALS	Al	0m	On-site
EL7613	DORADO RESOURCES PTY LTD	31 Aug 2010	31 Aug 2012	MINERALS	Ag Au Cu Pb Zn	192m	East
EL2768	TEPARA PTY LIMITED	01 Feb 1987	01 Dec 1988	MINERALS	Feldspar Nepheline Syenite	794m	South
EL1734	ESSO EXPLORATION & PRODUCTION AUSTRALIA INC	01 Oct 1981	01 Aug 1983	MINERALS	Pb Zn Cu Au	873m	North
EL3680	CRA EXPLORATION PTY LIMITED	01 Nov 1990	01 May 1991	MINERALS	Cu	998m	North

State Environmental Planning Policy

Cooma Hospital, Bent Street, Cooma, NSW 2630

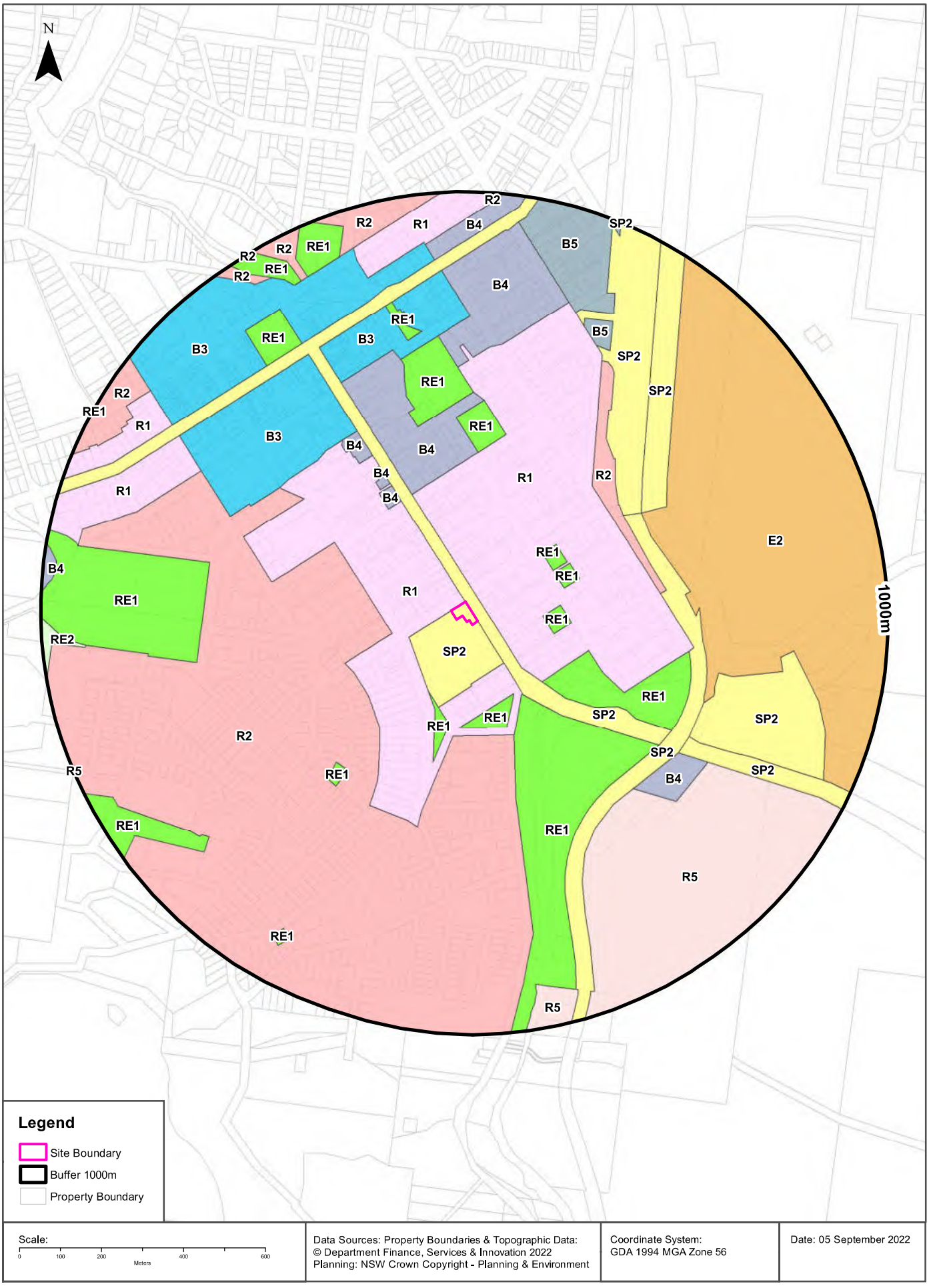
State Significant Precincts

What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
N/A	No records in buffer							

EPI Planning Zones

Cooma Hospital, Bent Street, Cooma, NSW 2630



Environmental Planning Instrument

Cooma Hospital, Bent Street, Cooma, NSW 2630

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
SP2	Infrastructure	Health Services Facilities	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		0m	On-site
R1	General Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		0m	West
SP2	Infrastructure	Classified Road	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		0m	North West
R1	General Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		30m	North East
R2	Low Density Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		153m	South West
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		159m	East
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		186m	South
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		195m	South
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		207m	South East
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		214m	South East
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		221m	North East
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		221m	East
B4	Mixed Use		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		292m	North West
B4	Mixed Use		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		294m	North
B4	Mixed Use		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		342m	North West
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		366m	North
R2	Low Density Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		413m	North East
B4	Mixed Use		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		423m	North West
SP2	Infrastructure	Rail Infrastructure Facilities	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		436m	South East
SP2	Infrastructure	Rail Infrastructure Facilities	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		438m	North East
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		443m	North
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		453m	South West
E2	Environmental Conservation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		470m	East
SP2	Infrastructure	Rail Infrastructure Facilities	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		479m	North East
B3	Commercial Core		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		490m	North West
R5	Large Lot Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		555m	South East
B4	Mixed Use		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		556m	South East

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
B4	Mixed Use		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		573m	North
SP2	Infrastructure	Stock & Sale Yards	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		584m	East
SP2	Infrastructure	Classified Road	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		584m	South East
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		597m	West
B3	Commercial Core		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		612m	North
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		653m	North
R1	General Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		698m	West
B5	Business Development		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		703m	North East
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		745m	North West
B3	Commercial Core		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		745m	North West
B5	Business Development		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		755m	North
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		803m	South West
R1	General Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		815m	North West
R1	General Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		826m	North
B4	Mixed Use		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		838m	North
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		861m	South West
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		878m	North West
R2	Low Density Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		880m	North
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		882m	North
R5	Large Lot Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		890m	South
RE2	Private Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		893m	West
R2	Low Density Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		906m	North West
B4	Mixed Use		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		967m	West
RE1	Public Recreation		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		994m	North West
R5	Large Lot Residential		Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	15/08/2014		999m	West

Heritage Items

Cooma Hospital, Bent Street, Cooma, NSW 2630

Heritage

Cooma Hospital, Bent Street, Cooma, NSW 2630

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							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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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
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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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
5011974	Cooma Railway Station and yard group	Bradley Street, Cooma	SNOWY MONARO REGIONAL	02/04/1999	01116	2532	438m	North East

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

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

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I43	Cooma District Hospital	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	0m	On-site
I70	Cottage (rendered)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	82m	North West
I159	Flats (granite)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	91m	North East

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I44	Cottage (stone)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	97m	South East
I158	House	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	160m	West
I69	Cottage (brick)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	185m	North
I160	Cottage (brick)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	191m	South West
I68	Cottage	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	236m	North East
C3	Church Hill	Conservation Area - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	245m	North West
I157	House (granite)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	246m	North West
I33	House	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	265m	East
I162	House (granite)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	272m	South
I32	House	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	291m	East
I112	St Patrick's Church and Presbytery	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	328m	North West
I73	Stables - formerly St Patrick's	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	379m	West
I38	Cottage (brick)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	394m	North East
C6	Soho Street (Geological site)	Conservation Area - Landscape	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	395m	West
C4	Cooma Railway Precinct	Conservation Area - General	State	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	413m	North East
I145	St Patrick's Primary School	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	424m	North West
I152	Brigidine Convent	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	451m	North West
I36	Cottage (brick)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	452m	North East
I113	Cottage (brick)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	456m	South
I61	House	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	466m	West
I52	Cooma Primary School	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	519m	North West
I242	Railway bridge	Item - General	State	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	530m	East
I51	Civic Building - Monaro Centre	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	534m	North West
I41	Drill Hall - Royal Australian Engineer's Building	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	547m	North West

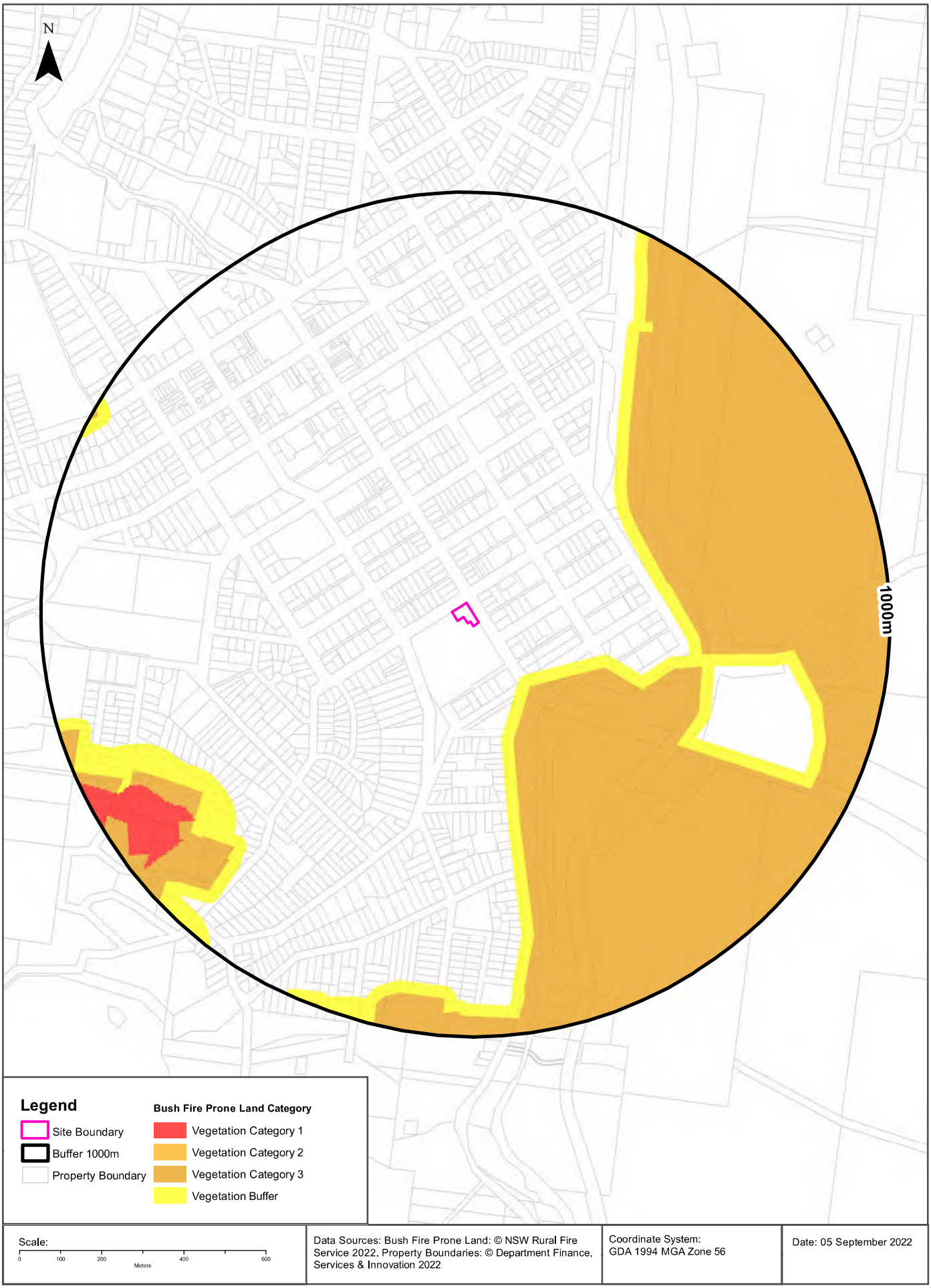
Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I35	Flats	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	558m	North
I65	Cottage (stone)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	565m	South West
I64	House	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	585m	South West
I63	House	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	589m	South West
I140	Presbyterian manse	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	603m	West
I139	Uniting Church	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	603m	West
I40	House - Old Grammar School	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	620m	South West
I54	St Paul's Anglican Rectory	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	628m	West
I53	St Paul's Anglican Church	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	641m	West
I156	Shop (two storey Victorian)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	655m	North West
I121	Shop - Asprey's Building	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	665m	North West
I153	House (Modernist)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	667m	North West
I155	Shops (19th century)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	675m	North West
I62	House (brick)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	678m	West
I116	Shop	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	682m	North West
I154	Shops (19th century)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	687m	North West
I56	Cottage (brick)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	698m	West
I128	Shop	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	706m	North West
I122	Shop - Percy's Newsagency	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	713m	North West
I117	Centennial Park	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	745m	North West
I119	Australian Hotel	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	752m	North West
I123	Westpac Bank	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	769m	North West
I60	Grandstand - Cooma Showground	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	770m	West
I46	Cottage	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	774m	North

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I125	Shop	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	781m	North West
I126	Shop	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	783m	North West
I45	Cottage (Victorian)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	788m	North
I129	Shop-formerly Woolstore Antiques	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	807m	North West
I66	Beresford House	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	817m	North West
I151	Shop	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	822m	North West
I131	Uniting Church	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	828m	North West
I57	Cottage	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	853m	West
I150	Shop	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	856m	North West
I67	Civic Building - former Municipality Council Chambers	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	859m	North West
I134	Cottage (multi-gabled)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	860m	West
I107	Masonic Lodge	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	866m	North West
C2	Courthouse/Memorial	Conservation Area - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	870m	North West
I105	Cooma Hotel	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	884m	North West
II35	Cottage (Victorian) and barn	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	887m	West
I146	War memorial	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	894m	North West
I148	Post office	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	896m	North West
I104	House	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	911m	North
I34	Vine Cottage	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	912m	North West
I133	Cottage (rendered)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	913m	North West
I102	Police station - former Cooma Police Barracks	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	914m	North West
I143	Courthouse	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	914m	North West
I138	Police station	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	914m	North West
I146	War memorial	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	931m	North West

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
I115	Cottage (brick)	Item - General	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	972m	North
C5	Nanny Goat Hill (Geological site)	Conservation Area - Landscape	Local	Cooma-Monaro Local Environmental Plan 2013	25/10/2013	25/10/2013	25/10/2013	993m	North West

Natural Hazards - Bush Fire Prone Land

Cooma Hospital, Bent Street, Cooma, NSW 2630



Data Sources: Bush Fire Prone Land: © NSW Rural Fire Service 2022. Property Boundaries: © Department Finance, Services & Innovation 2022

Coordinate System: GDA 1994 MGA Zone 56

Date: 05 September 2022

Natural Hazards

Cooma Hospital, Bent Street, Cooma, NSW 2630

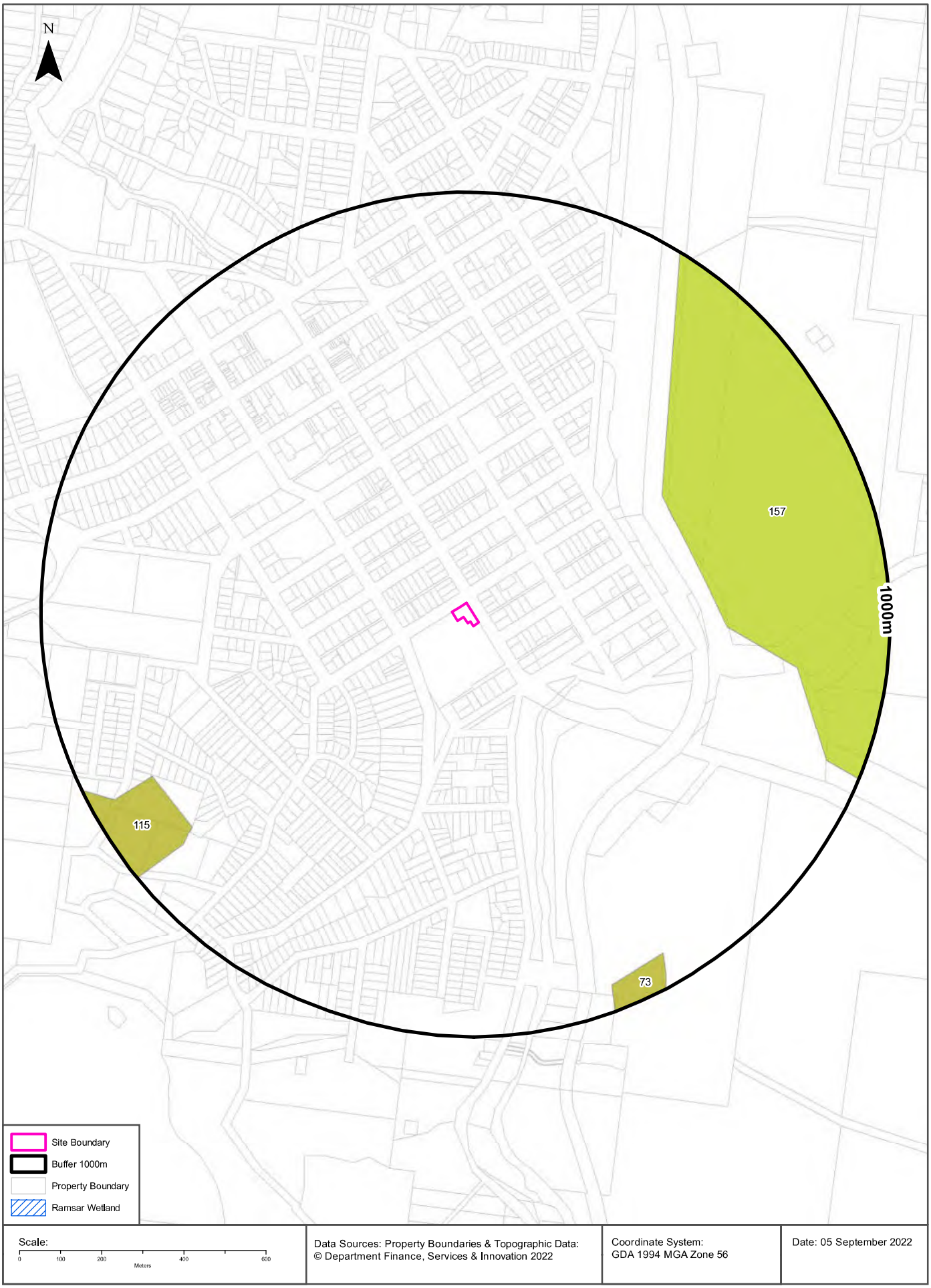
Bush Fire Prone Land

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

Bush Fire Prone Land Category	Distance	Direction
Vegetation Buffer	167m	South
Vegetation Category 3	197m	East
Vegetation Category 1	798m	South West

Ecological Constraints - Vegetation & Ramsar Wetlands

Cooma Hospital, Bent Street, Cooma, NSW 2630



Ecological Constraints

Cooma Hospital, Bent Street, Cooma, NSW 2630

Vegetation of the Southern Forests

What vegetation of the Southern Forests exists within the dataset buffer?

Veg Code	Formation	Class	Group	Distance	Direction
157	06 Grassy Woodlands/Grasslands	06d ST Temperate Grasslands	ACT-Monaro Dry Grassland - Bothriochloa macra	538m	East
115	05 Dry Grass/Shrub Forests	05b ST Dry Tussock Grass Forests	South East Tablelands Dry Shrub-Tussock Grass Forest	816m	South West
73	05 Dry Grass/Shrub Forests	05d Central ST Dry Grass/Shrub Forest	Eastern Tableland Dry Shrub-Grass Forest	920m	South East

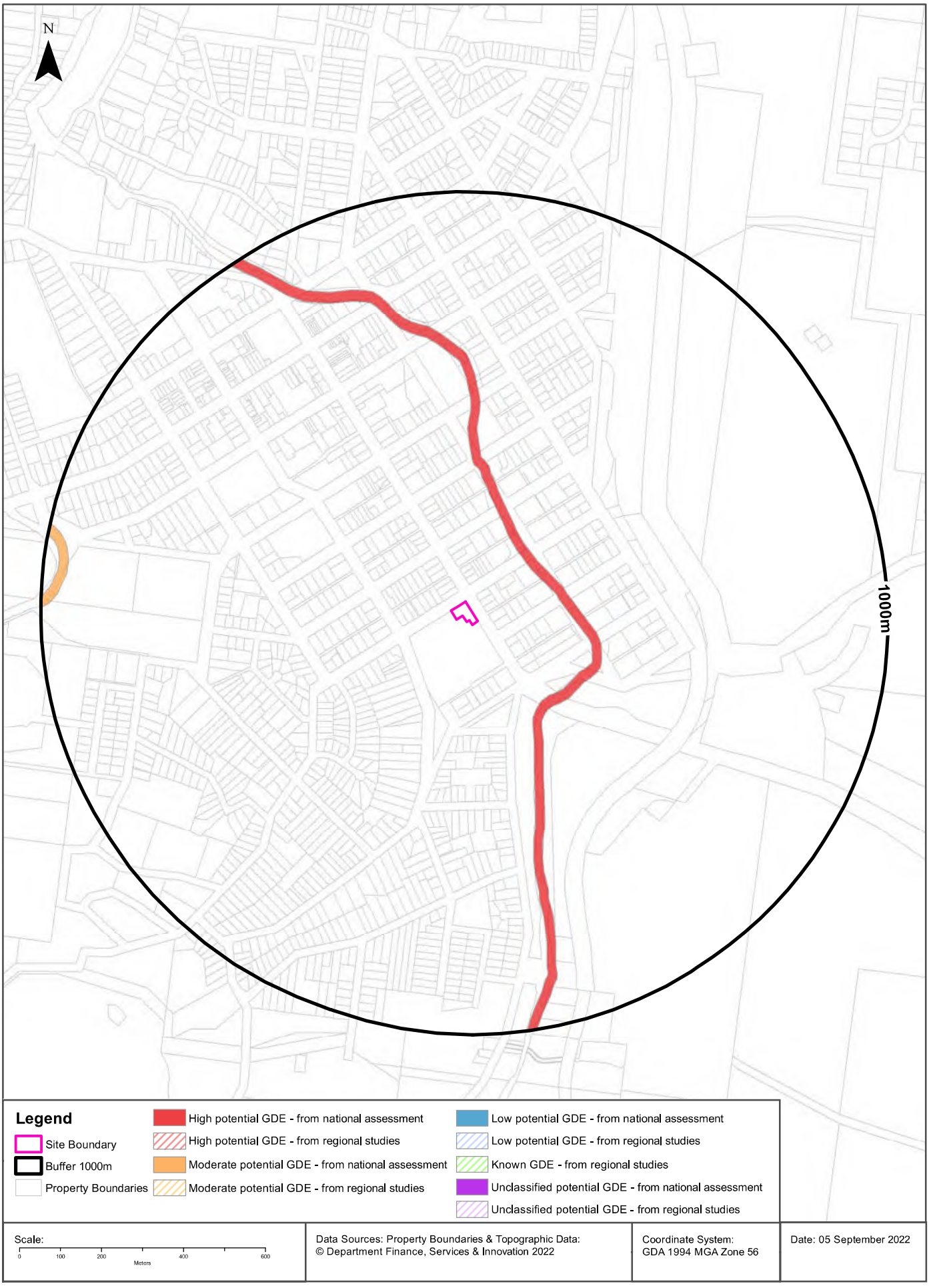
Ramsar Wetlands

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 - Groundwater Dependent Ecosystems Atlas

Cooma Hospital, Bent Street, Cooma, NSW 2630



Ecological Constraints

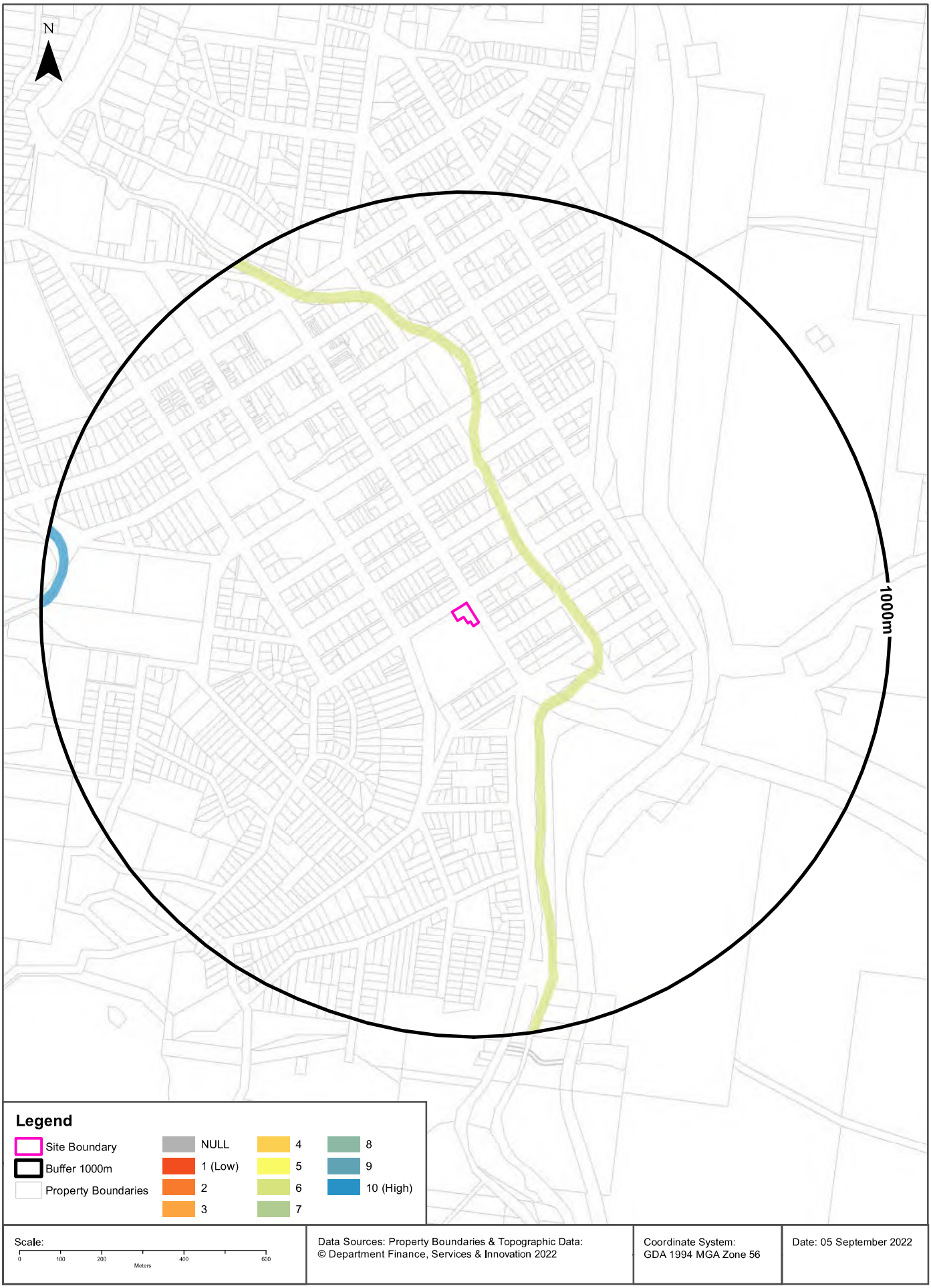
Cooma Hospital, Bent Street, Cooma, NSW 2630

Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Aquatic	High potential GDE - from national assessment	Undulating upland plains with some tablular basalt relief and granite tors.	River		175m	North East
Aquatic	Moderate potential GDE - from national assessment	Undulating upland plains with some tablular basalt relief and granite tors.	River		939m	West

Ecological Constraints - Inflow Dependent Ecosystems Likelihood

Cooma Hospital, Bent Street, Cooma, NSW 2630



Ecological Constraints

Cooma Hospital, Bent Street, Cooma, NSW 2630

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Aquatic	6	Undulating upland plains with some tablular basalt relief and granite tors.	River		175m	North East
Aquatic	10	Undulating upland plains with some tablular basalt relief and granite tors.	River		939m	West

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology

Ecological Constraints

Cooma Hospital, Bent Street, Cooma, NSW 2630

NSW BioNet Atlas

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

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Amphibia	Litoria verreauxii alpina	Alpine Tree Frog	Endangered	Not Sensitive	Vulnerable	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	Category 3	Endangered	
Animalia	Aves	Chthonicola sagittata	Speckled Warbler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Circus assimilis	Spotted Harrier	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Daphoenositta chrysoptera	Varied Sittella	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hirundapus caudacutus	White-throated Needletail	Not Listed	Not Sensitive	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ninox connivens	Barking Owl	Vulnerable	Category 3	Not Listed	
Animalia	Aves	Pachycephala olivacea	Olive Whistler	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Endangered	Not Sensitive	Endangered	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Aprasia parapulchella	Pink-tailed Legless Lizard	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Delma impar	Striped Legless Lizard	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Suta flagellum	Little Whip Snake	Vulnerable	Not Sensitive	Not Listed	

Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Reptilia	Tympanocryptis osbornei	Monaro Grassland Earless Dragon	Endangered	Not Sensitive	Not Listed	
Animalia	Reptilia	Varanus rosenbergi	Rosenberg's Goanna	Vulnerable	Not Sensitive	Not Listed	
Plantae	Flora	Calotis glandulosa	Mauve Burr-daisy	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Dodonaea procumbens	Creeping Hop-bush	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus aggregata	Black Gum	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Lepidium hyssopifolium	Aromatic Peppercress	Endangered	Not Sensitive	Endangered	
Plantae	Flora	Leucochrysum albicans var. tricolor	Hoary Sunray	Not Listed	Not Sensitive	Endangered	
Plantae	Flora	Rutidosis leiolepis	Monaro Golden Daisy	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Swainsona sericea	Silky Swainson-pea	Vulnerable	Not Sensitive	Not Listed	

Data does not include NSW category 1 sensitive species.

Location Confidences

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading “LC” or “LocConf”. These codes lookup to the following location confidences:

LC Code	Location Confidence
Premise Match	Georeferenced to the site location / premise or part of site
Area Match	Georeferenced to an approximate or general area
Road Match	Georeferenced to a road or rail corridor
Road Intersection	Georeferenced to a road intersection
Buffered Point	A point feature buffered to x metres
Adjacent Match	Land adjacent to a georeferenced feature
Network of Features	Georeferenced to a network of features
Suburb Match	Georeferenced to a suburb boundary
As Supplied	Spatial data supplied by provider

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   (i) the Report should not be used or taken to indicate or exclude actual fitness or unfitness of Land or Property for any particular purpose
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Land Title Records

ABN: 36 092 724 251
Ph: 02 9099 7400
(Ph: 0412 199 304)

Level 14, 135 King Street, Sydney
Sydney 2000
GPO Box 4103 Sydney NSW 2001
DX 967 Sydney

Summary of Owners Report

Address: Cooma Hospital - Bent Street, Cooma, NSW 2630

Description: - Lot 2 D.P. 1161366

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
09.05.1904 (1904 to 1962)	Gustave Thomas Carlisle Miller (Member of our Legislative Assembly of New South Wales) William Amess (Esquire) Thomas Wren Faulkner (Esquire) George Kaufline (Esquire) Edwin Hayden Litchfield (Esquire) Charles Solomon (Esquire) Wilfred Willmoff (Esquire) (As Trustees)	Volume 1532 Folio 187 (Crown Grant for Site for a Hospital)
17.09.1962 (1962 to 2010)	The Cooma District Hospital Then Cooma Hospital and Area Health Service Then Cooma Hospital and Health Service Then Monaro Health Service Then Southern Health Service Now Now Southern Area Health Service	Volume 1532 Folio 187 Now 1/802513
18.11.2010 (2010 to 2019)	Greater Southern Area Health Service	1/802513 Now 2/1161366
22.10.2019 (2019 to Date)	# Health Administration Corporation	2/1161366

 # Denotes current registered proprietor

Leases: - NIL

Easements: - NIL

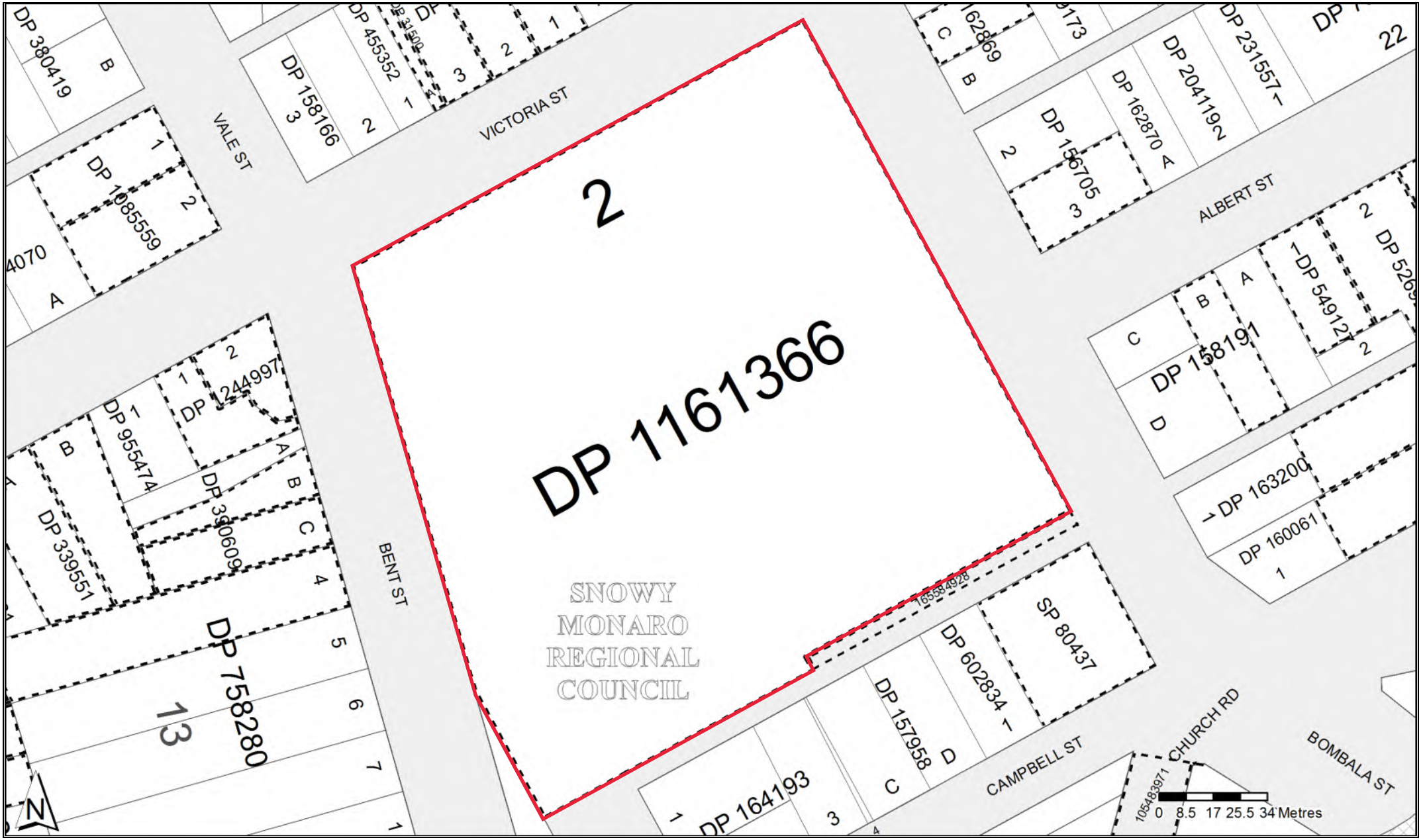
Yours Sincerely
Taylor Wilson
9th September 2022

Email: mark.groll@infotrack.com.au
Email: taylor.wilson@infotrack.com.au

Cadastral Records Enquiry Report : Lot 2 DP 1161366

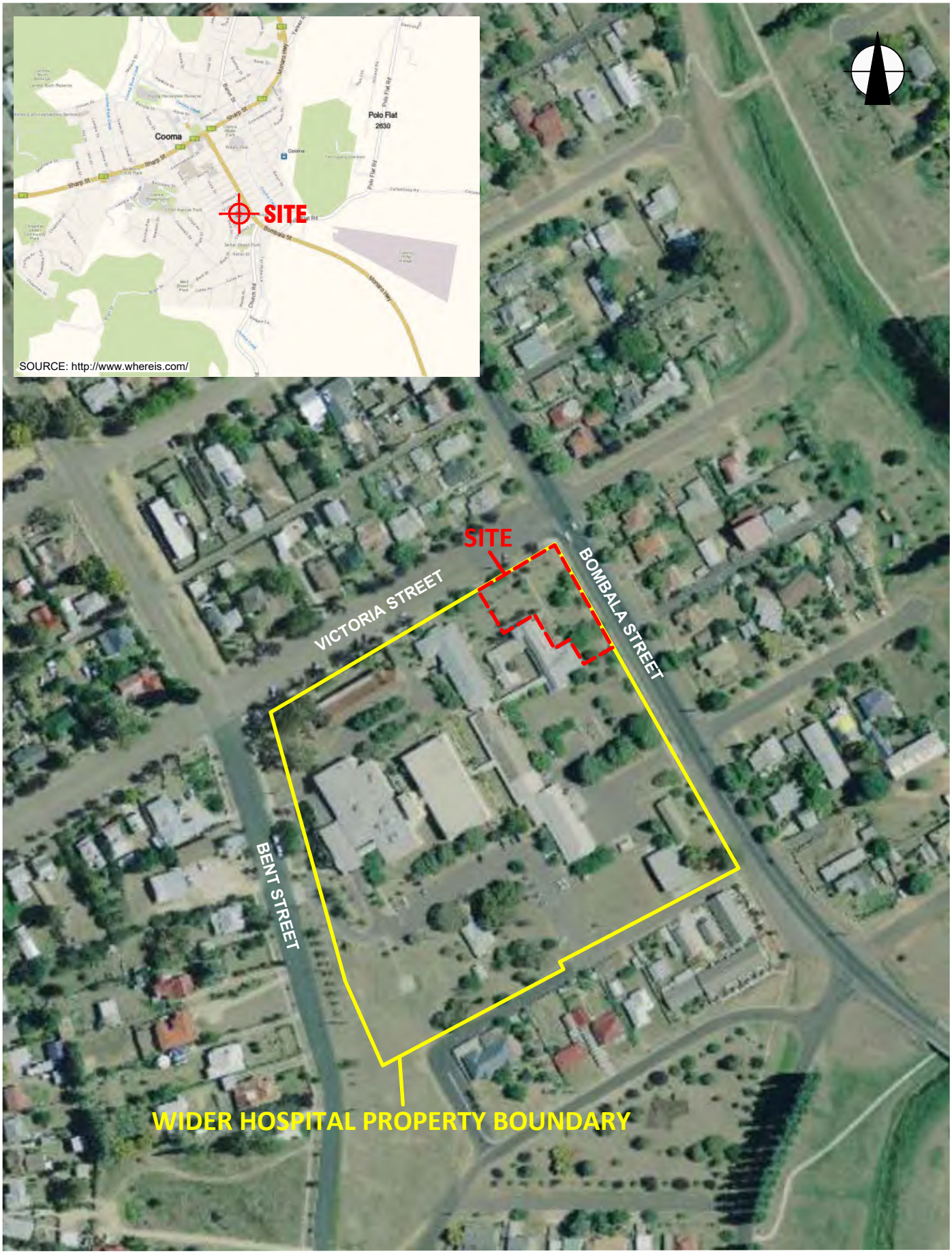
Ref : Cooma Hospital

Locality : COOMA
Parish : COOMA
LGA : SNOWY MONARO REGIONAL
County : BERESFORD



This information is provided as a searching aid only.Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For ALL ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps

	Status	Surv/Comp	Purpose
DP31500			
Lot(s): A			
CA137661 - LOT A DP31500			
DP156705			
Lot(s): 3			
CA95263 - LOT 3 DP156705			
DP158191			
Lot(s): B			
CA95237 - LOT B DP158191			
DP158934			
Lot(s): 1			
CA95295 - LOT 1 DP158934			
Lot(s): 3			
CA95398 - LOT 3 DP158934			
Lot(s): 2			
CA95397 - LOT 2 DP158934			
DP162869			
Lot(s): C			
CA95452 - LOT C DP162869			
DP220479			
Lot(s): 31, 32, 33			
DP1017327	REGISTERED	SURVEY	EASEMENT
DP339551			
Lot(s): A, B			
DP1017327	REGISTERED	SURVEY	EASEMENT
DP390609			
Lot(s): B, C			
DP1017327	REGISTERED	SURVEY	EASEMENT
DP526923			
Lot(s): 2			
CA87909 - LOT 2 DP526923			
DP549127			
Lot(s): 1			
CA89837 - LOT 1 DP549127			
DP758280			
Lot(s): 4 Section : 13			
DP1017327	REGISTERED	SURVEY	EASEMENT
DP1085559			
Lot(s): 2			
DP981506	HISTORICAL	COMPILATION	UNRESEARCHED
Lot(s): 1, 2			
DP665996	HISTORICAL	COMPILATION	DEPARTMENTAL
DP1129026			
Lot(s): 32			
DP1101694	HISTORICAL	COMPILATION	LIMITED FOLIO CREATION
Lot(s): 31			
DP998013	HISTORICAL	COMPILATION	DEPARTMENTAL
Lot(s): 31, 32			
CA99312 - LOT 25 DP1101694			
DP1161366			
Lot(s): 2, 3			
DP802513	HISTORICAL	SURVEY	CONSOLIDATION
DP1166520			
Lot(s): 1			
CA158792 - LOT 1 DP1166520			
DP1244997			
Lot(s): 1, 2			
DP581217	HISTORICAL	SURVEY	SUBDIVISION
SP80437			
DP602834	HISTORICAL	SURVEY	SUBDIVISION
DP1124540	HISTORICAL	SURVEY	REDEFINITION



AERIAL IMAGE SOURCE: MAPS.SIX.NSW.GOV.AU

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

Title: **SITE LOCATION PLAN**

Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Project No: E30596PT

Figure No: 1

JKEnvironments

PLOT DATE: 1/09/2022 2:18:50 PM DWG FILE: K:\SC EIS JOBS\30000'S\E30596K COOMA HOSPITAL\LICAD\E30596PTE30596PT.DWG

LAND REGISTRY SERVICES Historical Search

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE

9/9/2022 2:42PM

FOLIO: 1/802513

First Title(s): OLD SYSTEM VOL 1532 FOL 187
VOL 10649 FOL 171 VOL 15311 FOL 211
VOL 541 FOL 191
Prior Title(s): 1/47583 A-B/366195
VOL 1532 FOL 187 VOL 10649 FOL 187
CA46315

Recorded	Number	Type of Instrument	C.T. Issue
19/6/1990	CA46315	CONVERSION ACTION	FOLIO CREATED EDITION 1
18/11/2010	AF767237	APPLICATION FOR REPLACEMENT CERTIFICATE OF TITLE	
18/11/2010	AF767238	APPLICATION	EDITION 2
28/3/2011	DP1161366	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

Cooma Hospital PRINTED ON 9/9/2022

Received: 09/09/2022 14:42:53

Form: 04RP
Release: 2.2
www.lands.nsw.gov.au

(1)

APPLICATION TO RECORD NEW REGISTERED PROPRI

New South Wales
Section 46C Real Property Act 1
Section 12(4) Trustee Act 192

Leave this space clear. Affix ...

AF767238H

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authorises the ... by this form for the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires that the Register is made available to any person for search upon payment of a fee, if any.

STAMP DUTY

Office of State Revenue use only

Office of State Revenue
NSW Treasury
Client No: 98891 212
Duty: EXEMPT Trans No: 5998050
Asst details: SEC 276

(A) LAND

Torrens Title
1/802513

(B) REGISTERED DEALING

Number	Torrens Title

(C) LODGED BY

Document Collection Box	Name, Address or DX, Telephone, and LLPN if any	CODE
35D	LLPN: 123005 B MORRIS, HAYES & EDGAR DX 420 SYDNEY PH: 9232-2411 AS AGENTS FOR Reference: CE9871 KELL	AP

(D) APPLICANT

GREATER SOUTHERN AREA HEALTH SERVICE

(E) PRESENT REG'D PROPRIETOR

COOMA HOSPITAL AND AREA HEALTH SERVICE

(F) NEW REG'D PROPRIETOR

GREATER SOUTHERN AREA HEALTH SERVICE

(G) APPLICATION UNDER SECTION 46C REAL PROPERTY ACT 1900

In regard to the above land, the applicant requests the Registrar General to record the new registered proprietor on the relevant folio of the Register, the land having vested in the new registered proprietor pursuant to—

(H) Please refer to Annexure A

(G) APPLICATION UNDER SECTION 12(4) TRUSTEE ACT 1925 NOT APPLICABLE

In regard to the above CLICK & PICK >>>, the applicant requests the Registrar General to record the new registered registered proprietor on the folio of the Register consequent on—

(I)

DATE 10 SEPTEMBER 2010

(J)

Certified correct for the purposes of the Real Property Act 1900 by the person whose signature appears below.

Signature:

Signatory's name: Peter Campbell
Signatory's capacity: Applicant's solicitor

Annexure A to APPLICATION TO RECORD NEW REGISTERED PROPRIETOR

Parties:

GREATER SOUTHERN AREA HEALTH SERVICE

Dated

The Applicant requests the Registrar General to record the new registered proprietor on Certificate of Title Folio Identifier 1/802513, the land having vested in the new registered proprietor pursuant to:

1. On 1 June 1990 it was proclaimed that in pursuance of Section 4(2) of the Public Hospitals Act 1929 with effect from 1 June 1990 that Cooma Hospital and Area Health Service be renamed Cooma Hospital and Health Service.

2. On 1 July 1993 it was proclaimed that in pursuance of Section 13A(2) of the Public Hospitals Act 1929 with effect from 1 July 1993 that Cooma Hospital and Health Service be amalgamated into Monaro Health Service.

3. On 16 March 1996 it was proclaimed that in pursuance of Section 13A(2) of the Public Hospitals Act 1929 with effect from 16 March 1996 that Monaro Health Service be amalgamated into Southern Health Service.

4. On 27 July 2004 it was proclaimed that in pursuance of Section 19 of the Health Services Act 1997, with effect from 27 July 2004 that the name of the service be amended from Southern Health Service to Southern Area Health Service.

5. From 20 October 2004, it was proclaimed that in pursuance of Section 20(1) of the Health Services Act 1997, with effect from 20 October 2004 Southern Area Health Service was amalgamated and the assets, rights and liabilities of Southern Area Health Service vested in Greater Southern Area Health Service.

See annexed orders.

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE

9/9/2022 2:42PM

FOLIO: 2/1161366

First Title(s): VOL 10649 FOL 171 VOL 15311 FOL 211
VOL 1532 FOL 187 VOL 541 FOL 191
OLD SYSTEM
Prior Title(s): 1/802513

Recorded	Number	Type of Instrument	C.T. Issue
28/3/2011	DP1161366	DEPOSITED PLAN	FOLIO CREATED EDITION 1
22/10/2019	AP409215	REQUEST	
22/10/2019	AP622937	DEPARTMENTAL DEALING	EDITION 2
10/7/2020	AQ232958	CAVEAT	

*** END OF SEARCH ***

Cooma Hospital PRINTED ON 9/9/2022

Form: 11R
Release: 4·3

REQUEST

New South Wales
Real Property Act 1900

AP409215W

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authorises the Registrar General to collect the information required by this form for the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires that the Register is made available to any person for search upon payment of a fee, if any.

All Statutory Declarations and evidence that are lodged in support of land dealings will be treated as publicly accessible and will be disclosed to persons upon request.

(A) **STAMP DUTY** — If applicable. Revenue NSW use only

(B) **TORRENS TITLE** — See Annexure X

(C) **REGISTERED DEALING**

Number	Torrens Title

(D) **LODGED BY**

Document Collection Box	Name, Address or DX, Telephone, and Customer Account Number if any	CODE
47 V	LLPN 123012 E H.M. Allen & Co. DX 437 S, Sydney Ph 9232 3652 Reference: NSW HEALTH SNSWCMD 32	R

(E) **APPLICANT** — Health Administration Corporation ABN 45 100 538 161

(F) **NATURE OF REQUEST** — Issue of Certificates of Title

(G) **TEXT OF REQUEST**

The Health Administration Corporation has acquired the subject land pursuant to the Land Acquisition (Just Terms Compensation) Act 1991 and the Health Administration Act 1982. A copy of the acquisition notice from NSW Government Gazette No. 73 dated 12th July 2019 (n2019-2054) is attached at Annexure "Y". It is requested that the titles for the acquired land be issued in the name of the Health Administration Corporation.

DATE 23 SEP 2019 TIME: 3.45

Certified correct for the purposes of the Real Property Act 1900 by the authorised officer named below.

3 SEP 2019 TIME: 4pm

(H) I certify that I am an eligible witness and that an authorised officer of the applicant signed this dealing in my presence. [See note* below].

Signature of witness:

Name of witness: Shane Kenyon
Address of witness: 73 Miller Street, North Sydney NSW

Signature of authorised officer: B.Wil

Authorised officer's name: Bryson Wilson
Authority of officer: Delegate
Signing on behalf of: Health Administration Corporation

(I) *This section is to be completed where a notice of sale is required and the relevant data has been forwarded through eNOS.*

The applicant certifies that the eNOS data relevant to this dealing has been submitted and stored under eNOS ID No. 1866839 Full name: Shane Kenyon Signature:

* *s117 RP Act requires that you must have known the signatory for more than 12 months or have sighted identifying documentation.*

ALL HANDWRITING MUST BE IN BLOCK CAPITALS

1708

Ø EXTRA FEE RAISED

Annexure: X to Request

Parties:
Health Administration Corporation

Text:
(B) TORRENS TITLE
Being

Lot	Section	Plan	Plan No	Vol/Folio	Auto Consol
1		DP	133606		
A		DP	153358		
1		DP	233080	10622/131	
2		DP	233080	10622/132	
A		DP	351037	5672/13	being whole Auto Consol 5672-13
B		DP	351037	5672/13	
52		DP	754907	5350/161	
1	29	DP	758152	8434/115	
1	46	DP	758468		being whole Auto Consol 2143-196
2	46	DP	758468		
3	46	DP	758468		
4	46	DP	758468		
5	46	DP	758468		
6	46	DP	758468		
7	46	DP	758468		
8	46	DP	758468		
9	46	DP	758468		
10	46	DP	758468		
1	7	DP	758710	8434/159	
4	7	DP	758710	751/229	
2		DP	787223		
20		DP	818279		
21		DP	818279		
1		DP	936252		
1		DP	1133188		
16		DP	1133958		
22		DP	1152713		
1		DP	1160080		
2		DP	1161366		
1		DP	1203239		
2		DP	1243054		

B.W

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 2/1161366

SEARCH DATE	TIME	EDITION NO	DATE
9/9/2022	2:41 PM	2	22/10/2019

LAND

LOT 2 IN DEPOSITED PLAN 1161366
AT COOMA
LOCAL GOVERNMENT AREA SNOWY MONARO REGIONAL
PARISH OF COOMA COUNTY OF BERESFORD
TITLE DIAGRAM DP1161366

FIRST SCHEDULE

HEALTH ADMINISTRATION CORPORATION (R AP409215)

SECOND SCHEDULE (2 NOTIFICATIONS)

1 LAND EXCLUDES MINERALS WITHIN THE PARTS SHOWN SO INDICATED IN THE TITLE DIAGRAM - SEE CROWN GRANT AND MEMORANDUM S700000A

* 2 AQ232958 CAVEAT BY ESSENTIAL ENERGY

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Received: 09/09/2022 14:41:14

Appendix C: Laboratory Results Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ABC:	Ambient Background Concentration
ACM:	Asbestos Containing Material
ADWG:	AustralianDrinking Water Guidelines
AF:	Asbestos Fines
ANZG	Australian and New Zealand Guidelines
B(a)P:	Benzo(a)pyrene
CEC:	Cation Exchange Capacity
CRC:	Cooperative Research Centre
CT:	Contaminant Threshold
EILs:	Ecological Investigation Levels
ESLs:	Ecological Screening Levels
FA:	Fibrous Asbestos
GIL:	Groundwater Investigation Levels
GSW:	General Solid Waste
HILs:	Health Investigation Levels
HSLs:	Health Screening Levels
HSL-SSA:	Health Screening Level-SiteSpecific Assessment
kg/L	kilograms per litre
NA:	Not Analysed
NC:	Not Calculated
NEPM:	National Environmental Protection Measure
NHMRC:	National Health and Medical Research Council
NL:	Not Limiting
NSL:	No Set Limit
OCP:	Organochlorine Pesticides
OPP:	Organophosphorus Pesticides
PAHs:	Polycyclic Aromatic Hydrocarbons
%w/w:	weight per weight
ppm:	Parts per million
PCBs:	Polychlorinated Biphenyls
PCE:	Perchloroethylene (Tetrachloroethylene or Teterachloroethene)
pH_{KCL} :	pH of filtered 1:20, 1M KCL extract, shaken overnight
pH_{ox} :	pH of filtered 1:20 1M KCl after peroxide digestion
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
RSL:	Regional Screening Levels
RSW:	Restricted Solid Waste
SAC:	Site Assessment Criteria
SCC:	Specific Contaminant Concentration
S_{Cr}:	Chromium reducible sulfur
S_{POS}:	Peroxide oxidisable Sulfur
SSA:	Site Specific Assessment
SSHSLs:	Site Specific Health Screening Levels
TAA:	Total Actual Acidity in 1M KCL extract titrated to pH6.5
TB:	Trip Blank
TCA:	1,1,1 Trichloroethane (methyl chloroform)
TCE:	Trichloroethylene (Trichloroethene)
TCLP:	Toxicity Characteristics Leaching Procedure
TPA:	Total Potential Acidity, 1M KCL peroxide digest
TS:	Trip Spike
TRH:	Total Recoverable Hydrocarbons
TSA:	Total Sulfide Acidity (TPA-TAA)
UCL:	Upper Level Confidence Limit on Mean Value
USEPA	United States Environmental Protection Agency
VOCC:	Volatile Organic Chlorinated Compounds
WHO:	World Health Organisation

Table Specific Explanations:

HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also refered to as the B(a)P Toxic Equivalence Quotient (TEQ).
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

EIL/ESL Table:

- ABC Values for selected metals have been adopted from the published background concentrations presented in Olszowy et. al., (1995), Trace Element Concentrations in Soils from Rural and Urban New South Wales (the 25th percentile values for old suburbs with low traffic have been quoted).

Waste Classification and TCLP Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde.

QA/QC Table:

- Field blank, Inter and Intra laboratory duplicate results are reported in mg/kg.
- Trip spike results are reported as percentage recovery.
- Field rinsate results are reported in µg/L.

TABLE S1
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.
HIL-A: 'Residential with garden/accessible soils; children's day care centers; preschools; and primary schools'

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100
Site Assessment Criteria (SAC)			100	20	100	6000	300	40	400	7400	300	3	10	270	300	6	50	240	6	160	1	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
TP201	0-0.1	F: Silty Clay	<4	<0.4	**43**	**30**	**41**	**0.1**	**50**	**70**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP201 - [LAB_DUP]	0-0.1	F: Silty Clay	<4	<0.4	**45**	**34**	**50**	**0.1**	**58**	**81**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP201	1.0-1.2	XW Granite	<4	<0.4	**42**	**22**	**14**	**0.4**	**18**	**55**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP202	0-0.1	F: Silty Clay	<4	<0.4	**47**	**43**	**38**	**0.3**	**23**	**92**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP203	0-0.1	F: Silty Sandy Gravel	<4	<0.4	**29**	**17**	**51**	<0.1	**28**	**53**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP203	0.4-0.6	F: Silty Clay	<4	<0.4	**35**	**59**	**24**	**0.3**	**16**	**77**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP203	1.0-1.2	Silty clay	<4	<0.4	**65**	**33**	**13**	**0.1**	**31**	**52**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP204	0-0.1	F: Silty Clay	<4	<0.4	**38**	**19**	**23**	**0.1**	**17**	**86**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP205	0-0.1	F: Silty Clay	<4	<0.4	**42**	**19**	**23**	<0.1	**20**	**55**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP205	1.0-1.2	F: Silty Clay	<4	<0.4	**39**	**17**	**17**	**0.2**	**18**	**52**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP206	0-0.1	F: Silty Clay	<4	<0.4	**47**	**25**	**25**	**0.2**	**34**	**97**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP207	0-0.1	F: Silty Clay	<4	<0.4	**38**	**17**	**10**	<0.1	**17**	**37**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP207	0.8-1.0	Silty clay	<4	<0.4	**38**	**18**	**8**	<0.1	**17**	**28**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP208	0-0.1	F: Silty Clay	<4	<0.4	**36**	**15**	**10**	<0.1	**16**	**40**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP208	0.6-0.8	Silty clay	<4	<0.4	**51**	**24**	**10**	<0.1	**23**	**39**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP1	-	TP205 0-0.1	<4	<0.4	**43**	**19**	**16**	<0.1	**20**	**54**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP1 - [LAB_DUP]	-	TP205 0-0.1	<4	<0.4	**41**	**18**	**18**	<0.1	**19**	**53**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP2	-	TP201 0-0.1	<4	<0.4	**53**	**37**	**60**	**0.1**	**59**	**86**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP2 - [LAB_DUP]	-	TP201 0-0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA	NA
FCF1	Surface	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
FCF2	Surface	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP205-FCF1	0.1-0.6	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP205-FCF2	1.0-1.5	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP205-FCF3	1.0-1.5	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
Total Number of Samples			18	18	18	18	18	18	18	18	18	18	13	13	13	13	13	13	13	12	12	13
Maximum Value			<PQL	<PQL	65	59	60	0.4	59	97	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Detected

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S2
SOIL LABORATORY RESULTS COMPARED TO HSLs
All data in mg/kg unless stated otherwise

					C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category					**HSL-A/B: LOW/HIGH DENSITY RESIDENTIAL**							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
TP201	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.9
TP201 - [LAB_DUP]	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.9
TP201	1.0-1.2	XW Granite	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.5
TP202	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.5
TP203	0-0.1	F: Silty Sandy Gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.7
TP203	0.4-0.6	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1
TP203	1.0-1.2	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.8
TP204	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.8
TP205	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.3
TP205	1.0-1.2	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.9
TP206	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.4
TP207	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.6
TP207	0.8-1.0	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	2.3
TP208	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	1
TP208	0.6-0.8	Silty clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	3.4
SDUP1	-	TP205 0-0.1	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP1 - [LAB_DUP]	-	TP205 0-0.1	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP2	-	TP201 0-0.1	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP2 - [LAB_DUP]	-	TP201 0-0.1	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
Total Number of Samples					19	19	19	19	19	19	19	15
Maximum Value					<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	3.4

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the concentration above the SAC is highlighted in grey in the Site Assessment Criteria Table below

HSL SOIL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**	C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
TP201	0-0.1	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP201 - [LAB_DUP]	0-0.1	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP201	1.0-1.2	XW Granite	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP202	0-0.1	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP203	0-0.1	F: Silty Sandy Gravel	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP203	0.4-0.6	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP203	1.0-1.2	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP204	0-0.1	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP205	0-0.1	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP205	1.0-1.2	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP206	0-0.1	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP207	0-0.1	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP207	0.8-1.0	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP208	0-0.1	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP208	0.6-0.8	Silty clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP1	-	TP205 0-0.1	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP1 - [LAB_DUP]	-	TP205 0-0.1	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP2	-	TP201 0-0.1	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP2 - [LAB_DUP]	-	TP201 0-0.1	0m to <1m	Sand	45	110	0.5	160	55	40	3

TABLE S3
SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS
All data in mg/kg unless stated otherwise

			C_6-C_{10} (F1) plus BTEX	$>C_{10}$-C_{16} (F2) plus napthalene	$>C_{16}$-C_{34} (F3)	$>C_{34}$-C_{40} (F4)
PQL - Envirolab Services			25	50	100	100
NEPM 2013 Land Use Category			**RESIDENTIAL, PARKLAND & PUBLIC OPEN SPACE**			
Sample Reference	**Sample Depth**	**Soil Texture**				
TP201	0-0.1	Fine	<25	<50	**190**	<100
TP201 - [LAB_DUP]	0-0.1	Fine	<25	<50	**210**	<100
TP201	1.0-1.2	Fine	<25	<50	<100	<100
TP202	0-0.1	Fine	<25	<50	<100	<100
TP203	0-0.1	Fine	<25	<50	<100	<100
TP203	0.4-0.6	Fine	<25	<50	<100	<100
TP203	1.0-1.2	Fine	<25	<50	<100	<100
TP204	0-0.1	Fine	<25	<50	<100	<100
TP205	0-0.1	Fine	<25	<50	**190**	<100
TP205	1.0-1.2	Fine	<25	<50	<100	<100
TP206	0-0.1	Fine	<25	<50	**110**	<100
TP207	0-0.1	Fine	<25	<50	<100	<100
TP207	0.8-1.0	Fine	<25	<50	<100	<100
TP208	0-0.1	Fine	<25	<50	<100	<100
TP208	0.6-0.8	Fine	<25	<50	<100	<100
SDUP1	-	Fine	<25	<50	**100**	<100
SDUP1 - [LAB_DUP]	-	Fine	<25	<50	**120**	<100
SDUP2	-	Fine	<25	<50	**200**	**150**
SDUP2 - [LAB_DUP]	-	Fine	<25	<50	**210**	**170**
Total Number of Samples			19	19	19	19
Maximum Value			<PQL	<PQL	210	170

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Soil Texture**	C_6-C_{10} (F1) plus BTEX	$>C_{10}$-C_{16} (F2) plus napthalene	$>C_{16}$-C_{34} (F3)	$>C_{34}$-C_{40} (F4)
TP201	0-0.1	Fine	800	1000	3500	10000
TP201 - [LAB_DUP]	0-0.1	Fine	800	1000	3500	10000
TP201	1.0-1.2	Fine	800	1000	3500	10000
TP202	0-0.1	Fine	800	1000	3500	10000
TP203	0-0.1	Fine	800	1000	3500	10000
TP203	0.4-0.6	Fine	800	1000	3500	10000
TP203	1.0-1.2	Fine	800	1000	3500	10000
TP204	0-0.1	Fine	800	1000	3500	10000
TP205	0-0.1	Fine	800	1000	3500	10000
TP205	1.0-1.2	Fine	800	1000	3500	10000
TP206	0-0.1	Fine	800	1000	3500	10000
TP207	0-0.1	Fine	800	1000	3500	10000
TP207	0.8-1.0	Fine	800	1000	3500	10000
TP208	0-0.1	Fine	800	1000	3500	10000
TP208	0.6-0.8	Fine	800	1000	3500	10000
SDUP1	-	Fine	800	1000	3500	10000
SDUP1 - [LAB_DUP]	-	Fine	800	1000	3500	10000
SDUP2	-	Fine	800	1000	3500	10000
SDUP2 - [LAB_DUP]	-	Fine	800	1000	3500	10000

TABLE S4
SOIL LABORATORY RESULTS COMPARED T0 DIRECT CONTACT CRITERIA
All data in mg/kg unless stated otherwise

Analyte		C_6-C_{10}	>C_{10}-C_{16}	>C_{16}-C_{34}	>C_{34}-C_{40}	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact Criteria		4,400	3,300	4,500	6,300	100	14,000	4,500	12,000	1,400	
Site Use		**RESIDENTIAL WITH ACCESSIBLE SOIL- DIRECT SOIL CONTACT**									
Sample Reference	**Sample Depth**										
TP201	0-0.1	<25	<50	**190**	<100	<0.2	<0.5	<1	<1	<1	**0.9**
TP201 - [LAB_DUP]	0-0.1	<25	<50	**210**	<100	<0.2	<0.5	<1	<1	<1	**0.9**
TP201	1.0-1.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.5**
TP202	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.5**
TP203	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.7**
TP203	0.4-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**1**
TP203	1.0-1.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.8**
TP204	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.8**
TP205	0-0.1	<25	<50	**190**	<100	<0.2	<0.5	<1	<1	<1	**0.3**
TP205	1.0-1.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.9**
TP206	0-0.1	<25	<50	**110**	<100	<0.2	<0.5	<1	<1	<1	**0.4**
TP207	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.6**
TP207	0.8-1.0	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**2.3**
TP208	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**1**
TP208	0.6-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**3.4**
SDUP1	-	<25	<50	**100**	<100	<0.2	<0.5	<1	<1	<1	
SDUP1 - [LAB_DUP]	-	<25	<50	**120**	<100	<0.2	<0.5	<1	<1	<1	
SDUP2	-	<25	<50	**200**	**150**	<0.2	<0.5	<1	<1	<1	NA
SDUP2 - [LAB_DUP]	-	<25	<50	**210**	**170**	<0.2	<0.5	<1	<1	<1	
Total Number of Samples		19	19	19	19	19	19	19	19	19	15
Maximum Value		<PQL	<PQL	210	170	<PQL	<PQL	<PQL	<PQL	<PQL	3.4

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**

TABLE S5
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HSL-A: Residential with garden/accessible soils; children's day care centers; preschools; and primary schools

FIELD DATA															LABORATORY DATA											
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample refeference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation %(w/w)	FA and AF Estimation %(w/w)
SAC			**No**					**0.01**			**0.001**			**0.001**											**0.01**	**0.001**
17/11/2022	TP201	0.0-0.1	No	10	10,390	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	311057	TP201	0-0.1	704.19	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
17/11/2022	TP201	0.1-0.6	NA	10	10,560	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17/11/2022	TP202	0.0-0.1	No	10	10,250	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	311057	TP202	0-0.1	669.01	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
17/11/2022	TP202	0.1-0.6	NA	10	10,720	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17/11/2022	TP203	0.0-0.1	No	10	10,910	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	311057	TP203	0-0.1	778.54	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
17/11/2022	TP203	0.1-0.7	NA	10	11,200	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17/11/2022	TP204	0.0-0.1	No	10	11,490	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	311057	TP204	0-0.1	640.06	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
17/11/2022	TP204	0.1-0.5	NA	10	10,720	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17/11/2022	TP205	0.0-0.1	No	10	12,560	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	311057	TP205	0-0.1	653.3	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
17/11/2022	TP205	0.1-0.6	NA	10	10,290	20.2	3.027	0.0294	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17/11/2022	TP205	0.6-1.0	NA	10	10,530	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17/11/2022	TP205	1.0-1.5	NA	10	11,350	44.6	6.696	0.0590	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17/11/2022	TP206	0.0-0.1	No	10	10,190	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	311057	TP206	0-0.1	545.92	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
17/11/2022	TP206	0.1-0.7	NA	10	10,850	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17/11/2022	TP207	0.0-0.2	No	10	13,210	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	311057	TP207	0-0.1	809.06	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
17/11/2022	TP207	0.2-0.5	NA	10	10,070	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
17/11/2022	TP208	0.0-0.2	No	10	13,230	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	311057	TP208	0-0.1	801.37	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
17/11/2022	TP208	0.2-0.4	NA	10	10,440	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Concentration above the SAC **VALUE**

TABLE S6
SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs
All data in mg/kg unless stated otherwise

Land Use Category				URBAN RESIDENTIAL AND PUBLIC OPEN SPACE																	
							AGED HEAVY METALS-EILs						EILs		ESLs							
				pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	8	18	104	5	77	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																				
TP201	0-0.1	F: Silty Clay	Fine	**7.5**	**42**	NA	<4	**43**	**30**	**41**	**50**	**70**	<1	<0.1	<25	<50	**190**	<100	<0.2	<0.5	<1	<1	<0.05
TP201 - [LAB_DUP]	0-0.1	F: Silty Clay	Fine	**7.5**	**42**	NA	<4	**45**	**34**	**50**	**58**	**81**	<1	<0.1	<25	<50	**210**	<100	<0.2	<0.5	<1	<1	<0.05
TP201	1.0-1.2	XW Granite	Fine	NA	NA	NA	<4	**42**	**22**	**14**	**18**	**55**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
TP202	0-0.1	F: Silty Clay	Fine	NA	NA	NA	<4	**47**	**43**	**38**	**23**	**92**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
TP203	0-0.1	F: Silty Sandy Gravel	Fine	NA	NA	NA	<4	**29**	**17**	**51**	**28**	**53**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
TP203	0.4-0.6	F: Silty Clay	Fine	NA	NA	NA	<4	**35**	**59**	**24**	**16**	**77**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
TP203	1.0-1.2	Silty clay	Fine	NA	NA	NA	<4	**65**	**33**	**13**	**31**	**52**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
TP204	0-0.1	F: Silty Clay	Fine	NA	NA	NA	<4	**38**	**19**	**23**	**17**	**86**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
TP205	0-0.1	F: Silty Clay	Fine	NA	NA	NA	<4	**42**	**19**	**23**	**20**	**55**	<1	<0.1	<25	<50	**190**	<100	<0.2	<0.5	<1	<1	<0.05
TP205	1.0-1.2	F: Silty Clay	Fine	NA	NA	NA	<4	**39**	**17**	**17**	**18**	**52**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
TP206	0-0.1	F: Silty Clay	Fine	NA	NA	NA	<4	**47**	**25**	**25**	**34**	**97**	<1	<0.1	<25	<50	**110**	<100	<0.2	<0.5	<1	<1	<0.05
TP207	0-0.1	F: Silty Clay	Fine	NA	NA	NA	<4	**38**	**17**	**10**	**17**	**37**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
TP207	0.8-1.0	Silty clay	Fine	NA	NA	NA	<4	**38**	**18**	**8**	**17**	**28**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
TP208	0-0.1	F: Silty Clay	Fine	NA	NA	NA	<4	**36**	**15**	**10**	**16**	**40**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
TP208	0.6-0.8	Silty clay	Fine	NA	NA	NA	<4	**51**	**24**	**10**	**23**	**39**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
SDUP1	-	TP205 0-0.1	Fine	NA	NA	NA	<4	**43**	**19**	**16**	**20**	**54**	<1	<0.1	<25	<50	**100**	<100	<0.2	<0.5	<1	<1	<0.05
SDUP1 - [LAB_DUP]	-	TP205 0-0.1	Fine	NA	NA	NA	<4	**41**	**18**	**18**	**19**	**53**	<1	<0.1	<25	<50	**120**	<100	<0.2	<0.5	<1	<1	<0.05
SDUP2	-	TP201 0-0.1	Fine	**7.5**	**42**	NA	<4	**53**	**37**	**60**	**59**	**86**	<1	<0.1	<25	<50	**200**	**150**	<0.2	<0.5	<1	<1	<0.05
SDUP2 - [LAB_DUP]	-	TP201 0-0.1	Fine	**7.5**	**42**	NA	NA	NA	NA	NA	NA	NA	<1	<0.1	<25	<50	**210**	**170**	<0.2	<0.5	<1	<1	NA
Total Number of Samples				4	4	0	18	18	18	18	18	18	19	13	19	19	19	19	19	19	19	19	18
Maximum Value				7.5	42	NA	<PQL	65	59	60	59	97	<PQL	<PQL	<PQL	<PQL	210	170	<PQL	<PQL	<PQL	<PQL	<PQL

Concentration above the SAC **VALUE**
Concentration above the PQL **Bold**
The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below

EIL AND ESL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**	pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
TP201	0-0.1	F: Silty Clay	Fine	7.5	42	NA	100	200	250	1200	560	1400	170	180	180	120	1300	5600	65	105	125	45	20
TP201 - [LAB_DUP]	0-0.1	F: Silty Clay	Fine	7.5	42	NA	100	200	250	1200	560	1400	170	180	180	120	1300	5600	65	105	125	45	20
TP201	1.0-1.2	XW Granite	Fine	NA	NA	NA	100	200	80	1200	35	150	170	--	180	120	1300	5600	65	105	125	45	20
TP202	0-0.1	F: Silty Clay	Fine	NA	NA	NA	100	200	80	1200	35	150	170	180	180	120	1300	5600	65	105	125	45	20
TP203	0-0.1	F: Silty Sandy Gravel	Fine	NA	NA	NA	100	200	80	1200	35	150	170	180	180	120	1300	5600	65	105	125	45	20
TP203	0.4-0.6	F: Silty Clay	Fine	NA	NA	NA	100	200	80	1200	35	150	170	--	180	120	1300	5600	65	105	125	45	20
TP203	1.0-1.2	Silty clay	Fine	NA	NA	NA	100	200	80	1200	35	150	170	--	180	120	1300	5600	65	105	125	45	20
TP204	0-0.1	F: Silty Clay	Fine	NA	NA	NA	100	200	80	1200	35	150	170	180	180	120	1300	5600	65	105	125	45	20
TP205	0-0.1	F: Silty Clay	Fine	NA	NA	NA	100	200	80	1200	35	150	170	180	180	120	1300	5600	65	105	125	45	20
TP205	1.0-1.2	F: Silty Clay	Fine	NA	NA	NA	100	200	80	1200	35	150	170	--	180	120	1300	5600	65	105	125	45	20
TP206	0-0.1	F: Silty Clay	Fine	NA	NA	NA	100	200	80	1200	35	150	170	180	180	120	1300	5600	65	105	125	45	20
TP207	0-0.1	F: Silty Clay	Fine	NA	NA	NA	100	200	80	1200	35	150	170	180	180	120	1300	5600	65	105	125	45	20
TP207	0.8-1.0	Silty clay	Fine	NA	NA	NA	100	200	80	1200	35	150	170	--	180	120	1300	5600	65	105	125	45	20
TP208	0-0.1	F: Silty Clay	Fine	NA	NA	NA	100	200	80	1200	35	150	170	180	180	120	1300	5600	65	105	125	45	20
TP208	0.6-0.8	Silty clay	Fine	NA	NA	NA	100	200	80	1200	35	150	170	--	180	120	1300	5600	65	105	125	45	20
SDUP1	-	TP205 0-0.1	Fine	NA	NA	NA	100	200	80	1200	35	150	170	180	180	120	1300	5600	65	105	125	45	20
SDUP1 - [LAB_DUP]	-	TP205 0-0.1	Fine	NA	NA	NA	100	200	80	1200	35	150	170	180	180	120	1300	5600	65	105	125	45	20
SDUP2	-	TP201 0-0.1	Fine	7.5	42	NA	100	200	250	1200	560	1400	170	180	180	120	1300	5600	65	105	125	45	20
SDUP2 - [LAB_DUP]	-	TP201 0-0.1	Fine	7.5	42	NA	--	--	--	--	--	--	170	180	180	120	1300	5600	65	105	125	45	--

TABLE S7
SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES
All data in mg/kg unless stated otherwise

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled	PCBs	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Total C_{10}-C_{36}	Benzene	Toluene	Ethyl benzene	Total Xylenes	
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	25	50	100	100	50	0.2	0.5	1	1	100
General Solid Waste CT1			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	50	50	650		NSL		10,000	10	288	600	1,000	-
General Solid Waste SCC1			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	650		NSL		10,000	18	518	1,080	1,800	-
Restricted Solid Waste CT2			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	2600		NSL		40,000	40	1,152	2,400	4,000	-
Restricted Solid Waste SCC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600		NSL		40,000	72	2,073	4,320	7,200	-
Sample Reference	**Sample Depth**	**Sample Description**																									
TP201	0-0.1	F: Silty Clay	<4	<0.4	**43**	**30**	**41**	**0.1**	**50**	**70**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	**150**	**150**	<0.2	<0.5	<1	<1	Not Detected
TP201 - [LAB_DUP]	0-0.1	F: Silty Clay	<4	<0.4	**45**	**34**	**50**	**0.1**	**58**	**81**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	**180**	**180**	<0.2	<0.5	<1	<1	NA
TP201	1.0-1.2	XW Granite	<4	<0.4	**42**	**22**	**14**	**0.4**	**18**	**55**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
TP202	0-0.1	F: Silty Clay	<4	<0.4	**47**	**43**	**38**	**0.3**	**23**	**92**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
TP203	0-0.1	F: Silty Sandy Gravel	<4	<0.4	**29**	**17**	**51**	<0.1	**28**	**53**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
TP203	0.4-0.6	F: Silty Clay	<4	<0.4	**35**	**59**	**24**	**0.3**	**16**	**77**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
TP203	1.0-1.2	Silty clay	<4	<0.4	**65**	**33**	**13**	**0.1**	**31**	**52**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
TP204	0-0.1	F: Silty Clay	<4	<0.4	**38**	**19**	**23**	**0.1**	**17**	**86**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
TP205	0-0.1	F: Silty Clay	<4	<0.4	**42**	**19**	**23**	<0.1	**20**	**55**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	**120**	**120**	<0.2	<0.5	<1	<1	Not Detected
TP205	1.0-1.2	F: Silty Clay	<4	<0.4	**39**	**17**	**17**	**0.2**	**18**	**52**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
TP206	0-0.1	F: Silty Clay	<4	<0.4	**47**	**25**	**25**	**0.2**	**34**	**97**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
TP207	0-0.1	F: Silty Clay	<4	<0.4	**38**	**17**	**10**	<0.1	**17**	**37**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
TP207	0.8-1.0	Silty clay	<4	<0.4	**38**	**18**	**8**	<0.1	**17**	**28**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
TP208	0-0.1	F: Silty Clay	<4	<0.4	**36**	**15**	**10**	<0.1	**16**	**40**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
TP208	0.6-0.8	Silty clay	<4	<0.4	**51**	**24**	**10**	<0.1	**23**	**39**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP1	-	TP205 0-0.1	<4	<0.4	**43**	**19**	**16**	<0.1	**20**	**54**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP1 - [LAB_DUP]	-	TP205 0-0.1	<4	<0.4	**41**	**18**	**18**	<0.1	**19**	**53**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP2	-	TP201 0-0.1	<4	<0.4	**53**	**37**	**60**	**0.1**	**59**	**86**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	**210**	**210**	<0.2	<0.5	<1	<1	NA
SDUP2 - [LAB_DUP]	-	TP201 0-0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	NA	NA	NA	NA	<25	<50	<100	**240**	**240**	<0.2	<0.5	<1	<1	NA
FCF1	Surface	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
FCF2	Surface	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP205-FCF1	0.1-0.6	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
TP205-FCF2	1.0-1.5	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
TP205-FCF3	1.0-1.5	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
Total Number of Samples			18	18	18	18	18	18	18	18	18	18	13	12	12	12	12	19	19	19	19	19	19	19	19	19	13
Maximum Value			<PQL	<PQL	65	59	60	0.4	59	97	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	240	240	<PQL	<PQL	<PQL	<PQL	Detected

Concentration above the CT1 — **VALUE**
Concentration above SCC1 — **VALUE**
Concentration above the SCC2 — **VALUE**
Concentration above PQL — **Bold**

TABLE S8

SOIL LABORATORY TCLP RESULTS

All data in mg/L unless stated otherwise

			Arsenic	Cadmium	Chromium	Lead	Mercury	Nickel	B(a)P
PQL - Envirolab Services			0.05	0.01	0.01	0.03	0.0005	0.02	0.001
TCLP1 - General Solid Waste			5	1	5	5	0.2	2	0.04
TCLP2 - Restricted Solid Waste			20	4	20	20	0.8	8	0.16
TCLP3 - Hazardous Waste			>20	>4	>20	>20	>0.8	>8	>0.16
Sample Reference	**Sample Depth**	**Sample Description**							
TP201	0-0.1	F: Silty Clay	NA	NA	NA	NA	NA	<0.02	NA
Total Number of samples			0	0	0	0	0	1	0
Maximum Value			NA	NA	NA	NA	NA	<PQL	NA

General Solid Waste	**VALUE**
Restricted Solid Waste	**VALUE**
Hazardous Waste	**VALUE**
Concentration above PQL	**Bold**

TABLE Q1
SOIL QA/QC SUMMARY

			TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene
	PQL Envirolab SYD		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1*	*2*	*1*
	PQL Envirolab VIC		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1.0*	*2.0*	*1.0*
Intra laboratory duplicate	TP205	0-0.1	<25	<50	190	<100	<0.2	<0.5	<1	<2	<1
	SDUP1	-	<25	<50	100	<100	<0.2	<0.5	<1	<2	<1
	MEAN		nc	nc	145	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	62%	nc	nc	nc	nc	nc	nc
Inter laboratory duplicate	TP201	0-0.1	<25	<50	190	<100	<0.2	<0.5	<1	<2	<1
	SDUP2	-	<25	<50	200	150	<0.2	<0.5	<1	<2	<1
	MEAN		nc	nc	195	100	nc	nc	nc	nc	nc
	RPD %		nc	nc	5%	100%	nc	nc	nc	nc	nc
Field Blank	TB-S2 18/11/22	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
Field Rinsate	FR2-SHOVEL 18/11/22	µg/L	130	<50	<100	<100	<1	<1	<1	<2	<1
Trip Spike	TS-S2 18/11/22		-	-	-	-	97%	96%	97%	98%	98%

			Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.05*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*
Intra laboratory duplicate	TP205	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
	SDUP1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter laboratory duplicate	TP201	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
	SDUP2	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field Blank	TB-S2 18/11/22	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
Field Rinsate	FR2-SHOVEL 18/11/22	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1
Trip Spike	TS-S2 18/11/22		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

			HCB	alpha- BHC	gamma- BHC	beta- BHC	Heptachlor	delta- BHC	Aldrin	Heptachlor Epoxide	Gamma- Chlordane	alpha- chlordane
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Intra laboratory duplicate	TP205	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	SDUP1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter laboratory duplicate	TP201	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	SDUP2	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field Blank	TB-S2 18/11/22	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Rinsate	FR2-SHOVEL 18/11/22	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip Spike	TS-S2 18/11/22		-	-	-	-	-	-	-	-	-	-

			Endosulfan I	pp- DDE	Dieldrin	Endrin	pp- DDD	Endosulfan II	pp- DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Intra laboratory duplicate	TP205	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	SDUP1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter laboratory duplicate	TP201	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	SDUP2	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field Blank	TB-S2 18/11/22	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Rinsate	FR2-SHOVEL 18/11/22	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip Spike	TS-S2 18/11/22		-	-	-	-	-	-	-	-	-	-

			Azinphos-methyl (Guthion)	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Intra laboratory duplicate	TP205	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	SDUP1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter laboratory duplicate	TP201	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	SDUP2	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field Blank	TB-S2 18/11/22	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Field Rinsate	FR2-SHOVEL 18/11/22	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trip Spike	TS-S2 18/11/22		-	-	-	-	-	-	-	-	-	-	-	-	-

			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD		*4*	*0.4*	*1*	*1*	*1*	*0.1*	*1*	*1*
	PQL Envirolab VIC		*4.0*	*0.4*	*1.0*	*1.0*	*1.0*	*0.1*	*1.0*	*1.0*
Intra laboratory duplicate	TP205	0-0.1	<4	<0.4	42	19	23	<0.1	20	55
	SDUP1	-	<4	<0.4	43	19	16	<0.1	20	54
	MEAN		nc	nc	42.5	19	19.5	nc	20	54.5
	RPD %		nc	nc	2%	0%	36%	nc	0%	2%
Inter laboratory duplicate	TP201	0-0.1	<4	<0.4	43	30	41	0.1	50	70
	SDUP2	-	<4	<0.4	53	37	60	0.1	59	86
	MEAN		nc	nc	48	33.5	50.5	0.1	54.5	78
	RPD %		nc	nc	21%	21%	38%	0%	17%	21%
Field Blank	TB-S2 18/11/22	-	<4	<0.4	3	<1	2	<0.1	<1	2
Field Rinsate	FR2-SHOVEL 18/11/22	µg/L	<0.05	<0.01	<0.01	0.8	<0.03	<0.0005	<0.02	<0.02
Trip Spike	TS-S2 18/11/22		-	-	-	-	-	-	-	-

Result outside of QA/QC acceptance criteria (highlighted)

Appendix D: Test Pit Logs

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP201 1/1

SDUP2: 0-0.1m

Client: HEALTH INFRASTRUCTURE C/- CWPM

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Job No.: E30596PT **Method:** TEST PIT **R.L. Surface:** N/A

Date: 17/11/22 **Datum:** -

Plant Type: 2T EXCAVATOR **Logged/Checked by:** A.D./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, medium plasticity, trace of sand, granite and igneous gravel, ceramic fragments and root fibres.	w≈PL			GRASS COVER SCREEN: 10.39kg 0-0.1m NO FCF SCREEN: 10.56kg 0.1-0.6m NO FCF
							0.5		-	Extremely Weathered granite: gravelly SAND, fine to coarse grained, dark brown and dark grey, fine to coarse grained granite gravel, trace of silt.	XW			
							1			END OF TEST PIT AT 1.3m				
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Log No. TP202 1/1

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE C/- CWPM

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Job No.: E30596PT **Method:** TEST PIT **R.L. Surface:** N/A

Date: 17/11/22 **Datum:** -

Plant Type: 2T EXCAVATOR **Logged/Checked by:** A.D./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, low to medium plasticity, brown, trace of granite gravel, ash and root fibres.	w≈PL			GRASS COVER SCREEN: 10.25kg 0-0.1m NO FCF SCREEN: 10.72kg 0.1-0.7m NO FCF
							0.5							
									-	Extremely Weathered granite: gravelly SAND, fine to coarse grained, dark brown and dark grey, fine to coarse grained granite gravel, trace of silt.	XW			
							1			END OF TEST PIT AT 1.1m				
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP203 1/1

SDUP3: 0-0.1m

Client: HEALTH INFRASTRUCTURE C/- CWPM

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Job No.: E30596PT **Method:** TEST PIT **R.L. Surface:** N/A

Date: 17/11/22 **Datum:** -

Plant Type: 2T EXCAVATOR **Logged/Checked by:** A.D./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty sandy gravel, fine to coarse grained igneous, grey, fine to medium grained sand, trace of quartz gravel, clay nodules and root fibres.	D w≈PL			SCREEN: 10.91kg 0-0.1m NO FCF
							0.5			FILL: Silty clay, medium plasticity, brown, trace of sand, ceramic fragments and root fibres.				SCREEN: 11.20kg 0.1-0.7m NO FCF
							1		CI	Silty CLAY: medium plasticity, orange brown and yellow brown, trace of granite gravel.	w≈PL			RESIDUAL
							1.5			END OF TEST PIT AT 1.3m				
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP204** **1/1**

Client: HEALTH INFRASTRUCTURE C/- CWPM

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Job No.: E30596PT **Method:** TEST PIT **R.L. Surface:** N/A

Date: 17/11/22 **Datum:** -

Plant Type: 2T EXCAVATOR **Logged/Checked by:** A.D./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, low to medium plasticity, brown, trace of granite and quartz gravel and root fibres.	w≈PL			GRASS COVER SCREEN: 11.49kg 0-0.1m NO FCF SCREEN: 10.72kg 0.1-0.5m NO FCF
							0.5		-	Extremely Weathered granite: gravelly SAND, fine to coarse grained, dark brown and dark grey, fine to coarse grained granite gravel, trace of silt.	XW			
										END OF TEST PIT AT 0.8m				REFUSAL ON GRANITE BEDROCK
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP205 1/1

SDUP1: 0-0.1m

Client: HEALTH INFRASTRUCTURE C/- CWPM

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Job No.: E30596PT **Method:** TEST PIT **R.L. Surface:** N/A

Date: 17/11/22 **Datum:** -

Plant Type: 2T EXCAVATOR **Logged/Checked by:** A.D./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, low to medium plasticity, brown, trace of sand, quartz and granite gravel, concrete, brick and fibre cement fragments and root fibres.	w≈PL			GRASS COVER SCREEN: 12.56kg 0-0.1m NO FCF SCREEN: 10.29kg 0.1-0.6m TP205-FCF1 SCREEN: 10.53kg 0.6-1.0m NO FCF
							0.5							
							1			FILL: Silty clay, medium plasticity, red brown, trace of sand, brick and fibre cement fragments, ash and root fibres.	w≈PL			SCREEN: 11.35kg 1.0-1.5m TP205-FCF2 TP205-FCF3
							1.5		-	Extremely Weathered granite: gravelly SAND, fine to coarse grained, dark brown and dark grey, fine to coarse grained granite gravel, trace of silt.	XW			
							2			END OF TEST PIT AT 1.6m				REFUSAL ON GRANITE BEDROCK
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Log No. **TP206** **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: HEALTH INFRASTRUCTURE C/- CWPM

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Job No.: E30596PT **Method:** TEST PIT **R.L. Surface:** N/A

Date: 17/11/22 **Datum:** -

Plant Type: 2T EXCAVATOR **Logged/Checked by:** A.D./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0			FILL: Silty clay, low to medium plasticity, brown, trace of granite, quartz and igneous gravel, brick fragments, root fibres and ash.	w≈PL			GRASS COVER SCREEN: 10.19kg 0-0.1m NO FCF SCREEN: 10.85kg 0.1-0.7m NO FCF
							0.5		-	Extremely Weathered granite: gravelly SAND, fine to coarse grained, dark brown and dark grey, fine to coarse grained granite gravel, trace of silt.	XW			
							1			END OF TEST PIT AT 0.95m				REFUSAL ON GRANITE BEDROCK
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP207 1/1

SDUP4: 0-0.1m

Client: HEALTH INFRASTRUCTURE C/- CWPM

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Job No.: E30596PT **Method:** TEST PIT **R.L. Surface:** N/A

Date: 17/11/22 **Datum:** -

Plant Type: 2T EXCAVATOR **Logged/Checked by:** A.D./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty clay, low to medium plasticity, red brown, trace of igneous and granite gravel, ceramic fragments and root fibres.	w≈PL			SCREEN: 13.21kg 0-0.2m NO FCF
	■		■		■					as above, but with igneous gravel, fine to coarse grained, grey.	w≈PL			SCREEN: 10.07kg 0.2-0.5m NO FCF
							0.5		CI	Silty CLAY: medium plasticity, red brown, trace of granite gravel and root fibres.	w≈PL			RESIDUAL
							1			END OF TEST PIT AT 1.0m				
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP208** **1/1**

Client: HEALTH INFRASTRUCTURE C/- CWPM

Project: PROPOSED ALTERATIONS AND ADDITIONS

Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Job No.: E30596PT **Method:** TEST PIT **R.L. Surface:** N/A

Date: 17/11/22 **Datum:** -

Plant Type: 2T EXCAVATOR **Logged/Checked by:** A.D./M.D.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0			FILL: Silty clay, low to medium plasticity, red brown, trace of igneous and granite gravel and root fibres.	w≈PL			SCREEN: 13.23kg 0-0.2m NO FCF
	■		■		■					as above, but with igneous gravel and sand.	w<PL			SCREEN: 10.44kg 0.2-0.4m NO FCF
							0.5		CI	Silty CLAY: medium plasticity, red brown, trace of granite gravel.	w≈PL			RESIDUAL
							1			END OF TEST PIT AT 0.85m				REFUSAL ON GRANITE BEDROCK
							1.5							
							2							
							2.5							
							3							
							3.5							

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:

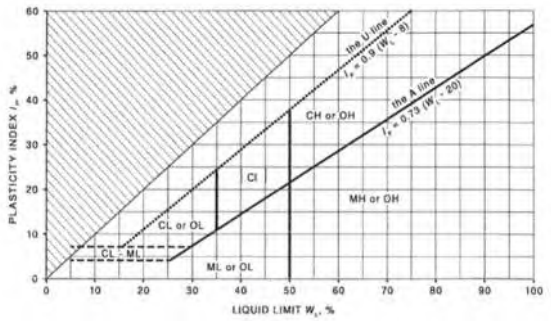
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

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.

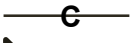
3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.

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	Vane shear reading in kPa of undrained shear strength.
	PID = 100	Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	w > PL	Moisture content estimated to be greater than plastic limit.
	$w \approx$ PL	Moisture content estimated to be approximately equal to plastic limit.
	w < PL	Moisture content estimated to be less than plastic limit.
	$w \approx$ LL	Moisture content estimated to be near liquid limit.
	w > LL	Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D	DRY – runs freely through fingers.
	M	MOIST – does not run freely but no free water visible on soil surface.
	W	WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS	VERY SOFT – unconfined compressive strength ≤ 25kPa.
	S	SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa.
	F	FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa.
	St	STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa.
	VSt	VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa.
	Hd	HARD – unconfined compressive strength > 400kPa.
	Fr	FRIABLE – strength not attainable, soil crumbles.
	( )	Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)		**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
	VL	
	L	
	MD	
	D	
	VD	
	( )	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 E: Laboratory Report(s) & COC Documents

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CERTIFICATE OF ANALYSIS 311057

Client Details

Client	JK Environments
Attention	Katrina Taylor
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E30596PT, Cooma**
Number of Samples	29 Soil, 1 Water, 6 Material
Date samples received	18/11/2022
Date completed instructions received	18/11/2022

Analysis Details

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

Samples were analysed as received from the client. 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	25/11/2022
Date of Issue	25/11/2022

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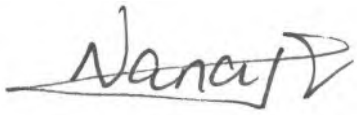
Asbestos Approved By
Analysed by Asbestos Approved Analyst: Nyovan Moonean, Lucy Zhu
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Giovanni Agosti, Group Technical Manager
Josh Williams, Organics and LC Supervisor
Kyle Gavrily, Senior Chemist
Lucy Zhu, Asbestos Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		311057-1	311057-4	311057-7	311057-10	311057-12
Your Reference	UNITS	TP201	TP202	TP203	TP204	TP205
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	23/11/2022	23/11/2022	23/11/2022	23/11/2022	23/11/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	81	82	85	81	90

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		311057-16	311057-19	311057-22	311057-25	311057-28
Your Reference	UNITS	TP206	TP207	TP208	SDUP1	TB-S2
Depth		0-0.1	0-0.1	0-0.1	-	-
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	23/11/2022	23/11/2022	23/11/2022	23/11/2022	23/11/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	83	84	86	82	89

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		311057-29
Your Reference	UNITS	TS-S2
Depth		-
Date Sampled		17/11/2022
Type of sample		Soil
Date extracted	-	21/11/2022
Date analysed	-	23/11/2022
Benzene	mg/kg	97%
Toluene	mg/kg	96%
Ethylbenzene	mg/kg	97%
m+p-xylene	mg/kg	98%
o-Xylene	mg/kg	98%
Naphthalene	mg/kg	[NT]
Total +ve Xylenes	mg/kg	[NT]
Surrogate aaa-Trifluorotoluene	%	97

svTRH (C10-C40) in Soil						
Our Reference		311057-1	311057-4	311057-7	311057-10	311057-12
Your Reference	UNITS	TP201	TP202	TP203	TP204	TP205
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	22/11/2022	22/11/2022	22/11/2022	22/11/2022	22/11/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	150	<100	<100	<100	120
Total +ve TRH (C10-C36)	mg/kg	150	<50	<50	<50	120
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	190	<100	<100	<100	190
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	190	<50	<50	<50	190
Surrogate o-Terphenyl	%	77	76	77	80	79

svTRH (C10-C40) in Soil						
Our Reference		311057-16	311057-19	311057-22	311057-25	311057-28
Your Reference	UNITS	TP206	TP207	TP208	SDUP1	TB-S2
Depth		0-0.1	0-0.1	0-0.1	-	-
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	22/11/2022	22/11/2022	22/11/2022	22/11/2022	22/11/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	110	<100	<100	100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	110	<50	<50	100	<50
Surrogate o-Terphenyl	%	73	70	79	72	76

PAHs in Soil						
Our Reference		311057-1	311057-4	311057-7	311057-10	311057-12
Your Reference	UNITS	TP201	TP202	TP203	TP204	TP205
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	78	78	79	79	77

PAHs in Soil						
Our Reference		311057-16	311057-19	311057-22	311057-25	311057-28
Your Reference	UNITS	TP206	TP207	TP208	SDUP1	TB-S2
Depth		0-0.1	0-0.1	0-0.1	-	-
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	77	78	75	76	79

Organochlorine Pesticides in soil						
Our Reference		311057-1	311057-4	311057-7	311057-10	311057-12
Your Reference	UNITS	TP201	TP202	TP203	TP204	TP205
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022	24/11/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	80	83	82	80	79

Organochlorine Pesticides in soil					
Our Reference		311057-16	311057-19	311057-22	311057-25
Your Reference	UNITS	TP206	TP207	TP208	SDUP1
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	80	79	78	80

Organophosphorus Pesticides in Soil						
Our Reference		311057-1	311057-4	311057-7	311057-10	311057-12
Your Reference	UNITS	TP201	TP202	TP203	TP204	TP205
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	80	83	82	80	79

Organophosphorus Pesticides in Soil					
Our Reference		311057-16	311057-19	311057-22	311057-25
Your Reference	UNITS	TP206	TP207	TP208	SDUP1
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	80	79	78	80

PCBs in Soil						
Our Reference		311057-1	311057-4	311057-7	311057-10	311057-12
Your Reference	UNITS	TP201	TP202	TP203	TP204	TP205
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	80	83	82	80	79

PCBs in Soil					
Our Reference		311057-16	311057-19	311057-22	311057-25
Your Reference	UNITS	TP206	TP207	TP208	SDUP1
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	80	79	78	80

Acid Extractable metals in soil						
Our Reference		311057-1	311057-4	311057-7	311057-10	311057-12
Your Reference	UNITS	TP201	TP202	TP203	TP204	TP205
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/11/2022	22/11/2022	22/11/2022	22/11/2022	22/11/2022
Date analysed	-	23/11/2022	23/11/2022	23/11/2022	23/11/2022	23/11/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	43	47	29	38	42
Copper	mg/kg	30	43	17	19	19
Lead	mg/kg	41	38	51	23	23
Mercury	mg/kg	0.1	0.3	<0.1	0.1	<0.1
Nickel	mg/kg	50	23	28	17	20
Zinc	mg/kg	70	92	53	86	55

Acid Extractable metals in soil						
Our Reference		311057-16	311057-19	311057-22	311057-25	311057-28
Your Reference	UNITS	TP206	TP207	TP208	SDUP1	TB-S2
Depth		0-0.1	0-0.1	0-0.1	-	-
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/11/2022	22/11/2022	22/11/2022	22/11/2022	22/11/2022
Date analysed	-	23/11/2022	23/11/2022	23/11/2022	23/11/2022	23/11/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	47	38	36	43	3
Copper	mg/kg	25	17	15	19	<1
Lead	mg/kg	25	10	10	16	2
Mercury	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	34	17	16	20	<1
Zinc	mg/kg	97	37	40	54	2

Moisture						
Our Reference		311057-1	311057-4	311057-7	311057-10	311057-12
Your Reference	UNITS	TP201	TP202	TP203	TP204	TP205
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	22/11/2022	22/11/2022	22/11/2022	22/11/2022	22/11/2022
Moisture	%	8.4	10	5.4	10	9.5

Moisture						
Our Reference		311057-16	311057-19	311057-22	311057-25	311057-28
Your Reference	UNITS	TP206	TP207	TP208	SDUP1	TB-S2
Depth		0-0.1	0-0.1	0-0.1	-	-
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/11/2022	21/11/2022	21/11/2022	21/11/2022	21/11/2022
Date analysed	-	22/11/2022	22/11/2022	22/11/2022	22/11/2022	22/11/2022
Moisture	%	15	9.1	7.8	11	2.9

Asbestos ID - soils NEPM - ASB-001						
Our Reference		311057-1	311057-4	311057-7	311057-10	311057-12
Your Reference	UNITS	TP201	TP202	TP203	TP204	TP205
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Sample mass tested	g	704.19	669.01	778.54	640.06	653.3
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001				
Our Reference		311057-16	311057-19	311057-22
Your Reference	UNITS	TP206	TP207	TP208
Depth		0-0.1	0-0.1	0-0.1
Date Sampled		17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil
Date analysed	-	24/11/2022	24/11/2022	24/11/2022
Sample mass tested	g	545.92	809.06	801.37
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–
FA and AF Estimation*	g	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001

Asbestos ID - materials						
Our Reference		311057-31	311057-32	311057-34	311057-35	311057-36
Your Reference	UNITS	FCF1	FCF2	TP205-FCF1	TP205-FCF2	TP205-FCF3
Depth		Surface	Surface	0.1-0.6	1.0-1.5	1.0-1.5
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Material	Material	Material	Material	Material
Date analysed	-	24/11/2022	24/11/2022	24/11/2022	24/11/2022	24/11/2022
Mass / Dimension of Sample	-	8.07g	11.33g	20.20g	32.79g	11.84g
Sample Description	-	Grey fibre cement material	Grey fibre cement material	Grey fibre cement material	Brown cement material	Grey fibre cement material
Asbestos ID in materials	-	No asbestos detected Synthetic mineral fibres detected	Chrysotile asbestos detected Amosite asbestos detected	Chrysotile asbestos detected	No asbestos detected	Chrysotile asbestos detected
Trace Analysis	-	No asbestos detected	[NT]	[NT]	No asbestos detected	[NT]

vTRH(C6-C10)/BTEXN in Water		
Our Reference		311057-30
Your Reference	UNITS	FR2-SHOVEL
Depth		-
Date Sampled		17/11/2022
Type of sample		Water
Date extracted	-	22/11/2022
Date analysed	-	22/11/2022
TRH C_6 - C_9	µg/L	120
TRH C_6 - C_{10}	µg/L	130
TRH C_6 - C_{10} less BTEX (F1)	µg/L	130
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	115
Surrogate toluene-d8	%	98
Surrogate 4-BFB	%	80

svTRH (C10-C40) in Water		
Our Reference	UNITS	311057-30
Your Reference		FR2-SHOVEL
Depth		-
Date Sampled		17/11/2022
Type of sample		Water
Date extracted	-	21/11/2022
Date analysed	-	23/11/2022
TRH C_{10} - C_{14}	µg/L	<50
TRH C_{15} - C_{28}	µg/L	<100
TRH C_{29} - C_{36}	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	<50
TRH >C_{10} - C_{16}	µg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50
TRH >C_{16} - C_{34}	µg/L	<100
TRH >C_{34} - C_{40}	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	<50
Surrogate o-Terphenyl	%	72

PAHs in Water		
Our Reference		311057-30
Your Reference	UNITS	FR2-SHOVEL
Depth		-
Date Sampled		17/11/2022
Type of sample		Water
Date extracted	-	21/11/2022
Date analysed	-	21/11/2022
Naphthalene	µg/L	<1
Acenaphthylene	µg/L	<1
Acenaphthene	µg/L	<1
Fluorene	µg/L	<1
Phenanthrene	µg/L	<1
Anthracene	µg/L	<1
Fluoranthene	µg/L	<1
Pyrene	µg/L	<1
Benzo(a)anthracene	µg/L	<1
Chrysene	µg/L	<1
Benzo(b,j+k)fluoranthene	µg/L	<2
Benzo(a)pyrene	µg/L	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1
Dibenzo(a,h)anthracene	µg/L	<1
Benzo(g,h,i)perylene	µg/L	<1
Benzo(a)pyrene TEQ	µg/L	<5
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	68

Metals in Waters - Acid extractable		
Our Reference		311057-30
Your Reference	UNITS	FR2-SHOVEL
Depth		-
Date Sampled		17/11/2022
Type of sample		Water
Date prepared	-	21/11/2022
Date analysed	-	22/11/2022
Arsenic - Total	mg/L	<0.05
Cadmium - Total	mg/L	<0.01
Chromium - Total	mg/L	<0.01
Copper - Total	mg/L	0.8
Lead - Total	mg/L	<0.03
Mercury - Total	mg/L	<0.0005
Nickel - Total	mg/L	<0.02
Zinc - Total	mg/L	<0.02

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	[NT]
Date extracted	-			21/11/2022	1	21/11/2022	21/11/2022		21/11/2022	[NT]
Date analysed	-			23/11/2022	1	23/11/2022	23/11/2022		23/11/2022	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	101	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	101	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	97	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	98	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	100	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	105	[NT]
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	110	[NT]
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	91	1	81	83	2	95	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	21/11/2022	21/11/2022		[NT]	[NT]
Date analysed	-			[NT]	25	23/11/2022	23/11/2022		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	25	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	25	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	25	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	25	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	25	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	25	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	25	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	25	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	25	82	81	1	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	[NT]
Date extracted	-			21/11/2022	1	21/11/2022	21/11/2022		21/11/2022	[NT]
Date analysed	-			21/11/2022	1	22/11/2022	22/11/2022		21/11/2022	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	101	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	103	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	150	180	18	86	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	101	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	190	210	10	103	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	86	[NT]
Surrogate o-Terphenyl	%		Org-020	72	1	77	78	1	74	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	21/11/2022	21/11/2022		[NT]	[NT]
Date analysed	-			[NT]	25	22/11/2022	22/11/2022		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	25	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	25	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	25	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	25	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	25	100	120	18	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	25	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	25	72	73	1	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	[NT]
Date extracted	-			21/11/2022	1	21/11/2022	21/11/2022		21/11/2022	[NT]
Date analysed	-			24/11/2022	1	24/11/2022	24/11/2022		24/11/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	89	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	73	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	80	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	80	1	78	77	1	79	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	21/11/2022	21/11/2022		[NT]	[NT]
Date analysed	-			[NT]	25	24/11/2022	24/11/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	25	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	25	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	25	76	73	4	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	[NT]
Date extracted	-			21/11/2022	1	21/11/2022	21/11/2022		21/11/2022	[NT]
Date analysed	-			24/11/2022	1	24/11/2022	24/11/2022		24/11/2022	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	89	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	70	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	120	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	82	1	80	79	1	82	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	21/11/2022	21/11/2022		[NT]	[NT]
Date analysed	-			[NT]	25	24/11/2022	24/11/2022		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	25	80	79	1	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	[NT]
Date extracted	-			21/11/2022	1	21/11/2022	21/11/2022		21/11/2022	[NT]
Date analysed	-			24/11/2022	1	24/11/2022	24/11/2022		24/11/2022	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	81	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	79	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	77	[NT]
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	81	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	[NT]
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	82	1	80	79	1	82	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	21/11/2022	21/11/2022		[NT]	[NT]
Date analysed	-			[NT]	25	24/11/2022	24/11/2022		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	25	80	79	1	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	[NT]
Date extracted	-			21/11/2022	1	21/11/2022	21/11/2022		21/11/2022	[NT]
Date analysed	-			24/11/2022	1	24/11/2022	24/11/2022		24/11/2022	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	111	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	82	1	80	79	1	82	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	21/11/2022	21/11/2022		[NT]	[NT]
Date analysed	-			[NT]	25	24/11/2022	24/11/2022		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	25	80	79	1	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	[NT]
Date prepared	-			22/11/2022	1	22/11/2022	22/11/2022		22/11/2022	[NT]
Date analysed	-			23/11/2022	1	23/11/2022	23/11/2022		23/11/2022	[NT]
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	104	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	103	[NT]
Chromium	mg/kg	1	Metals-020	<1	1	43	45	5	100	[NT]
Copper	mg/kg	1	Metals-020	<1	1	30	34	12	96	[NT]
Lead	mg/kg	1	Metals-020	<1	1	41	50	20	104	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.1	0.1	0	88	[NT]
Nickel	mg/kg	1	Metals-020	<1	1	50	58	15	101	[NT]
Zinc	mg/kg	1	Metals-020	<1	1	70	81	15	103	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	25	22/11/2022	22/11/2022		[NT]	[NT]
Date analysed	-			[NT]	25	23/11/2022	23/11/2022		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	25	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	25	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	25	43	41	5	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	25	19	18	5	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	25	16	18	12	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	25	20	19	5	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	25	54	53	2	[NT]	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			21/11/2022	[NT]	[NT]	[NT]	[NT]	22/11/2022	[NT]
Date analysed	-			23/11/2022	[NT]	[NT]	[NT]	[NT]	22/11/2022	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	92	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	93	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	103	[NT]	[NT]	[NT]	[NT]	98	[NT]
Surrogate toluene-d8	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	97	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			21/11/2022	[NT]	[NT]	[NT]	[NT]	21/11/2022	[NT]
Date analysed	-			22/11/2022	[NT]	[NT]	[NT]	[NT]	22/11/2022	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	97	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	117	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	129	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	97	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	117	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	129	[NT]
Surrogate o-Terphenyl	%		Org-020	114	[NT]	[NT]	[NT]	[NT]	89	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			21/11/2022	[NT]	[NT]	[NT]	[NT]	21/11/2022	[NT]
Date analysed	-			21/11/2022	[NT]	[NT]	[NT]	[NT]	21/11/2022	[NT]
Naphthalene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Acenaphthylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Fluorene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Phenanthrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Benzo(a)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	81	[NT]
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	77	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	88	[NT]	[NT]	[NT]	[NT]	92	[NT]

QUALITY CONTROL: Metals in Waters - Acid extractable					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			23/11/2022	[NT]	[NT]	[NT]	[NT]	23/11/2022	[NT]
Date analysed	-			23/11/2022	[NT]	[NT]	[NT]	[NT]	23/11/2022	[NT]
Arsenic - Total	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	95	[NT]
Cadmium - Total	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	94	[NT]
Chromium - Total	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	90	[NT]
Copper - Total	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	88	[NT]
Lead - Total	mg/L	0.03	Metals-020	<0.03	[NT]	[NT]	[NT]	[NT]	93	[NT]
Mercury - Total	mg/L	0.0005	Metals-021	<0.0005	[NT]	[NT]	[NT]	[NT]	100	[NT]
Nickel - Total	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	91	[NT]
Zinc - Total	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	96	[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.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

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.

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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

vTRH & BTEXN in Soil NEPM - The positive result in the rinsate sample is due to THM's consistent with the use of tap water.

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

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

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Katrina Taylor

Sample Login Details

Your reference	E30596PT, Cooma
Envirolab Reference	311057
Date Sample Received	18/11/2022
Date Instructions Received	18/11/2022
Date Results Expected to be Reported	25/11/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	29 Soil, 1 Water, 6 Material
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	12
Cooling Method	Ice Pack
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:

Envirolab Services Pty Ltd
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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	Asbestos ID - materials	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHsin Water	Metals in Waters -Acid extractable	On Hold
TP201-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓						
TP201-0.5-0.6														✓
TP201-1.0-1.2														✓
TP202-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓						
TP202-0.5-0.6														✓
TP202-0.8-1.0														✓
TP203-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓						
TP203-0.4-0.6														✓
TP203-1.0-1.2														✓
TP204-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓						
TP204-0.6-0.8														✓
TP205-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓						
TP205-0.4-0.5														✓
TP205-1.0-1.2														✓
TP205-1.5-1.6														✓
TP206-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓						
TP206-0.5-0.7														✓
TP206-0.7-0.9														✓
TP207-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓						
TP207-0.2-0.4														✓
TP207-0.8-1.0														✓
TP208-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓						
TP208-0.2-0.4														✓
TP208-0.6-0.8														✓
SDUP1	✓	✓	✓	✓	✓	✓	✓							
SDUP3														✓
SDUP4														✓
TB-S2	✓	✓	✓				✓							
TS-S2	✓													
FR2-SHOVEL	✓	✓	✓				✓			✓	✓	✓	✓	
FCF1-Surface									✓					
FCF2-Surface									✓					

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	Asbestos ID - materials	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHsin Water	Metals in Waters -Acid extractable	On Hold
FCF3-Surface														✓
TP205-FCF1-0.1-0.6									✓					
TP205-FCF2-1.0-1.5									✓					
TP205-FCF3-1.0-1.5									✓					

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: E30596PT Date Results Required: STANDARD Page: 1 of 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Katrina Taylor ktaylor@jkenvironments.com.au

Location:	Cooma	Sample Preserved in Esky on Ice
Sampler:	AD	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 3	Asbestos (WA 500mL)	Asbestos (Detection)	BTEX						
17/11/2022	1	TP201	0-0.1	G, A	0.9	F: Silty Clay	X		X								
17/11/2022	2	TP201	0.5-0.6	G, A	0.6	F: Silty Clay											
17/11/2022	3	TP201	1.0-1.2	G, A	0.5	XW Granite											
17/11/2022	4	TP202	0-0.1	G, A	0.5	F: Silty Clay	X		X								
17/11/2022	5	TP202	0.5-0.6	G, A	0	F: Silty Clay											
17/11/2022	6	TP202	0.8-1.0	G, A	0	XW Granite											
17/11/2022	7	TP203	0-0.1	G, A	0.7	F: Silty Sandy Gravel	X		X								
17/11/2022	8	TP203	0.4-0.6	G, A	1	F: Silty Clay											
17/11/2022	9	TP203	1.0-1.2	G, A	0.8	Silty Clay											
17/11/2022	10	TP204	0-0.1	G, A	0.8	F: Silty Clay	X		X								
17/11/2022	11	TP204	0.6-0.8	G, A	0.7	XW Granite											
17/11/2022	12	TP205	0-0.1	G, A	0.3	F: Silty Clay	X		X								
17/11/2022	13	TP205	0.4-0.5	G, A	0.4	F: Silty Clay											
17/11/2022	14	TP205	1.0-1.2	G, A	1.1	F: Silty Clay											
17/11/2022	15	TP205	1.5-1.6	G, A	0.9	XW Granite											
17/11/2022	16	TP206	0-0.1	G, A	0.4	F: Silty Clay	X		X								
17/11/2022	17	TP206	0.5-0.7	G, A	0.7	F: Silty Clay											
17/11/2022	18	TP206	0.7-0.9	G, A	1.1	XW Granite											
17/11/2022	19	TP207	0-0.1	G, A	0.6	F: Silty Clay	X		X								
17/11/2022	20	TP207	0.2-0.4	G, A	1.8	F: Silty Clay											
17/11/2022	21	TP207	0.8-1.0	G, A	2.3	Silty Clay											
17/11/2022	22	TP208	0-0.1	G, A	1	F: Silty Clay	X		X								
17/11/2022	23	TP208	0.2-0.4	G, A	2.3	F: Silty Clay											
17/11/2022	24	TP208	0.6-0.8	G, A	3.4	Silty Clay											
17/11/2022	25	SDUP1	-	G	-	Soil Duplicate	X										

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

Job No: 311057
Date Received: 18/11/22
Time Received: 1415
Received By: CR
Temp: Cool/Ambien
Cooling: Ice/Ice pack
Security: Intact/Broken/None
12 °C

Remarks (comments/detection limits required):

G - 250mg Glass Jar V- Vial
A - Ziplock Asbestos Bag P - Plastic Bag
2x amber glass, 1x HNO3 bottle, 2x BTEX Vials

Relinquished By: AD	Date: 18.11.22	Time:	Received By: Cheeman, GLS	Date: 18/11/22

Sydney 1415

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: E30596PT Date Results Required: STANDARD Page: 2 of 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Katrina Taylor ktaylor@jkenvironments.com.au

Location: Cooma

Sampler: AD

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 3	Asbestos (WA 500mL)	Asbestos (Detection)	BTEX							
17/11/2022	~~26~~	SDUP2	-	G	-	Soil Duplicate	X	Please send to Melbourne Envirolab										
17/11/2022	~~26~~ 27	SDUP3	-	G	-	Soil Duplicate												
17/11/2022	28	SDUP4	-	G	-	Soil Duplicate												
17/11/2022	28	TB-S2	-	G	-	Trip Blank		X										
17/11/2022	29	TS-S2	-	V	-	Trip Spike					X							
17/11/2022	30	FR2-SHOVEL	-	#	-	Field Rinsate		X										
17/11/2022	31	FCF1	Surface	A	-	Fragment				X								
17/11/2022	32	FCF2	Surface	A	-	Fragment				X								
17/11/2022	33	FCF3	Surface	A	-	Fragment												
17/11/2022	34	TP205-FCF1	0.1-0.6	A	-	Fragment				X								
17/11/2022	35	TP205-FCF2	1.0-1.5	A	-	Fragment				X								
17/11/2022	36	TP205-FCF3	1.0-1.5	A	-	Fragment				X								

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar V- Vial
A - Ziplock Asbestos Bag P - Plastic Bag
2x amber glass, 1x HNO3 bottle, 2x BTEX Vials

Relinquished By: AD	Date: 18.11.22	Time:	Received By: Roseman, ES Sydney	Date: 18/11/22 1415

311097

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CERTIFICATE OF ANALYSIS 311057-A

Client Details

Client	JK Environments
Attention	Katrina Taylor
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E30596PT, Cooma**
Number of Samples	additional analysis
Date samples received	18/11/2022
Date completed instructions received	25/11/2022

Analysis Details

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

Samples were analysed as received from the client. 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	02/12/2022
Date of Issue	02/12/2022

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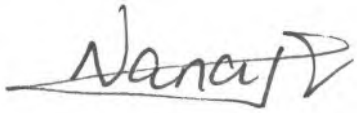

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		311057-A-3	311057-A-8	311057-A-9	311057-A-14	311057-A-21
Your Reference	UNITS	TP201	TP203	TP203	TP205	TP207
Depth		1.0-1.2	0.4-0.6	1.0-1.2	1.0-1.2	0.8-1.0
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	28/11/2022	28/11/2022	28/11/2022	28/11/2022	28/11/2022
Date analysed	-	30/11/2022	30/11/2022	30/11/2022	30/11/2022	30/11/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	80	84	81	80	85

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		311057-A-24
Your Reference	UNITS	TP208
Depth		0.6-0.8
Date Sampled		17/11/2022
Type of sample		Soil
Date extracted	-	28/11/2022
Date analysed	-	30/11/2022
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	83

svTRH (C10-C40) in Soil						
Our Reference		311057-A-3	311057-A-8	311057-A-9	311057-A-14	311057-A-21
Your Reference	UNITS	TP201	TP203	TP203	TP205	TP207
Depth		1.0-1.2	0.4-0.6	1.0-1.2	1.0-1.2	0.8-1.0
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	28/11/2022	28/11/2022	28/11/2022	28/11/2022	28/11/2022
Date analysed	-	29/11/2022	29/11/2022	29/11/2022	29/11/2022	29/11/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	87	80	81	81	84

svTRH (C10-C40) in Soil		
Our Reference		311057-A-24
Your Reference	UNITS	TP208
Depth		0.6-0.8
Date Sampled		17/11/2022
Type of sample		Soil
Date extracted	-	28/11/2022
Date analysed	-	29/11/2022
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	82

PAHs in Soil						
Our Reference		311057-A-3	311057-A-8	311057-A-9	311057-A-14	311057-A-21
Your Reference	UNITS	TP201	TP203	TP203	TP205	TP207
Depth		1.0-1.2	0.4-0.6	1.0-1.2	1.0-1.2	0.8-1.0
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	28/11/2022	28/11/2022	28/11/2022	28/11/2022	28/11/2022
Date analysed	-	02/12/2022	02/12/2022	02/12/2022	02/12/2022	02/12/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	94	90	88	93	87

PAHs in Soil		
Our Reference		311057-A-24
Your Reference	UNITS	TP208
Depth		0.6-0.8
Date Sampled		17/11/2022
Type of sample		Soil
Date extracted	-	28/11/2022
Date analysed	-	02/12/2022
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d14	%	91

Acid Extractable metals in soil						
Our Reference		311057-A-3	311057-A-8	311057-A-9	311057-A-14	311057-A-21
Your Reference	UNITS	TP201	TP203	TP203	TP205	TP207
Depth		1.0-1.2	0.4-0.6	1.0-1.2	1.0-1.2	0.8-1.0
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/11/2022	28/11/2022	28/11/2022	28/11/2022	28/11/2022
Date analysed	-	30/11/2022	30/11/2022	30/11/2022	30/11/2022	30/11/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	42	35	65	39	38
Copper	mg/kg	22	59	33	17	18
Lead	mg/kg	14	24	13	17	8
Mercury	mg/kg	0.4	0.3	0.1	0.2	<0.1
Nickel	mg/kg	18	16	31	18	17
Zinc	mg/kg	55	77	52	52	28

Acid Extractable metals in soil		
Our Reference		311057-A-24
Your Reference	UNITS	TP208
Depth		0.6-0.8
Date Sampled		17/11/2022
Type of sample		Soil
Date prepared	-	28/11/2022
Date analysed	-	30/11/2022
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	51
Copper	mg/kg	24
Lead	mg/kg	10
Mercury	mg/kg	<0.1
Nickel	mg/kg	23
Zinc	mg/kg	39

Moisture						
Our Reference		311057-A-3	311057-A-8	311057-A-9	311057-A-14	311057-A-21
Your Reference	UNITS	TP201	TP203	TP203	TP205	TP207
Depth		1.0-1.2	0.4-0.6	1.0-1.2	1.0-1.2	0.8-1.0
Date Sampled		17/11/2022	17/11/2022	17/11/2022	17/11/2022	17/11/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	28/11/2022	28/11/2022	28/11/2022	28/11/2022	28/11/2022
Date analysed	-	29/11/2022	29/11/2022	29/11/2022	29/11/2022	29/11/2022
Moisture	%	10	8.4	18	9.8	14

Moisture		
Our Reference		311057-A-24
Your Reference	UNITS	TP208
Depth		0.6-0.8
Date Sampled		17/11/2022
Type of sample		Soil
Date prepared	-	28/11/2022
Date analysed	-	29/11/2022
Moisture	%	11

CEC		
Our Reference		311057-A-1
Your Reference	UNITS	TP201
Depth		0-0.1
Date Sampled		17/11/2022
Type of sample		Soil
Date prepared	-	02/12/2022
Date analysed	-	02/12/2022
Exchangeable Ca	meq/100g	32
Exchangeable K	meq/100g	1.6
Exchangeable Mg	meq/100g	6.7
Exchangeable Na	meq/100g	<0.1
Cation Exchange Capacity	meq/100g	41

Metals from Leaching Fluid pH 2.9 or 5		
Our Reference		311057-A-1
Your Reference	UNITS	TP201
Depth		0-0.1
Date Sampled		17/11/2022
Type of sample		Soil
Date extracted	-	02/12/2022
Date analysed	-	02/12/2022
pH of soil for fluid# determ.	pH units	7.5
pH of soil TCLP (after HCl)	pH units	1.6
Extraction fluid used		1
pH of final Leachate	pH units	5.1
Nickel	mg/L	<0.02

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of various metals by ICP-AES following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-OES analytical finish.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			28/11/2022	[NT]	[NT]	[NT]	[NT]	28/11/2022	[NT]
Date analysed	-			30/11/2022	[NT]	[NT]	[NT]	[NT]	30/11/2022	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	98	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	97	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	93	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	104	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	81	[NT]	[NT]	[NT]	[NT]	87	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			28/11/2022	[NT]	[NT]	[NT]	[NT]	28/11/2022	[NT]
Date analysed	-			28/11/2022	[NT]	[NT]	[NT]	[NT]	28/11/2022	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	110	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	88	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	110	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	88	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
Surrogate o-Terphenyl	%		Org-020	86	[NT]	[NT]	[NT]	[NT]	85	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			28/11/2022	[NT]	[NT]	[NT]	[NT]	28/11/2022	[NT]
Date analysed	-			02/12/2022	[NT]	[NT]	[NT]	[NT]	02/12/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	71	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	66	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	97	[NT]	[NT]	[NT]	[NT]	94	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			28/11/2022	[NT]	[NT]	[NT]	[NT]	28/11/2022	[NT]
Date analysed	-			30/11/2022	[NT]	[NT]	[NT]	[NT]	30/11/2022	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	98	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	95	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date prepared	-			02/12/2022	1	02/12/2022	02/12/2022		02/12/2022	[NT]
Date analysed	-			02/12/2022	1	02/12/2022	02/12/2022		02/12/2022	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	1	32	35	9	110	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	1	1.6	1.6	0	104	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	1	6.7	6.5	3	104	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	1	<0.1	<0.1	0	114	[NT]

QUALITY CONTROL: Metals from Leaching Fluid pH 2.9 or 5					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			02/12/2022	[NT]	[NT]	[NT]	[NT]	02/12/2022	[NT]
Date analysed	-			02/12/2022	[NT]	[NT]	[NT]	[NT]	02/12/2022	[NT]
Nickel	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	93	[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.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

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.

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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

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

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Katrina Taylor

Sample Login Details

Your reference	E30596PT, Cooma
Envirolab Reference	311057-A
Date Sample Received	18/11/2022
Date Instructions Received	25/11/2022
Date Results Expected to be Reported	02/12/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	additional analysis
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	12
Cooling Method	Ice Pack
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	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	CEC	pH of soil for fluid#determ.	pH of soil TCLP (after HCl)	Extraction fluid used	pH of final Leachate	Nickel	On Hold
TP201-0-0.1					✓	✓	✓	✓	✓	✓	
TP201-0.5-0.6											✓
TP201-1.0-1.2	✓	✓	✓	✓							
TP202-0-0.1											✓
TP202-0.5-0.6											✓
TP202-0.8-1.0											✓
TP203-0-0.1											✓
TP203-0.4-0.6	✓	✓	✓	✓							
TP203-1.0-1.2	✓	✓	✓	✓							
TP204-0-0.1											✓
TP204-0.6-0.8											✓
TP205-0-0.1											✓
TP205-0.4-0.5											✓
TP205-1.0-1.2	✓	✓	✓	✓							
TP205-1.5-1.6											✓
TP206-0-0.1											✓
TP206-0.5-0.7											✓
TP206-0.7-0.9											✓
TP207-0-0.1											✓
TP207-0.2-0.4											✓
TP207-0.8-1.0	✓	✓	✓	✓							
TP208-0-0.1											✓
TP208-0.2-0.4											✓
TP208-0.6-0.8	✓	✓	✓	✓							
SDUP1											✓
SDUP3											✓
SDUP4											✓
TB-S2											✓
TS-S2											✓
FR2-SHOVEL											✓
FCF1-Surface											✓
FCF2-Surface											✓

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www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	CEC	pH of soil for fluid#determ.	pH of soil TCLP (after HCl)	Extraction fluid used	pH of final Leachate	Nickel	On Hold
FCF3-Surface											✓
TP205-FCF1-0.1-0.6											✓
TP205-FCF2-1.0-1.5											✓
TP205-FCF3-1.0-1.5											✓

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.

Ming To

From: Katrina Taylor <KTaylor@jkenvironments.com.au>
Sent: Friday, 25 November 2022 4:45 PM
To: Samplereceipt
Subject: FW: Results for Registration 311057 E30596PT, Cooma
Attachments: 311057-[R00].pdf; 311057-COC.pdf; JK Environment Soil for Envirolab 311057.xlsx; 311057.Excel.xlsx

Ref: 311057-A
TAT: Standard.
Due: 02/12/2022
MT

Afternoon,

Please schedule the following samples on standard TA:

#3
TP201 (1.0-1.2) 3
TP203 (0.4-0.6) 8
TP203 (1.0-1.2) 9
TP205 (1.0-1.2) 14
TP207 (0.8-1.0) 21
TP208 (06-0.8) 24

CEC
TP201 (0-0.1) 1.

TCLP Nickel
TP201 (0-0.1) 1.

Thank you!

Regards
Katrina Taylor
Associate | Environmental Scientist
NSW Licensed Asbestos Assessor

T: +612 9888 5000
D: 0418 481 628
E: KTaylor@jkenvironments.com.au
www.jkenvironments.com.au

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

JKEnvironments

From: Nancy Zhang <NZhang@envirolab.com.au>
Sent: Friday, 25 November 2022 3:33 PM
To: Katrina Taylor <KTaylor@jkenvironments.com.au>
Subject: Results for Registration 311057 E30596PT, Cooma

Envirolab Services Pty Ltd
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25 Research Drive Croydon South VIC 3136
ph 03 9763 2500 fax 03 9763 2633
melbourne@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 34681

Client Details

Client	JK Environments
Attention	Katrina Taylor
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details

Your Reference	**E30596PT**
Number of Samples	1 Soil
Date samples received	22/11/2022
Date completed instructions received	22/11/2022

Analysis Details

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

Samples were analysed as received from the client. 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	28/11/2022
Date of Issue	28/11/2022

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

Results Approved By
Tara White, Metals Team Leader
Tianna Milburn, Chemist

Authorised By

Pamela Adams, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		34681-1
Your Reference	UNITS	SDUP2
Date Sampled		17/11/2022
Type of sample		Soil
Date extracted	-	24/11/2022
Date analysed	-	24/11/2022
vTRH C_6 - C_9	mg/kg	<25
vTRH C_6 - C_{10}	mg/kg	<25
TRH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total BTEX	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	92

TRH Soil C10-C40 NEPM		
Our Reference		34681-1
Your Reference	UNITS	SDUP2
Date Sampled		17/11/2022
Type of sample		Soil
Date extracted	-	24/11/2022
Date analysed	-	25/11/2022
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	210
Total +ve TRH (C10-C36)	mg/kg	210
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	200
TRH >C_{34} -C_{40}	mg/kg	150
Total +ve TRH (>C10-C40)	mg/kg	350
Surrogate o-Terphenyl	%	77

PAHs in Soil		
Our Reference		34681-1
Your Reference	UNITS	SDUP2
Date Sampled		17/11/2022
Type of sample		Soil
Date extracted	-	24/11/2022
Date analysed	-	25/11/2022
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j&k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	<0.05
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (Half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d_{14}	%	84

OCP in Soil		
Our Reference		34681-1
Your Reference	UNITS	SDUP2
Date Sampled		17/11/2022
Type of sample		Soil
Date extracted	-	24/11/2022
Date analysed	-	25/11/2022
alpha-BHC	mg/kg	<0.1
Hexachlorobenzene	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve reported Aldrin + Dieldrin	mg/kg	<0.1
Total +ve reported DDT+DDD+DDE	mg/kg	<0.1
Surrogate 2-chlorophenol-d4	%	82

OP in Soil		
Our Reference		34681-1
Your Reference	UNITS	SDUP2
Date Sampled		17/11/2022
Type of sample		Soil
Date extracted	-	24/11/2022
Date analysed	-	25/11/2022
Azinphos-methyl	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyrifos	mg/kg	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorovos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate 2-chlorophenol-d4	%	82

PCBs in Soil		
Our Reference		34681-1
Your Reference	UNITS	SDUP2
Date Sampled		17/11/2022
Type of sample		Soil
Date extracted	-	24/11/2022
Date analysed	-	25/11/2022
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate 2-fluorobiphenyl	%	86

Acid Extractable metals in soil		
Our Reference		34681-1
Your Reference	UNITS	SDUP2
Date Sampled		17/11/2022
Type of sample		Soil
Date digested	-	25/11/2022
Date analysed	-	26/11/2022
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	53
Copper	mg/kg	37
Lead	mg/kg	60
Mercury	mg/kg	0.1
Nickel	mg/kg	59
Zinc	mg/kg	86

Moisture		
Our Reference		34681-1
Your Reference	UNITS	SDUP2
Date Sampled		17/11/2022
Type of sample		Soil
Date prepared	-	24/11/2022
Date analysed	-	25/11/2022
Moisture	%	13

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105°C for a minimum of 12 hours.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021/022	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD or GC-MS. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Note, For OCs the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

Method ID	Methodology Summary
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			24/11/2022	[NT]	[NT]	[NT]	[NT]	24/11/2022	[NT]
Date analysed	-			24/11/2022	[NT]	[NT]	[NT]	[NT]	24/11/2022	[NT]
vTRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	100	[NT]
vTRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	100	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	91	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	103	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	104	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	103	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: TRH Soil C10-C40 NEPM						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			24/11/2022	1	24/11/2022	24/11/2022		24/11/2022	[NT]
Date analysed	-			25/11/2022	1	25/11/2022	25/11/2022		25/11/2022	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	93	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	93	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	210	240	13	93	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	93	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	200	210	5	93	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	150	170	12	93	[NT]
Surrogate o-Terphenyl	%		Org-020	79	1	77	77	0	73	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			24/11/2022	[NT]	[NT]	[NT]	[NT]	24/11/2022	[NT]
Date analysed	-			25/11/2022	[NT]	[NT]	[NT]	[NT]	25/11/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Acenaphthylene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Fluorene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Phenanthrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Pyrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Benzo(b,j&k)fluoranthene	mg/kg	0.2	Org-022	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022	<0.05	[NT]	[NT]	[NT]	[NT]	88	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d_{14}	%		Org-022	86	[NT]	[NT]	[NT]	[NT]	92	[NT]

QUALITY CONTROL: OCP in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	34681-1
Date extracted	-			24/11/2022	1	24/11/2022	24/11/2022		24/11/2022	24/11/2022
Date analysed	-			25/11/2022	1	25/11/2022	25/11/2022		25/11/2022	25/11/2022
alpha-BHC	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	82	95
Hexachlorobenzene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	80	87
gamma-BHC	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	80	90
delta-BHC	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	94	101
Heptachlor Epoxide	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	78	94
gamma-Chlordane	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	78	91
alpha-chlordane	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	96	98
Dieldrin	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	78	95
Endrin	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	104	114
Endrin Aldehyde	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	76	86
Methoxychlor	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022	82	1	82	84	2	84	86

QUALITY CONTROL: OP in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	34681-1
Date extracted	-			24/11/2022	1	24/11/2022	24/11/2022		24/11/2022	24/11/2022
Date analysed	-			25/11/2022	1	25/11/2022	25/11/2022		25/11/2022	25/11/2022
Azinphos-methyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	78	90
Chlorpyrifos-methyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	86	91
Diazinon	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	98	108
Dichlorovos	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	90	131
Fenitrothion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	74	110
Malathion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022	82	1	82	84	2	84	86

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			24/11/2022	[NT]	[NT]	[NT]	[NT]	24/11/2022	[NT]
Date analysed	-			25/11/2022	[NT]	[NT]	[NT]	[NT]	25/11/2022	[NT]
Aroclor 1016	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Aroclor 1260	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-fluorobiphenyl	%		Org-022	84	[NT]	[NT]	[NT]	[NT]	86	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date digested	-			25/11/2022	[NT]	[NT]	[NT]	[NT]	25/11/2022	[NT]
Date analysed	-			26/11/2022	[NT]	[NT]	[NT]	[NT]	26/11/2022	[NT]
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	[NT]	[NT]	100	[NT]
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	[NT]	[NT]	99	[NT]
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	100	[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.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

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.

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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
ph 03 9763 2500 fax 03 9763 2633
melbourne@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Katrina Taylor

Sample Login Details

Your reference	E30596PT
Envirolab Reference	34681
Date Sample Received	22/11/2022
Date Instructions Received	22/11/2022
Date Results Expected to be Reported	28/11/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	6.0
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Pamela Adams	Chris De Luca
Phone: 03 9763 2500	**Phone: 03 9763 2500**
Fax: 03 9763 2633	**Fax: 03 9763 2633**
Email: padams@envirolab.com.au	**Email: cdeluca@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645 - 002
25 Research Drive Croydon South VIC 3136
ph 03 9763 2500 fax 03 9763 2633
melbourne@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	OCP in Soil	OP in Soil	PCBsin Soil	Acid Extractable metalsin soil
SDUP2	✓	✓	✓	✓	✓	✓	✓

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.

34681 2/2

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: E30596PT Date Results Required: STANDARD Page: 2 of 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Katrina Taylor ktaylor@jkenvironments.com.au

Location: Cooma
Sampler: AD

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 3	Asbestos (WA 500mL)	Asbestos (Detection)	BTEX							
17/11/2022	~~26~~ 27	SDUP2	-	G	-	Soil Duplicate	X	Please send to Melbourne Envirolab										
17/11/2022	~~27~~ 28	SDUP3	-	G	-	Soil Duplicate												
17/11/2022	28	SDUP4	-	G	-	Soil Duplicate												
17/11/2022	29	TB-S2	-	G	-	Trip Blank		X										
17/11/2022	30	TS-S2	-	V	-	Trip Spike					X							
17/11/2022	31	FR2-SHOVEL	-	#	-	Field Rinsate		X										
17/11/2022	32	FCF1	Surface	A	-	Fragment				X								
17/11/2022	33	FCF2	Surface	A	-	Fragment				X								
17/11/2022	34	FCF3	Surface	A	-	Fragment												
17/11/2022	35	TP205-FCF1	0.1-0.6	A	-	Fragment				X								
17/11/2022	36	TP205-FCF2	1.0-1.5	A	-	Fragment				X								
17/11/2022	37	TP205-FCF3	1.0-1.5	A	-	Fragment				X								

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar V- Vial
A - Ziplock Asbestos Bag P - Plastic Bag
2x amber glass, 1x HNO3 bottle, 2x BTEX Vials

Relinquished By: AD	Date: 18.11.22	Time:	Received By:	Date:
EJ Sydney emulenze	21/11/22 1250		Roseman, EJ Sydney	18/11/22 1415

#311057

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: E30596PT Date Results Required: STANDARD Page: 1 of 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Katrina Taylor ktaylor@jkenvironments.com.au

Location:	Cooma	Sample Preserved in Esky on Ice
Sampler:	AD	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 3	Asbestos (WA 500mL)	Asbestos (Detection)	BTEX			
17/11/2022	1	TP201	0-0.1	G, A	0.9	F: Silty Clay	X		X					
17/11/2022	2	TP201	0.5-0.6	G, A	0.6	F: Silty Clay								
17/11/2022	3	TP201	1.0-1.2	G, A	0.5	XW Granite								
17/11/2022	4	TP202	0-0.1	G, A	0.5	F: Silty Clay	X		X					
17/11/2022	5	TP202	0.5-0.6	G, A	0	F: Silty Clay								
17/11/2022	6	TP202	0.8-1.0	G, A	0	XW Granite								
17/11/2022	7	TP203	0-0.1	G, A	0.7	F: Silty Sandy Gravel	X		X					
17/11/2022	8	TP203	0.4-0.6	G, A	1	F: Silty Clay								
17/11/2022	9	TP203	1.0-1.2	G, A	0.8	Silty Clay								
17/11/2022	10	TP204	0-0.1	G, A	0.8	F: Silty Clay	X		X					
17/11/2022	11	TP204	0.6-0.8	G, A	0.7	XW Granite	-				-	-		
17/11/2022	12	TP205	0-0.1	G, A	0.3	F: Silty Clay	X		X					
17/11/2022	13	TP205	0.4-0.5	G, A	0.4	F: Silty Clay								
17/11/2022	14	TP205	1.0-1.2	G, A	1.1	F: Silty Clay								
17/11/2022	15	TP205	1.5-1.6	G, A	0.9	XW Granite								
17/11/2022	16	TP206	0-0.1	G, A	0.4	F: Silty Clay	X		X					
17/11/2022	17	TP206	0.5-0.7	G, A	0.7	F: Silty Clay								
17/11/2022	18	TP206	0.7-0.9	G, A	1.1	XW Granite								
17/11/2022	19	TP207	0-0.1	G, A	0.6	F: Silty Clay	X		X					
17/11/2022	20	TP207	0.2-0.4	G, A	1.8	F: Silty Clay								
17/11/2022	21	TP207	0.8-1.0	G, A	2.3	Silty Clay								
17/11/2022	22	TP208	0-0.1	G, A	1	F: Silty Clay	X		X					
17/11/2022	23	TP208	0.2-0.4	G, A	2.3	F: Silty Clay								
17/11/2022	24	TP208	0.6-0.8	G, A	3.4	Silty Clay								
17/11/2022	25	SDUP1	-	G	-	Soil Duplicate	X							

ENVIROLAB GROUP
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 31057
Date Received: 18/11/22
Time Received: 14:15
Received By: CR
Temp: Cool/Ambient
Cooling: Ice/Ice pack
Security: Intact/Broken/None
12 °C

Remarks (comments/detection limits required):

G - 250mg Glass Jar V- Vial
A - Ziplock Asbestos Bag P - Plastic Bag
2x amber glass, 1x HNO3 bottle, 2x BTEX Vials

Relinquished By: AD	Date: 18.11.22	Time:	Received By:	Date:
ELS Sydney C. Monteiro	21/11/22 1230	Envirolab Services	Caseman, ELS	18/11/22

Sydney 1415

Envirolab Services
12 Ashley St Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 34684
Date Received: 22/11/22
Time Received: 12:45pm
Received By: W
Temp: Cool/Ambient
Cooling: Ice/Ice pack
Security: Intact/Broken/None
6.0°C

Appendix F: Report Explanatory Notes

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)[14] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[15]. The NEPM (2013) is consistent with these documents.

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 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).

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). 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. Accuracy is typically reported as percent recovery.

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.

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;

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

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

- 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 (e.g. 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, transport 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:

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

Appendix G: Data (QA/QC) Evaluation

Data (QA/QC) Evaluation

A. INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in the SAQP. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

1. Field and Laboratory Considerations

The quality of the analytical data produced for this project has been considered in relation to the following:

- Sample collection, storage, transport and analysis;
- Laboratory PQLs;
- Field QA/QC results; and
- Laboratory QA/QC results.

2. Field QA/QC Samples and Analysis

A summary of the field QA/QC samples collected and analysed for this investigation is provided in the following table:

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	SDUP1 (primary sample TP205 0-0.1m)	Approximately 5% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs, and PCBs
Inter-laboratory duplicate (soil)	SDUP2 (primary sample TP201 0-0.1m)	Approximately 5% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs, and PCBs
Trip spike (soil)	TS1-S2 (18 November 2022)	One for the investigation to demonstrate adequacy of preservation, storage and transport methods	BTEX
Trip blank (soil)	TB-S2 (27 September 2022)	One for the investigation to demonstrate adequacy of storage and transport methods	Heavy metals, TRH/BTEX, PAHs
Rinsate (shovel)	FR2-Shovel (18 November 2022)	One for the investigation to demonstrate adequacy of decontamination methods	Heavy metals, TRH/BTEX, PAHs

The results for the field QA/QC samples are detailed in the laboratory summary table Q1 attached to the investigation report and are discussed in the subsequent sections of this Data (QA/QC) Evaluation report.

3. Data Assessment Criteria

We adopted the following criteria for assessing the field and laboratory QA/QC analytical results:

Field Duplicates

Acceptable targets for precision of field duplicates in this report will be 30% or less, consistent with NEPM (2013). RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the concentrations used to calculate the RPD (i.e. RPD exceedance where concentrations are close to the PQL are typically not as significant as those where concentrations are reported at least five or 10 times the PQL), sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Field Blanks and Rinsates

Acceptable targets for field blank and rinsate samples in this report will be less than the PQL for organic analytes. Metals will be considered on a case-by-case basis with regards to typical background concentrations in soils and published drinking water guidelines for waters.

Trip Spikes

Acceptable targets for trip spike samples in this report will be 70% to 130%.

Laboratory QA/QC

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the laboratory reports. These criteria were developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the acceptable limits adopted by the primary laboratory (Envirolab) is provided below:

RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics;
- 60-140% recovery acceptable for organics; and
- 10-140% recovery acceptable for VOCs.

Surrogate Spikes

- 60-140% recovery acceptable for general organics; and
- 10-140% recovery acceptable for VOCs.

Method Blanks

- All results less than PQL.

B. DATA EVALUATION

1. Sample Collection, Storage, Transport and Analysis

Samples were collected by trained field staff in accordance. Field sampling procedures were designed to be consistent with relevant guidelines, including NEPM (2013) and other guidelines made under the CLM Act 1997.

Appropriate sample preservation, handling and storage procedures were adopted. Laboratory analysis was undertaken within specified holding times generally in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies. Envirolab noted that the asbestos results were reported to be consistent with the recommendations in NEPM (2013), however this level of reporting is outside the scope of their NATA accreditation. In the absence of other available analytical methods for asbestos, this was found to be acceptable for the purpose of this investigation.

Review of the project data also indicated that:

- COC documentation was adequately maintained;
- Sample receipt advice documentation was provided for all sample batches;
- All analytical results were reported; and
- Consistent units were used to report the analysis results.

We note that the blank and rinsate were not analysed for PCBs and pesticides. This was deemed acceptable given that there were no detectable concentrations of these contaminants in the primary samples.

2. Laboratory PQLs

Appropriate PQLs were adopted for the analysis and all PQLs were below the SAC.

3. Field QA/QC Sample Results

Field Duplicates

The results indicated that field precision was acceptable. RPD non-conformances were reported for some analytes as discussed below:

- An elevated RPD was reported for TRH F3 and lead in SDUP1/TP205 (0-0.1m); and
- An elevated RPD was reported for TRH F4 and lead in SDUP2/TP201 (0-0.1m).

These TRH and lead results outside the acceptable limits had been attributed to minor sample heterogeneity and the difficulties associated with obtaining homogenous duplicate samples of heterogeneous matrices. As both the primary and duplicate sample results were significantly less than the SAC, the exceedances are not considered to have had an adverse impact on the data set as a whole.

Field/Trip Blanks

During the investigation, one soil trip blank was placed in the esky during sampling and transported back to the laboratory. The soil trip blank analysis results were all less than the PQLs with the exception of chromium, lead and zinc with reported concentrations of 3mg/kg, 2mg/kg and 2mg/kg respectively. Low level metals concentrations are typical in washed sand which is utilised as blank material. In our experience, the concentrations reported were consistent with background concentrations in a sand matrix and were not

indicative of cross-contamination. On this basis, cross contamination between samples that may have significance for data validity did not occur.

Rinsates

A low concentration of TRH was detected in the rinsate sample. This detection is consistent with the use of plastic containers (these were used to store the rinsate water) as noted in the Envirolab report comments (report ref: 311057). The detectable concentration of copper is most likely attributed to the use of potable water. Copper is associated with leaking water infrastructure typically encountered in urban groundwater. Considering the soil analysis results obtained during the investigation, there is considered to be a low potential for cross contamination to have occurred to an extent that may have significance for data validity.

Trip Spikes

The results ranged from 96% to 98% and indicated that field preservation methods were appropriate.

4. Laboratory QA/QC

The analytical methods implemented by the laboratory were performed in accordance with their NATA accreditation and were consistent with Schedule B(3) of NEPM (2013). The frequency of data reported for the laboratory QA/QC (i.e. duplicates, spikes, blanks, LCS) was considered to be acceptable for the purpose of this investigation.

C. DATA QUALITY SUMMARY

We are of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

Non-conformances were reported for some field QA/QC samples and laboratory QA/QC analysis. These non-conformances were considered to be sporadic and minor, and were not considered to be indicative of systematic sampling or analytical errors. On this basis, these non-conformances are not considered to materially impact the report findings.

Appendix H: Sampling, Analysis and Quality Plan (SAQP)

REPORT TO

HEALTH INFRASTRUCTURE

ON

SAMPLING, ANALYSIS AND QUALITY PLAN (SAQP)

FOR

DETAILED (STAGE 2) SITE INVESTIGATION

AT

KEY WORKER ACCOMMODATION DEVELOPMENT STAGE 2, COOMA HOSPITAL, BENT STREET, COOMA, NSW

Date: 15 November 2022

Ref: E30596PT-SAQP2

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DOCUMENT REVISION RECORD

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Attachments

Abbreviations

Ambient Background Concentrations	**ABC**
Added Contaminant Limits	**ACL**
Asbestos Containing Material	**ACM**
Area of Environmental Concern	**AEC**
Australian Height Datum	**AHD**
Acid Sulfate Soil	**ASS**
Below Ground Level	**BGL**
Benzo(a)pyrene Toxicity Equivalent Factor	**BaP TEQ**
Benzene, Toluene, Ethylbenzene, Xylene	**BTEX**
Cation Exchange Capacity	**CEC**
Contaminated Land Management	**CLM**
Contaminant(s) of Potential Concern	**CoPC**
Chain of Custody	**COC**
Conceptual Site Model	**CSM**
Dial Before You Dig	**DBYD**
Data Quality Indicator	**DQI**
Data Quality Objective	**DQO**
Detailed (Stage 2) Site Investigation	**DSI**
Ecological Investigation Level	**EIL**
Ecological Screening Level	**ESL**
Environment Protection Authority	**EPA**
Environmental Site Assessment	**ESA**
Health Investigation Level	**HILs**
Health Screening Level	**HSL**
International Organisation of Standardisation	**ISO**
JK Environments	**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**
Polycyclic Aromatic Hydrocarbons	**PAH**
Polychlorinated Biphenyls	**PCBs**
Photo-ionisation Detector	**PID**
Protection of the Environment Operations	**POEO**
Practical Quantitation Limit	**PQL**
Quality Assurance	**QA**
Quality Control	**QC**
Remediation Action Plan	**RAP**
Relative Percentage Difference	**RPD**
Site Assessment Criteria	**SAC**
Sampling, Analysis and Quality Plan	**SAQP**
State Environmental Planning Policy	**SEPP**
Site Specific Assessment	**SSA**
Source, Pathway, Receptor	**SPR**
Specific Contamination Concentration	**SCC**
Standard Penetration Test	**SPT**
Trip Blank	**TB**
Total Recoverable Hydrocarbons	**TRH**
Trip Spike	**TS**
Upper Confidence Limit	**UCL**

Volatile Organic Compounds	**VOC**
World Health Organisation	**WHO**
Work Health and Safety	**WHS**

Units

Metres BGL	**mBGL**
Metres	**m**
Milligrams per Kilogram	**mg/kg**
Milligrams per Litre	**mg/L**
Parts Per Million	**ppm**
Percentage	**%**
Percentage weight for weight	**%w/w**

1 INTRODUCTION

Health Infrastructure ('the client') commissioned JK Geotechnics (JKG) to prepare a Sampling, Analysis and Quality Plan (SAQP) for the Detailed (Stage 2) Site Investigation (DSI) to be undertaken for the proposed Cooma Hospital Key Worker Accommodation Development – Stage 2 at Cooma Hospital, Bent Street, Cooma, NSW ('the site'). The site location is shown on Figure 1 and the investigation will be confined to the site boundaries as shown on Figure 2.

JKG's environmental division (Environmental Investigation Services - EIS) has previously undertaken an Environmental Site Assessment (ESA) of the wider hospital property. A summary of relevant information from this investigation has been included in Section 2.

1.1 Proposed Development Details

The proposed development for this stage of works includes construction of a single storey, six unit block with indoor and outdoor shared space, which is proposed to be positioned in the central east of the existing hospital property (refer to Figure 1). The development is to be utilised for worker accommodation.

1.2 Aims and Objectives

The primary aim of the DSI is to characterise the soil contamination conditions in order to assess site risks in relation to contamination and establish whether remediation is required. A secondary aim is to provide preliminary waste classification data for off-site disposal of soil waste which may be generated during the proposed development works.

The DSI objectives are to:

- Provide an appraisal of the past site use(s) based on a review of limited historical records;
- Assess the soil contamination conditions;
- Assess the potential risks posed by contamination to the receptors identified in the Conceptual Site Model (CSM);
- Provide a preliminary waste classification for the in-situ soil; and
- Assess whether the site is suitable or can be made suitable (via remediation) for the proposed development, from a contamination viewpoint; and
- Assess whether further intrusive investigation and/or remediation is required.

1.3 Scope of Work

The SAQP was prepared generally in accordance with a JKG proposal (Ref: EP57659PT) of 3 November 2022 and written acceptance from the client of 14 November 2022.

The scope of work included review of the existing project information and preparation of an SAQP with regards to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as

amended (2013)[1], and other guidelines made under or with regards to the Contaminated Land Management Act (1997)[2]. A list of reference documents/guidelines is included in the appendices.

[1] National Environment Protection Council (NEPC), (2013). *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).* (referred to as NEPM 2013)

[2] Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)

2 SITE INFORMATION

2.1 Previous Investigations

We undertook an Environmental Site Assessment (ESA) across the wider hospital property (including the site), in 2017. The ESA included a review of site history information and soil sampling from 40 borehole locations across the wider hospital property, including one location within the site. Fill (i.e. historically imported soils, or soils placed during prior earthworks) in this location was indicated to be deeper than 0.32m in depth.

The ESA identified the following potential contamination sources/AEC relevant to the proposed development area that was investigated:

1. Fill material (imported material);
2. Use of pesticides; and
3. Hazardous building materials in existing and former buildings.

The assessment did not encounter elevated concentrations of the contaminants of concern in the soil samples analysed for the investigation and all results were below the site assessment criteria (SAC). The report concluded that the risk posed by the AEC to the receptors was relatively low. At the time of the ESA, the site was considered to be suitable for the proposed hospital redevelopment, provided that:

1. The environmental consultant was notified of any unexpected finds (e.g. buried structures, fibre cement fragments, discoloured or odorous soil etc) encountered between sampling locations (particularly beneath buildings) so that appropriate action could be taken; and
2. All hazardous materials (eg asbestos cement) were removed from buildings / structures prior to demolition.

Relevant information from the previous investigation has been considered and documented throughout the SAQP. Additional site history information relevant to the site will be included in the DSI.

2.2 Site Identification

Table 2-1: Site Identification

Site Address:	Bent Street, Cooma, NSW
Lot & Deposited Plan:	Part of Lot 2 in DP1161366
Current Land Use:	Hospital grounds (landscaped/paved areas outside existing building footprints)
Proposed Land Use:	Continued use as part of the hospital grounds for key worker accommodation
Local Government Authority (LGA):	Snowy Monaro regional Council
Current Zoning:	SP2: Infrastructure
Site Area (m^2) (approx.):	875

Geographical Location (decimal degrees) (approx. centre of site):	Latitude: -36.2410161 Longitude: 149.1307076
Site Plans:	Appendix A

2.3 Site Description Summary

A site inspection was not undertaken for preparation of the SAQP and the following site description is based on existing project information and information obtained from Google Maps / Street View and a Lotsearch Environmental Risk and Planning report. The site description will be updated in the DSI:

- The site is located in the central east of the wider hospital property, which itself is located in a predominantly residential area of Cooma;
- The site is bound by the Monaro Highway to the east;
- The site and wider hospital property is located approximately 200m to the east of Cooma Creek;
- The regional topography is characterised by undulating terrain that generally falls towards Cooma Creek to the north and north east of the site and wider hospital property;
- The site slopes gently towards the north / north-east and parts of the site appear to have been levelled to account for the slope and accommodate the adjacent driveway and parking area;
- The site is predominantly a grassed landscaped garden area to the east of an existing on-grade parking area;
- The site appears to be entirely unfenced, with a concrete block retaining wall along the eastern side of the site; and
- Surface water would be expected to infiltrate the unpaved site surface, with excess flow direction being towards to the north-east in keeping with the localised fall of the site.

2.4 Underground Services

The 'Dial Before You Dig' (DBYD) plans and utilities plan provided by the client were reviewed in order to establish whether any major underground services exist at the site or in the immediate vicinity that could act as a preferential pathway for contamination migration. Major services were not identified at the site that may act as preferential pathways for contamination migration.

2.5 Summary of Geology and Hydrogeology

2.5.1 Regional Geology and Soil/Bedrock Conditions

Regional geological maps indicated that the site is underlain by Cooma Granodiorite, which typically consists of biotite granite, foliated granite, leucogranite, diorite and tonalitic gneiss.

The previous investigations encountered shallow granite bedrock across the site and wider hospital property from depths of approximately 0.4mBGL to 2mBGL.

The site is not located in an acid sulfate soil (ASS) risk area according to the risk maps prepared by the Department of Land and Water Conservation.

2.5.2 Hydrogeology and Groundwater

Hydrogeological information reviewed for the investigation indicated that the regional aquifer on-site and in the areas immediately surrounding the site includes fractured or fissured, extensive aquifers of low to moderate productivity. There was a total of 48 registered bores within 2km of the site. The nearest registered bore was 130m cross-gradient to the north-east of the site and was registered for water supply purposes. All other bores were over 775m from the site and none were down-gradient.

There is a reticulated water supply in the area and consumption of groundwater is not expected to occur.

Considering the local topography, groundwater is anticipated to flow towards the north and north-east in sympathy with the topography and towards the nearest down gradient water body.

The closest surface water body is Cooma Creek located approximately 200m to the east of the site at its closest point. This is down-gradient and is a potential receptor.

3 SUMMARY OF CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. An iteration of the CSM for the site is presented in the following table and is based on the site information (including the site inspection information) and the review of site history information including previous investigation findings.

Table 3-1: Review of CSM

Contaminant source(s) and contaminants of concern	**Potential contamination sources/contaminating activities:** historically imported fill soil; use of pesticides around and beneath buildings; and hazardous building materials from former demolition works (on the wider hospital property) and within the existing hospital structures. **Contaminants of potential concern (CoPC)**: Soil: heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.
Affected media	For the purpose of the DSI fill/soil. The potential for groundwater impacts to pose a risk to the receptors will be considered initially under the DSI scope based on the soil results (i.e. an assessment will be made regarding whether the soils represent a potential source of groundwater contamination via processes such as leaching). Site-related sources of groundwater contamination have not been identified to date.
Receptor identification	Human receptors include site occupants/users (including adult workers, and adult and children visitors), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users. Ecological receptors include terrestrial organisms and plants within unpaved areas (including any proposed landscaped areas).
Exposure pathways and mechanisms	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, BTEX and naphthalene [a PAH compound]). The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Potential exposure pathways for ecological receptors include primary contact and ingestion. Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens, inhalation of airborne asbestos fibres and dust during soil disturbance, or inhalation of vapours within enclosed spaces such as buildings. The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into the proposed building (either from soil contamination or volatilisation of contaminants from groundwater); and • Contact (dermal, ingestion or inhalation) with exposed soils in landscaped areas and/or unpaved areas, or with soils/dust during construction works.

4 SAMPLING, ANALYSIS AND QUALITY PLAN

4.1 Data Quality Objectives (DQO)

Data Quality Objectives (DQOs) have been developed to define the type and quality of data required to achieve the project objectives outlined in Section 1.2. The DQOs were prepared with reference to the process outlined in Schedule B2 of NEPM (2013). The seven-step DQO approach for this project is outlined in the following sub-sections.

4.1.1 Step 1 - State the Problem

Potential sources of contamination/AEC have been identified that may pose a risk to human health and the environment. The sampling density associated with the previous ESA is not sufficient to facilitate characterisation of the site in the context of the proposed land use.

Investigation data is required to characterise the site, assess the risks posed by the contaminants in the context of the proposed development/intended land use, and assess whether remediation is required. This information will be considered by the project team in the design and delivery of the project as well as by the consent authority in exercising its planning functions in relation to the approval of the development proposal under Chapter 4, Clause 4.6 of State Environmental Planning Policy (Resilience and Hazards) 2021[3] (formerly known as SEPP55).

4.1.2 Step 2 - Identify the Decisions of the Study

The objectives of the assessment are outlined in Section 1.2. The decisions to be made reflect these objectives and are as follows:

- Did the site inspection, or does the historical information identify potential contamination sources/areas of environmental concern at the site?
- Are any of the laboratory results above the site assessment criteria?
- Do potential risks associated with contamination exist, and if so, what are they?
- Is further investigation/remediation required?
- Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

4.1.3 Step 3 - Identify Information Inputs

The primary information inputs required to address the decisions outlined in Step 2 include the following:

- Existing site information from the previous site investigations/assessments;
- Sampling of soil;
- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, and odours and staining;
- Laboratory analysis of soils, and fibre cement (if found in soil) for the CoPC identified in the CSM; and
- Field and laboratory QA/QC data.

[3] *State Environmental Planning Policy (Resilience and Hazards) 2021* (NSW) (referred to as SEPP Resilience and Hazards 2021)

4.1.4 Step 4 - Define the Study Boundary

The sampling will be confined to the site boundaries as shown on Figure 2 and will be limited vertically to maximum nominated sampling depths of approximately 0.5m into the natural soil (or prior refusal). The sampling is expected to be completed in November 2022 (temporal boundary).

4.1.5 Step 5 - Develop an Analytical Approach (or Decision Rule)

The laboratory data will be assessed against relevant Tier 1 screening criteria (referred to as SAC), as outlined below for each media. Exceedances of the SAC do not necessarily indicate a requirement for remediation or a risk to human health and/or the environment. Exceedances are considered in the context of the CSM and valid source-pathway-receptor (SPR) linkages.

For this investigation, the individual results will be assessed as either above or below the SAC. Statistical evaluation of the dataset via calculation of mean values and/or 95% upper confidence limit (UCL) values is not proposed for primary decision-making purposes as the sampling plan will not be probabilistic due to access constraints. Statistical analysis may be adopted to provide supporting lines of evidence for risk assessment purposes, if deemed appropriate.

4.1.5.1 Tier 1 Screening Criteria for Soil

4.1.5.1.1 Human Health

Soil data will be compared to relevant Tier 1 screening criteria in accordance with NEPM (2013). Health Investigation Level (HILs) will be based on land use Type A as a conservative measure. Whilst this is overly conservative given the proposed use is for worker accommodation which is expected to include adults and would be expected to occur over a shorter duration than a typical residential-type scenario, the approach is considered reasonable compared to applying the other available Tier 1 HILs. Health Screening Levels (HSL) for asbestos will also be based on land use Type A.

HSLs for assessing hydrocarbon risks from vapour intrusion will be based on land use Type A/B and will be derived conservatively using a sand soil type and a depth interval of 0-1m for the initial data screening. These may be adjusted for depth and soil type where deemed appropriate.

HSLs for direct soil contact will be adopted based on the values presented in the CRC Care Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document (2011)[4]. Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) will also be considered following evaluation of human health and ecological risks, and risks to groundwater.

4.1.5.1.2 Environment (Ecological – terrestrial ecosystems)

Regarding the ecological screening criteria, the Ecological Investigation Levels (EIL) will be derived using the Ambient Background Concentration (ABC) from the document titled Trace Element Concentrations in Soils

[4] Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC Care), (2011). Technical Report No. 10 - *Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document*

from Rural and Urban Areas of Australia (1995)[5] and using site specific physiochemical data for soil pH, clay content and Cation Exchange Capacity (CEC) to select the Added Contaminant Limit (ACL) values in Schedule B(1) of NEPM (2013). NEPM (2013) recommends that ecological SAC are applied to the top 2m of soil.

4.1.5.2 Data Assessment

For this investigation, the following decision rules will apply:

- If all CoPC (with the exception of asbestos) concentrations are below the SAC, then the data will be compared directly to the SAC without statistical analysis;
- For soil data, if any individual CoPC (with the exception of asbestos) concentration is above the SAC, then statistical analysis will be undertaken. This will include calculation of the 95% upper confidence limit (UCL) value for the data set, with regards to the NEPM (2013) framework and other relevant guidelines made under the CLM Act 1997. The UCL will be considered acceptable where the UCL is below the SAC, the standard deviation of the data is less than 50% of the SAC and none of the individual concentrations are more than 250% of the SAC;
- If asbestos concentrations are encountered above the SAC or in the top 100mm of soil, then asbestos will be deemed a contaminant of concern for remediation purposes; and
- All results will be considered with regards to whether or not complete SPR-linkages exist or will exist in the context of the proposed development.

4.1.5.3 Quality Assurance/Quality Control (QA/QC)

Field QA/QC will include analysis of inter-laboratory duplicates (minimum of 5% of primary samples), intra-laboratory duplicates (minimum of 5% of primary samples), and trip spike (for volatiles), trip blank (for volatiles) and rinsate (for volatiles) samples.

The suitability of the laboratory data is to be assessed against the laboratory QA/QC criteria which will be outlined in the laboratory reports. These criteria are developed and implemented in accordance with the laboratory's National Association of Testing Authorities, Australia (NATA) accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence are reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory will be undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, the most conservative concentration reported are to be adopted.

4.1.5.4 Appropriateness of Practical Quantitation Limits (PQLs)

The PQLs of the analytical methods are to be considered in relation to the SAC to confirm that the PQLs are less than the SAC. In cases where the PQLs are greater than the SAC, a discussion of this will be provided.

[5] Olszowy, H., Torr, P., and Imray, P., (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4*. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

4.1.6 Step 6 – Specify Limits on Decision Errors

Decision errors can be controlled through the use of hypothesis testing. The test can be used to show either that the baseline condition is false or that there is insufficient evidence to indicate that the baseline condition is false. The null hypothesis is an assumption that is assumed to be true in the absence of contrary evidence. For this investigation, the null hypothesis (H_0) is that the 95% UCL for the CoPC is greater than the SAC. The alternative hypothesis (H_A) is that the 95% UCL for the CoPC is less than the SAC. Alternative considerations are made regarding asbestos based on an assessment of multiple lines of evidence.

Potential outcomes include Type I and Type II errors as follows:

- Type I error of determining that the soil is acceptable for the proposed land use when it is not (wrongly rejects true H_0), includes an alpha (α) risk of 0.05; and
- Type II error of determining that the soil is unacceptable for the proposed land use when it is (wrongly accepts false H_0), includes beta (β) risk of 0.2.

Statistical analysis will not apply to asbestos, therefore these data will be assessed based on a multiple lines of evidence and risk-based approach.

Data Quality Indicators (DQI) for field and laboratory QA/QC samples are defined below. An assessment of the DQI's is to be made in relation to precision, accuracy, representativeness, completeness and comparability.

Field Duplicates

Acceptable targets for precision of field duplicates will be 30% or less, consistent with NEPM (2013). RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the concentrations used to calculate the RPD (i.e. RPD exceedance where concentrations are close to the PQL are typically not as significant as those where concentrations are reported at least five or 10 times the PQL), sample type, collection methods and the specific analyte where the RPD exceedance was reported.

Field/Trip Blanks and Rinsates

Acceptable targets for trip blank samples will be less than the PQL.

Trip Spikes

Acceptable targets for trip spike samples will be 70% to 130%.

Laboratory QA/QC

The suitability of the laboratory data will be assessed against the laboratory QA/QC criteria. These criteria are developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the typical limits is provided below:

RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics; and
- 60-140% recovery acceptable for organics.

Surrogate Spikes

- 60-140% recovery acceptable for general organics.

Method Blanks

- All results less than PQL.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence will be reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is to be undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, we will adopt the most conservative concentration reported.

4.1.7 Step 7 - Optimise the Design for Obtaining Data

The most resource-effective design will be used in an optimum manner to achieve the objectives. For this investigation, the design will be optimised via consideration of the various lines of evidence used to select the sample locations, the media being sampled, and also by the way in which the data will be collected. The sampling plan and methodology are outlined in the following sub-sections.

4.2 Soil Sampling Plan and Methodology

The soil sampling plan and methodology to be adopted for the DSI is outlined in the table below:

Table 4-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	Samples for the investigation will be collected from a total of eight test pit locations. The proposed sample locations are shown on Figure 2 attached in Appendix A. The sampling plan has been designed to meet the minimum sampling density outlined in the NSW EPA Sampling Design Part 1 – Application (2022)[6] contaminated land guidelines. <u>Grid-based Sampling Locations</u> Based on the site area of 875m^2, eight grid-based sampling locations are proposed for the DSI which corresponds to a sampling density of approximately one sample per 109m^2, and a square grid spacing of approximately 11m. Based on the above density, the following hotspot diameters have been calculated: • Circular hotspot diameter with a 95% confidence level (K value of 0.59) – 6.6m; and • Elliptical hotspot diameter with a 95% confidence level (K value of 0.9) – 10.07m along the long dimension/axis and 5.03m along the short dimension/axis.
Sampling Plan	The sampling locations will be placed on a systematic plan with a grid spacing of approximately 11m between sampling locations. A systematic plan is considered suitable to identify hotspots to a 95% confidence level and calculate UCLs for specific data populations (UCLs will only be

[6] NSW EPA, (2022). *Sampling design part 1 - application.* (referred to as EPA Sampling Design Guidelines 2022)

Aspect	Input
	applied were appropriate and in accordance with the DQOs). However, we acknowledge that the presence of underground services may result in samples being moved off the planned grid. Soil sample collection will be limited to depths of approximately 0.5m into natural soils/bedrock unless staining or odours are encountered which may trigger deeper sampling into the natural ground.
Set-out and Sampling Equipment	Sampling locations will be set out using a tape measure, set-out from the existing boundaries and site features. In-situ sampling locations will be checked for underground services by an external contractor prior to sampling. A borehole will be drilled at each location through the fill profile using hand equipment prior to excavation to check for services. Samples will not be obtained from the borehole. Samples will be collected using a combination of excavator bucket and excavator fitted with an auger. Soil samples will be obtained from the test pit walls, directly from the excavator bucket and / or directly from the auger. JKG acknowledge that the use of an excavator and auger for soil sampling may result in some loss of volatiles. However, this method is required to facilitate bulk sampling for asbestos. Volatile soil concentrations identified in the wider hospital property previously were relatively low. On this basis, the test pit and auger sampling methods are considered to be appropriate.
Sample Collection and Field QA/QC	The locations are to be logged to an appropriate standard in accordance with NEPM (2013) and all samples will be documented on the logs. Soil samples for contamination are to be collected from the fill and natural profiles based on field observations, and at least 0.5 into the natural soil profile. Samples for contamination analysis are to be placed in glass jars with plastic caps and Teflon seals with minimal headspace. Samples for asbestos analysis will be placed in zip-lock plastic bags. During sampling, soil at selected depths will be split into primary and duplicate samples for field QA/QC analysis. The splitting procedure will include alternate filling of the jars with soil.
Field Screening	A portable Photoionisation Detector (PID) fitted with a 10.6mV lamp will be used to screen the samples for the presence of volatile organic compounds (VOCs). PID screening for VOCs will be undertaken on soil samples using the soil sample headspace method. VOC data will be obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. PID calibration records are maintained on file by JKG and are to be included in the report. The field screening for asbestos quantification from the sampling locations will include the following: • A bulk sample will be collected from fill at 1m intervals, or from each distinct fill profile to the extent possible; • Each bulk sample will be weighed using an electronic scale; • Each bulk sample will be passed through a sieve with a 7.1mm aperture and inspected for the presence of fibre cement. Alternatively, due to the cohesive nature of the soils, the samples may be placed on a contrasting support (blue tarpaulin) and inspected for the presence of fibre cement. Any soil clumps/nodules are to be disaggregated; • The condition of fibre cement or any other suspected asbestos materials will be noted on the field records; and

Aspect	Input
	• If observed, any fragments of fibre cement in the sample will be collected, placed in a zip-lock bag and assigned a unique identifier. Calculations for asbestos content will be undertaken based on the requirements outlined in Schedule B1 of NEPM (2013).
Decontami-nation and Sample Preservation	Sampling personnel will use disposable nitrile gloves during sampling activities. Re-usable sampling equipment will be decontaminated using a potable water/decon solution (with rags and scrubbing brush), followed by a rinse with potable water. Soil samples will be preserved by immediate storage in an insulated sample container with ice. On completion of the fieldwork, the contamination samples may be stored temporarily in fridges in the JKG warehouse before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures.

4.3 Laboratory Analysis and Analytical Rationale

Samples are to be analysed by an appropriate, NATA Accredited laboratory using the analytical methods detailed in Schedule B(3) of NEPM 2013. The laboratory details are provided in the table below:

Table 4-2: Laboratory Details

Samples	Laboratory
All primary soil samples and field QA/QC samples, including soil intra-laboratory duplicates, trip blanks and trip spikes, and the rinsate sample	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)
Inter-laboratory duplicates for soil samples	Envirolab Services Pty Ltd VIC, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)

An allowance has been made for the following analysis:

- Up to eight selected soil samples will be analysed for: heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc); PAHs; TRH; BTEX; OCP/OPP; PCBs; and asbestos (500ml quantification);
- Up to three selected soil samples will be analysed for: heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc); PAHs; TRH; and BTEX;
- Up to two selected fill/natural soil samples will be analysed for: pH; cation exchange capacity (CEC); and clay content (%);
- One representative fibre cement fragment, if found on or in soil, will be analysed for asbestos;
- TCLP leachability analysis for PAHs and selected metals; and
- Collection and analysis of QA/QC samples (including intra- and inter-laboratory duplicates, trip blank/spike, and a rinsate blank.

The soil analysis will generally be targeted on fill samples. Deeper samples may be analysed based on the results of the fill soils, or if other indicators such as staining or odours are encountered. A staged approach to soil sample analysis will be undertaken to allow for targeting areas based on the results of the initial analysis.

4.4 Reporting Requirements

A DSI report is to be prepared presenting the results of the investigation, in accordance with the NSW EPA Consultants Reporting on Contaminated Land, Contaminated Land Guidelines (2020)[7].

[7] NSW EPA, (2020). *Consultants Reporting on Contaminated Land, Contaminated Land Guidelines*

5 LIMITATIONS

The report limitations are outlined below:

- JKG accepts no responsibility for any unidentified contamination 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;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- 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 JKG proposal; and terms of contract between JKG 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;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- 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, JKG has not undertaken any verification process, except where specifically stated in the report;
- JKG 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;
- JKG accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- JKG 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. JKG should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- 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.

Important Information About This Report

These notes have been prepared by JKG 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 JKG 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.

JKG will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the investigation. If the subject site is sold, ownership of the investigation report should be transferred by JKG to the new site owners who will be informed of the conditions and limitations under which the investigation was undertaken. No person should apply an investigation 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 investigation 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 investigations 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 investigation 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.

Investigation Limitations

Although information provided by a site investigation can reduce exposure to the risk of the presence of contamination, no environmental site investigation can eliminate the risk. Even a rigorous professional investigation 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 Investigations by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an investigation 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 Investigation Report

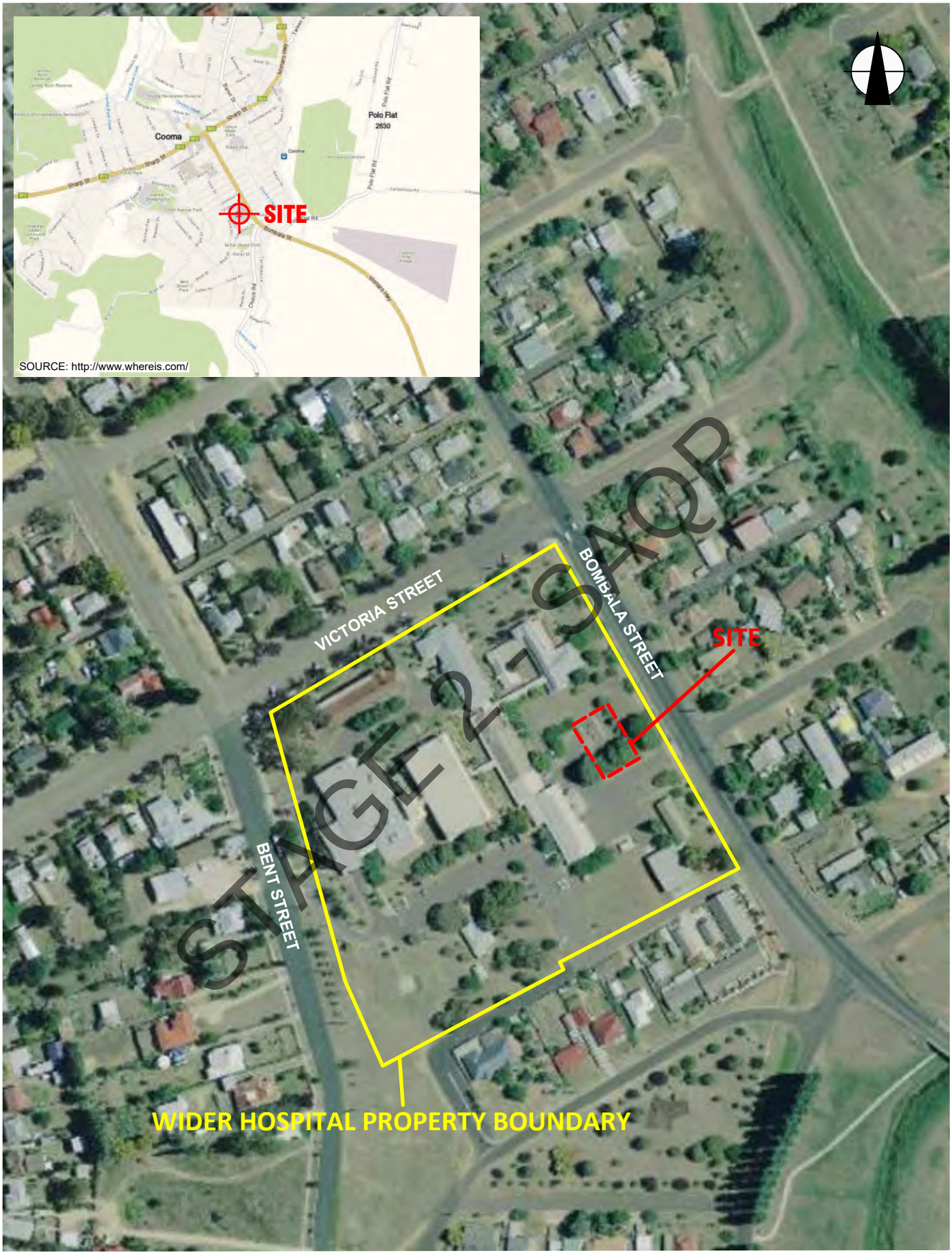
Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other 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 investigation. 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 investigation. 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 investigation 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 investigation 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 investigation, 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.SIX.NSW.GOV.AU

This plan should be read in conjunction with the JK Geotechnics report.

Title: **SITE LOCATION PLAN**

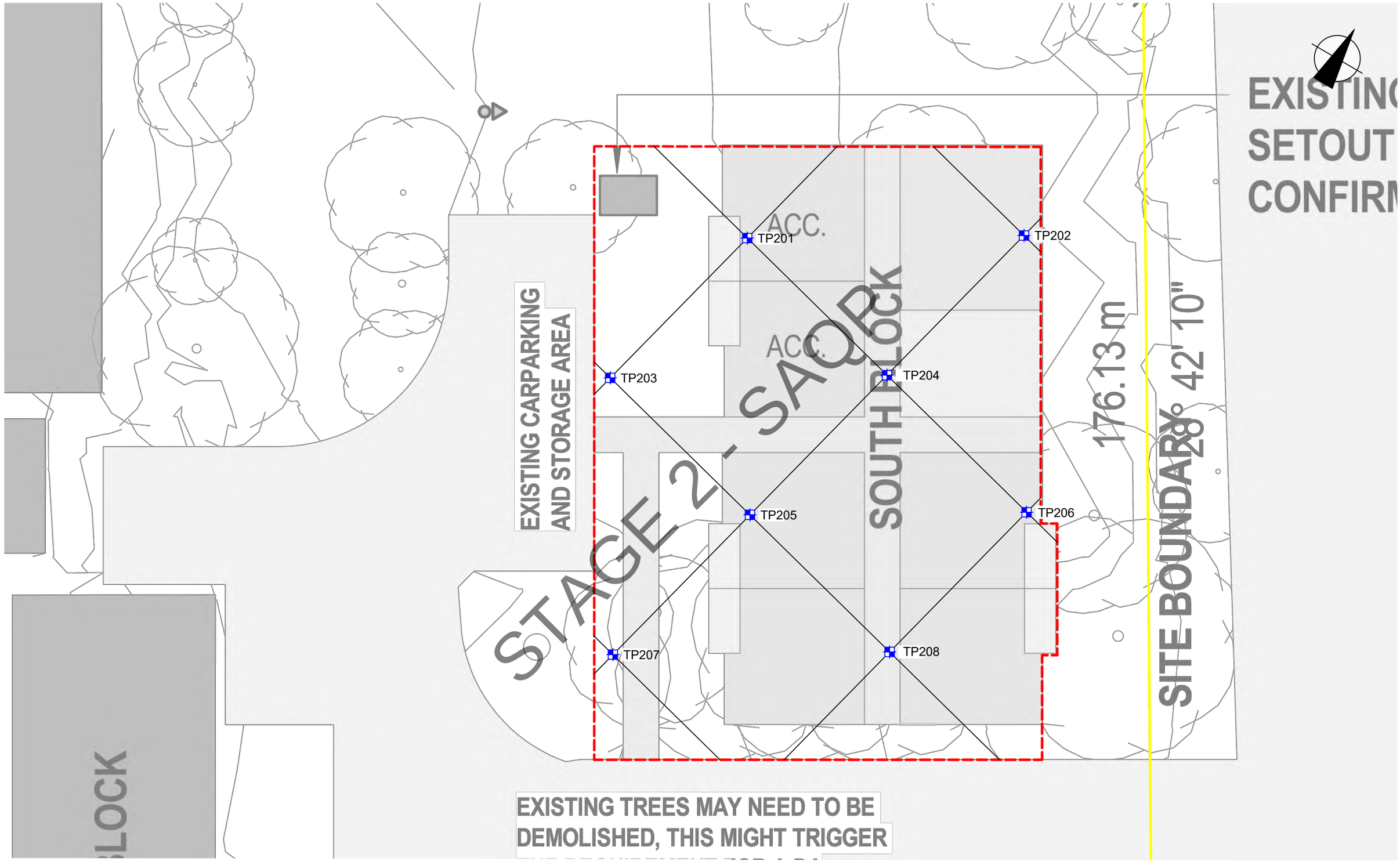
Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Report No: E30596PT

Figure No: 1

JKGeotechnics

PLOT DATE: 15/11/2022 11:10:57 AM DWG FILE: K:\5C EIS JOBS\30000'S\E30596K COOMA HOSPITAL\CAD\E30596PTE30596PT.DWG



LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE WIDER PROPERTY BOUNDARY
- TP1 — PROPOSED TEST PIT LOCATION AND NUMBER

0 2 4 6 8 10
SCALE 1:200 @A3 METRES

This plan should be read in conjunction with the JK Geotechnics report.

Title: **PROPOSED SAMPLE LOCATION PLAN**

Location: COOMA HOSPITAL, BENT STREET, COOMA, NSW

Report No: E30596PT

Figure No: 2

JKGeotechnics

PLOT DATE: 15/11/2022 2:25:10 PM DWG FILE: K:\5C EIS JOBS\30000\SIE30596K COOMA HOSPITAL\CAD\E30596PT\E30596PT.DWG

Appendix B: Report Explanatory Notes

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)[8] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[9]. The NEPM (2013) is consistent with these documents.

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 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).

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). 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. Accuracy is typically reported as percent recovery.

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.

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;

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

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

- 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 (e.g. 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, transport 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:

$$\frac{\text{(D1 – D2) x 100}}{\text{\{(D1 + D2)/2\}}}$$

Appendix C: Guidelines and Reference Documents

Contaminated Land Management Act 1997 (NSW)

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

NSW EPA, (2022). Sampling design part 1 – application, Contaminated Land Guidelines

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

NSW EPA, (2020). Consultants Reporting on Contaminated Land, Contaminated Land Guidelines

National Environment Protection Council (NEPC), (2013). National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

State Environmental Planning Policy (Resilience and Hazards) 2021 (NSW)

Appendix I: Guidelines and Reference Documents

Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). Acid Sulfate Soils Manual

Canadian Council of Ministers of the Environment, (1999). Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)

CRC Care, (2011). Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document

Contaminated Land Management Act 1997 (NSW)

Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map Series

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

NSW EPA, (1995). Contaminated Sites Sampling Design Guidelines

NSW EPA, (2014). Waste Classification Guidelines - Part 1: Classifying Waste

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

NSW EPA, (2020). Consultants Reporting on Contaminated Land, Contaminated Land Guidelines

National Environment Protection Council (NEPC), (2013). National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

Olszowy, H., Torr, P., and Imray, P., (1995). Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4. Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy (Resilience and Hazards) 2021 (NSW)

Western Australia Department of Health, (2021). Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia