REPORT TO

NSW HEALTH INFRASTRUCTURE

ON

UNEXPECTED FINDS PROCEDURE (UFP)

FOR

PROPOSED DPHI SITE DEVELOPMENT

AT

WINDSOR ROAD, ROUSE HILL, NSW

Date: 18 September 2025
Ref: E37757Brpt3-UFP

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E37757Brpt3-UFP Draft	Draft Report	9 September 2025
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Abbreviations

Site Assessment Criteria	**SAC**
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Specific Contamination Concentration	**SCC**
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Volatile Organic Compounds	**VOC**
Work Health and Safety	**WHS**

1 INTRODUCTION

NSW Health Infrastructure ('the client') commissioned JK Environments (JKE) to prepare an Unexpected Finds Proposal (UFP) for the proposed development of the DPHI site at the corner of Windsor Road, Rouse Hill, NSW. The site location is shown on Figures 1 and 2 and the UFP applies to the site boundaries for the DPHI site shown on Figure 2a attached in the appendices.

JKE were also commissioned to undertake a Detailed Site Contamination Investigation (DSI) for the proposed DPHI site. The results of the DSI are presented in a separate report (Ref: E37757Brpt-DSI-DPHI) [1]. This report should be read in conjunction with the above reports.

Our geotechnical division, JK Geotechnics (JKG) were commissioned to undertake a geotechnical investigation for the site in conjunction with the DSI. The results of the geotechnical investigation are presented in a separate report (Ref: 37756LFrpt-DPHI)[2]. This report should be read in conjunction with the JKG report.

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

1.1 Proposed DPHI Landuse

We understand the DPHI site will be utilised as the temporary works area during construction the main hospital site to the east. Whilst no details are currently available, the temporary works is expected to comprise of access roads, site sheds, amenities, material storage, etc.

Works will also be carried out at the main hospital site along Commercial Road comprising of new concrete islands and road widening to facilitate the site entry in the north-eastern corner of the site. A shared pathway will also be constructed in the south-western corner of the site connecting the site to the corner of Windsor Road and Rouse Hill Drive. JKE and JKG were engaged to investigate these areas and the results of the investigation are presented in separate reports.

1.2 Purpose of the UFP

The primary aim of the UFP is to provide a framework to be implemented during the proposed development works at the DPHI site so that risks associated with the identification of any unexpected, contamination-related finds in ground remain low and acceptable. A secondary aim is to provide guidance on the requirements for managing waste and imported materials in the context of contamination.

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

[2] JKG, (2025). *Report to Health Infrastructure on Preliminary Geotechnical Investigation for Proposed DPHI Site Development at Commercial Road, Rouse Hill, NSW.* (referred to as JKG report)

1.3 Roles and Responsibilities

The primary role and responsible party for implementing this UFP is the construction contractor. The construction contractor is responsible for obtaining a copy of this UFP and taking reasonable steps so that it is adequately implemented. The client or the construction contractor is to engage a suitably qualified contaminated land consultant (environmental consultant) to carry out the required inspections and fulfill the relevant actions and reporting requirements under this UFP. The construction contractor and environmental consultant are also to refer to any specific development consent requirements.

1.4 Scope of Work

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

The scope of work included the following:

- Review of JKG and JKE investigation reports prepared for the DPHI site;
- Review of existing site information;
- Identification of the type and nature of potential unexpected finds that may be present at the DPHI site;
- Outline of the methodologies to be adopted should unexpected finds be identified during development works; and
- Preparation of a UFP report.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)[3], other guidelines made under or with regards to the Contaminated Land Management Act (1997)[4] and State Environmental Planning Policy (Resilience and Hazards) 2021[5] (formerly known as SEPP55).

A list of reference documents/guidelines is included in the appendices.

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

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

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

2 SITE INFORMATION

2.1 Summary of Previous Investigations

Table 2-1: Summary of Previous Investigations

Historical Assessments (circa 2000 to 2006)	Environmental Investigation Services (EIS, now JKE) has previously undertaken various stages of assessment across a larger area of the Rouse Hill precinct that incorporated the site[6]. The assessments included a review of a Geotechnique Stage 1 Preliminary Environmental Site Assessment[7] and soil and groundwater sampling across an approximately 100 hectare portion of land (the wider site). The DPHI site was located in the north-west corner of the wider site. The Stage 1 preliminary assessment undertaken by Geotechnique Pty Ltd included a review of historical records, limited soil sampling and laboratory chemical analysis. The Phase 2 assessment included soil sampling from 401 locations in 2003 and an additional 20 locations in 2006. Five of the locations from 2003 were within the DPHI site (C309, C310, ET4, ET17 and ET5) and one additional location from 2006 was within the DPHI site (TP211). At the time of the Phase 2 assessment the site was part of a larger golf course. No dams or other excavated areas were located within the site. The sampling locations within the DPHI site typically encountered topsoil or fill to depths of approximately 0.2m to 0.5m below ground level (BGL), underlain by natural silty clay soil. The topsoil/fill was typically silty clay and contained traces of roots and ironstone gravel. Laboratory analysis included analysis of heavy metals (arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel and zinc), polycyclic aromatic hydrocarbons (PAHs), total recoverable hydrocarbons (TRH), organochlorine pesticides (OCPs) and polychlorinated biphenyls (PCBs). The majority of samples were analysed for a selection of the contaminants listed, rather than the full suite. The report indicated that all results were within the most sensitive health-based land use criteria (residential with accessible soil), based on the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC Guidelines). The Phase 2 assessment concluded that the wider site was relatively clean from a contamination viewpoint and was not considered to require remediation. The minor levels of contamination that were encountered across the wider site were associated with rubbish and waste and the process of rubbish and waste removal was anticipated to effectively remove all of these materials. The rubbish and waste at the wider site included variable asbestos containing material (ACM) in the form of sheeting and pipework. The ACM was in a bound form in a cement matrix and analysis of soil in the waste and rubbish areas did not detect free asbestos fibres. Removal of the rubbish and waste from the wider site was recommended prior to any construction activity. We note that no rubbish areas were located on the DPHI site.
Rehabilitation and Early Validation Works	Rubbish and a buried asbestos pipeline removal were undertaken in 2006 and EIS completed inspections and prepared a validation report[8] for the works across the Rouse Hill Town Centre (RHTC) site. No rubbish was located on the DPHI site.

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

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

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

(circa 2006 – 2007)	Based on the scope of work completed, the site was considered suitable for the proposed mixed residential and commercial land use. A Site Audit Statement (SAS) was issued for the proposed development by Mr Ross McFarland, a NSW EPA accredited site auditor (now with AECOM).
Sampling Analysis Quality Plan (SAQP) (JKE and JKG, 2025[9])	JKE and JKG were commissioned to prepare a SAQP for the investigation of the DPHI, Commercial Road and shared pathway sites in 2025. The SAQP included recommendations for additional soil and groundwater investigation works including the following: • Geotechnical investigation along DPHI, Commercial Road and Shared pathway; • Contamination investigation of soil and groundwater conditions along DPHI, Commercial Road and Shared pathway; • Investigation of dryland salinity and ASS conditions along DPHI, Commercial Road and Shared pathway; • Surface and groundwater impacted assessment (SGIA) along DPHI, Commercial Road and Shared pathway; and • Identify the need for mitigation measures based on the results of the above additional investigations. The additional sampling requirements outlined in the SAQP have been incorporated within this report as discussed in the below sections.
Detailed Site Investigation (DSI) (JKE 2025[10])	JKE were commissioned to undertake a DSI for the DPHI site. The primary aims of the DSI were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, and make a detailed assessment of the soil and groundwater contamination conditions. The objectives were to: • Assess the current site conditions and use(s) via a site walkover inspection; • Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC); • Assess the soil and groundwater contamination conditions via implementation of a detailed sampling and analysis program; • Document an iteration and review of the conceptual site model (CSM) • Prepare a conceptual site model (CSM); • Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment); • Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and • Assess whether further investigation and/or remediation is required. The scope of work included the following: • Review of site information, including background and site history information from various sources outlined in the report; • Preparation of a CSM; • Design and implementation of a sampling, analysis and quality plan (SAQP); • 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.

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

[10] JKE, (2025b). *Report to NSW Health Infrastructure on Detailed Site Investigation (DSI) for Proposed Rouse Hill Hospital at Windsor Roads, Rouse Hill, NSW* (Ref: E37757Brpt-DSI-DPHI) dated September 2025 (referred to as JKE DSI).

	The DSI included a review of site information including previous investigations completed at the site, historical information, soil sampling from 11 testpits locations and groundwater sampling from one monitoring well as shown on Figure 2a. The site has been historically used for agricultural (grazing) purposes prior to the 1970s and as a golf course between 1970s to circa 1994. The DSI identified the following AEC at the site: fill material and former land use as a golf course. The soil laboratory results did not identify any elevations of CoPC above the human health-based and ecological SAC. Elevations of selected heavy metals (total chromium, copper and zinc) and PFOS (a PFAS compound) were detected in the groundwater above the ecological SAC as shown on Figure 3. We are of the opinion that the exceedances are likely to be representative of background concentrations in an urban environment and point sources of site contamination were not identified. The DSI assessed the risk pose by these elevations to be low in the context of the proposed land use. Based on the results, the DSI concluded that the DPHI site is suitable for the landuse. The DSI recommended preparing and implementing an Unexpected Finds Protocol (UFP) for the proposed use of the DPHI site.

2.2 Site Identification

Table 2-2: Site Identification

Current Site Owner (certificate of title):	Department of Planning, Housing and Infrastructure (DPHI)
Site Address:	Windsor Road, Rouse Hill, NSW
Lot & Deposited Plan:	Northern portion of Lot 229 DP1249147
Current Land Use:	Vacant
Proposed Land Use:	Temporary works area for the New Rouse Hill Hospital
Local Government Area:	The Hills Shire Council
Current Zoning:	MU1 – Mixed use R3 – Medium Density Residential SP2 – Infrastructure
Site Area (m^2) (approx.):	3,400
RL (AHD in m) (approx.):	55-58
Geographical Location (decimal degrees) (approx.):	Latitude: -33.687928 Longitude: 150.920613
Site Figures:	Appendix A

2.3 Site Location and Regional Setting

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

2.4 Topography

The regional topography is characterised by gently undulating areas that typically fall towards local creeks and gullies. The DPHI site itself gently slopes to the south-east.

2.5 Site Inspection

A site inspection was completed by JKE as part of the DSI on 24 July 2025. At the time of the fieldwork, the DPHI site was vacant and fenced on all boundaries with chain link fencing. No buildings or structures were located on the DPHI site. The surface in the central and eastern portion of the site was characterised by asphaltic concrete (AC) and road base.

Some small areas of exposed soil were observed at the ground surface. There was no evidence of soil erosion observed during the inspection. No obvious signs of chemical or waste storage were observed on the DPHI site.

Fill would be expected on site due to the higher elevation compared to Commercial Road to the north which was noted at a lower elevation. Cut and fill was most likely utilised on site or along Commercial Road. Other than fill which is a potential source of contamination, there were no indicators of contamination observed at the DPHI site.

Surface water would be expected to flow to the south due to the slight fall in topography to the south of the DPHI site.

The majority of the DPHI site was vegetated with grass, weeds and trees, particularly to the north and west. No obvious signs of plans stress of dieback were observed.

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

3 UNEXPECTED FINDS PROCEDURE

3.1 Unexpected Finds

Unexpected, contamination-related in-ground finds at the site may include (but would not necessarily be limited to) the following:

- Waste materials in fill, including building and demolition waste. This could also be associated with historical burial of waste on site associated with the former landuse;
- Fibre cement fragments containing asbestos (e.g. Asbestos Containing Material [ACM]);
- Stained fill/soil;
- Underground fuel storage tanks (USTs);
- Odorous soils (e.g. hydrocarbon odours); and/or
- Ash, slag and/or coal wash.

The procedure to be followed in the event of an unexpected find is presented below. A flow chart outlining the procedure is attached in the appendices:

- In the event of an unexpected find, all work in the immediate vicinity must cease and the construction contractor must contact the client (or their representative such as their project manager) and the environmental consultant;
- Temporary barricades should be erected to isolate the area from access to workers;
- The environmental consultant is to attend the site, adequately characterise the conditions and any contamination-related impacts, and provide advice in relation to site management/remediation. Any relevant reports or associated documentation must be prepared; and
- The find must be managed in accordance with the environmental consultant's advice. In the event that contamination is identified that warrants remediation, notification/approval of such work must occur with regards to Chapter 4 of State Environmental Planning Policy (Resilience and Hazards) 2021[11] (formerly known as SEPP55). Where remediation is required, a Remediation Action Plan (RAP) must be prepared, and the remediation work must be validated in accordance with the RAP to demonstrate that contamination risks are low and acceptable in the context of the proposed development.

3.2 Excavated Material and Waste Classification

Surplus material (fill, natural soil, rock, and/or stockpiled material) requiring off-site disposal as part of the proposed development works is regulated by the Protection of the Environment Operations Act (1997[12]) and associated regulations and guidelines including Part 1 of the Waste Classification Guidelines. A waste classification assessment includes soil sampling, laboratory analysis and the preparation of a report presenting the results of the assessment.

In the event that off-site transport of material containing asbestos is necessary, the proposed transport must be registered with the NSW EPA WasteLocate tracking system[13] to comply with the legislation in regards to transporting/movement of asbestos waste.

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

[12] NSW Government, (1997). *Protection of Environment Operations Act.* (POEO Act 1997)

[13] **https://wastelocate.epa.nsw.gov.au/** visited on 5 October 2017

Soils are classed into the following categories based on the chemical contaminant criteria outlined in the Waste Classification Guidelines:

Table 3-1: Waste Categories

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

It is recommended that the construction contractor maintains adequate records and retains all documentation for waste disposal activities for the duration of the project, including:

- A summary register (in Microsoft Excel format) including details such as waste disposal dates, waste materials descriptions, disposal locations (i.e. facility details) and reconciliation of this information with the associated waste classification documentation and the waste disposal docket numbers;
- Waste tracking records and transport certificates (where waste is required to be tracked/transported in accordance with the regulations); and
- Disposal dockets for the waste (i.e. weighbridge dockets for each load).

An example register is attached in the appendices.

Reference must also be made to any specific conditions in the development consent regarding waste materials.

3.3 Imported Materials

The construction contractor should implement procedures to minimise the potential for contaminated materials to be imported onto the site. We recommend the following in this regard:

- Any imported materials for general earthworks/filling or backfilling trenches should comprise only virgin excavated natural material (VENM), or a suitable, commercially available engineered product from a reputable supplier. Where engineered products are used, preference should be given to using products made solely from natural quarried (i.e. not recycled) material. If products made from recycled materials are used, these products must be produced by the supplier in accordance with a relevant Resource Recovery Exemption;
- Landscaping materials should not contain anthropogenic inclusions;
- Documentation should be sought from the supplier confirming the above; and
- The construction contractor should inspect all materials upon importation to ensure there are no unexpected finds, and the material is consistent with expectations.

Examples of imported materials for this project may include (but would not be limited to): site preparation materials (e.g. DGB, 40/70); general fill to level/raise the site; engineered materials for basecourse beneath buildings floor slabs and hardstand areas; backfill for the service trenches; landscaping materials etc.

It is recommended that the construction contractor maintains, for the duration of the project, an imported material register. This should include a register (in Microsoft Excel format) with details of each imported material type, supplier details, summary record of where the imported materials were placed on site, and importation docket numbers and a tally of quantities (separated for each import stream). Dockets for imported materials are to be provided electronically so these can be reconciled with the register. An example register is attached in the appendices.

Reference must also be made to any specific conditions in the development consent regarding imported materials.

3.4 Ash, Slag and Other Inclusions in Fill

In the unexpected event that 'pockets' of ash, slag and other inclusions are encountered in the fill, this material must be isolated and tested for contaminants of potential concern (CoPC) outlined in the DSI to assess its suitability to remain on site and the potential risks posed by this soil in the context of the future land use.

Sampling of any impacted fill should occur in accordance with the guidelines NSW EPA Sampling Design Part 1 – Application (August 2022). The laboratory results should be assessed against the relevant human health, ecological and waste classification guidelines applicable to the landuse.

In the event that exceedances of the Site Assessment Criteria (SAC) outlined in the DSI are encountered, there may be a need to implement a remediation strategy. This strategy would need to be documented in a RAP and submitted to the consent authority. A site-specific human health risk assessment could be considered to establish whether the risks warrant long-term management.

4 DOCUMENTATION

Reference must be made to the development consent conditions for any specific documentation requirements for the project. Notwithstanding such requirements, the following subsections outline the documentation requirements applicable to the environmental consultant and the construction contractor with regards to this plan.

4.1 Environmental Consultant

The environmental consultant must provide the following documentation:

- Interim advice following each site inspection (preferably this is to be in the form of a Site Inspection Report);
- Additional inspection reports and any associated reports triggered under the unexpected finds procedure in Section 3; and
- A final UFP compliance report on completion of all in-ground works (i.e. once all excavation work is complete and the new building floor slab and pavements are constructed). The UFP compliance report is to consolidate and discuss the information from the various inspections, and any actions triggered as a result of unexpected finds. The report must provide an overall assessment of the compliance with the UFP.

4.2 Construction Contractor

The construction contractor must supply any records kept in relation to waste classification/waste disposal and imported materials to the client and the environmental consultant. If there are no unexpected finds, the construction contractor must provide a letter to the client/environmental consultant confirming this.

4.3 Regulatory Requirements

The regulatory requirements applicable for the site are outlined in the following table:

Table 4-1: Regulatory Requirements

Guideline	Applicability
Duty to Report Contamination 2015[14]	Contamination that poses a risk to site receptors may require notification to the NSW EPA. The requirement to notify should be considered by the environmental consultant in the event of site contamination.
POEO Act 1997	Section 143 of the POEO Act 1997 states that if waste is transported to a place that cannot lawfully be used as a waste facility for that waste, then the transporter and owner of the waste are each guilty of an offence. The transporter and owner of the waste have a duty to ensure that the waste is disposed of in an appropriate manner.
Work Health and Safety Code of Practice 2011[15]	Sites contaminated with asbestos become a 'workplace' when work is carried out there and require a register and asbestos management plan.

[14] NSW EPA, (2015), *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997.* (referred to as Duty to Report Contamination 2015)

[15] WorkCover NSW, (2011), *WHS Regulation: Code of Practice – How to Manage and Control Asbestos in the Workplace*

Guideline	Applicability
Dewatering Consent	In the event groundwater is intercepted during excavation works, dewatering may be required. Council, NSW Office of Water (NOW) and other relevant approvals (from discharge authorities like Sydney Water etc.) should be obtained prior to the commencement of dewatering.

5 LIMITATIONS

The report limitations are outlined below:

- JKE 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 JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- 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, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- JKE 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;
- JKE have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or landuse. JKE should be contacted immediately in such circumstances;
- 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 JKE to assist with the assessment and interpretation of this report.

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

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

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

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

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

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

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

Misinterpretation of Site Assessments by Design Professionals

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

Logs Should not be Separated from the Assessment Report

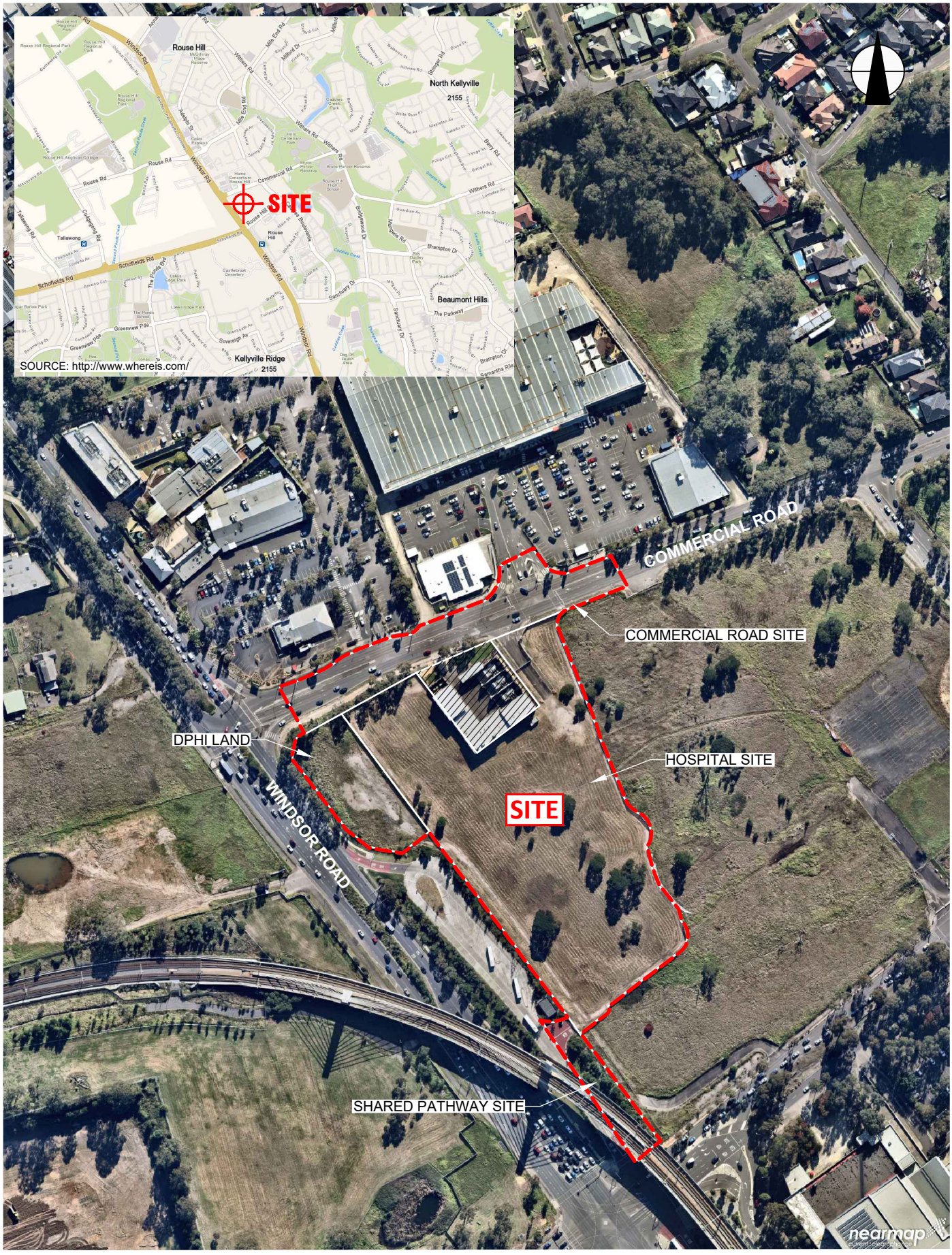
Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other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

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

Read Responsibility Clauses Closely

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

Appendix A: Report Figures



AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

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

Title: **SITE LOCATION PLAN**

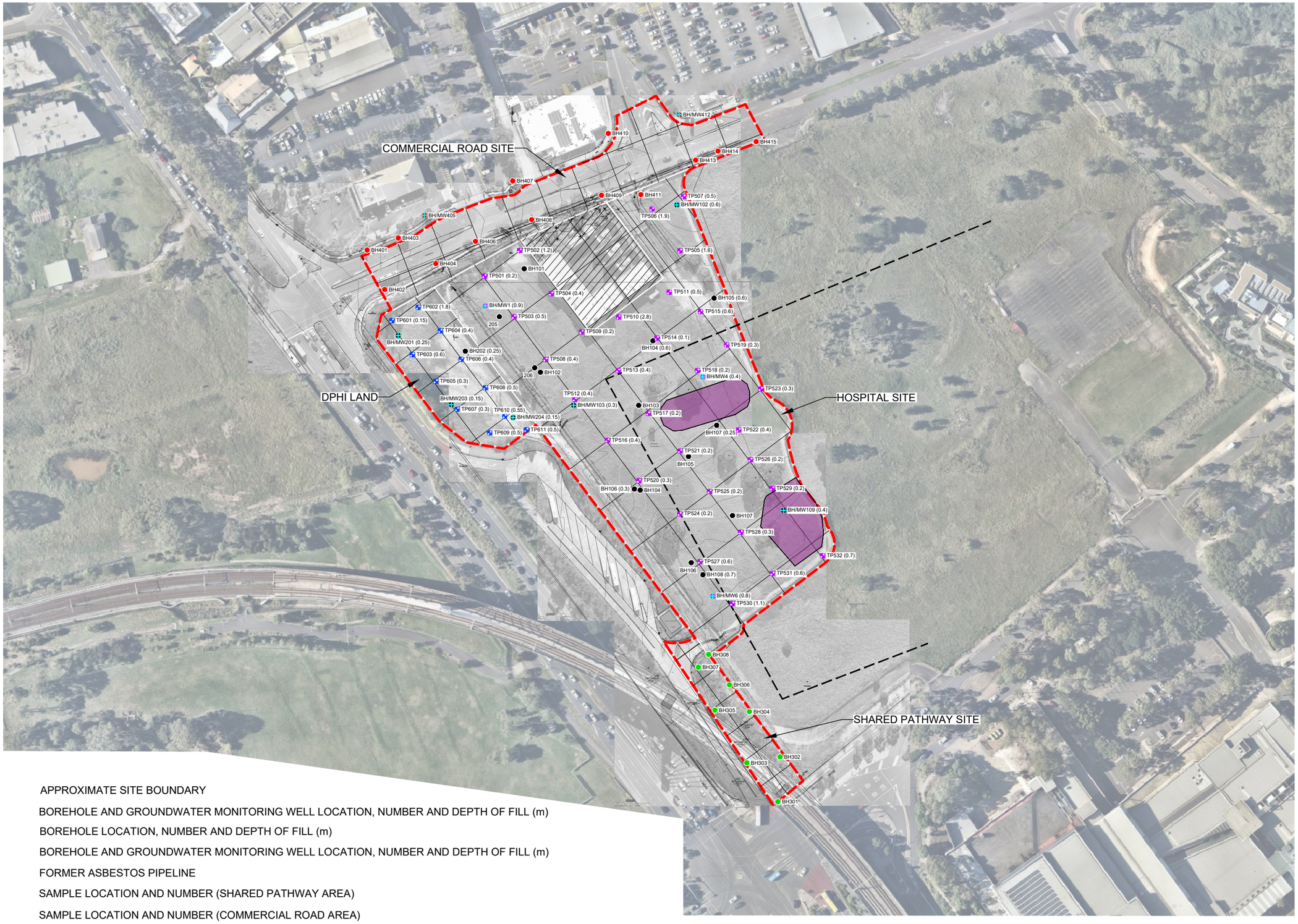
Location: CNR WINDSOR AND COMMERCIAL ROAD, ROUSE HILL, NSW

Project No: E37757B

Figure No: 1

JKEnvironments

PLOT DATE: 27/08/2025 11:16:33 AM DWG FILE: K:\SC EIS JOBS\37000'S\E37757B ROUSE HILL HOSPITAL\CAD\E37757B.DWG



LEGEND

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

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 20 40 60 80 100

SCALE 1:2000 @A3 METRES

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

Title: **SAMPLE LOCATION PLAN**

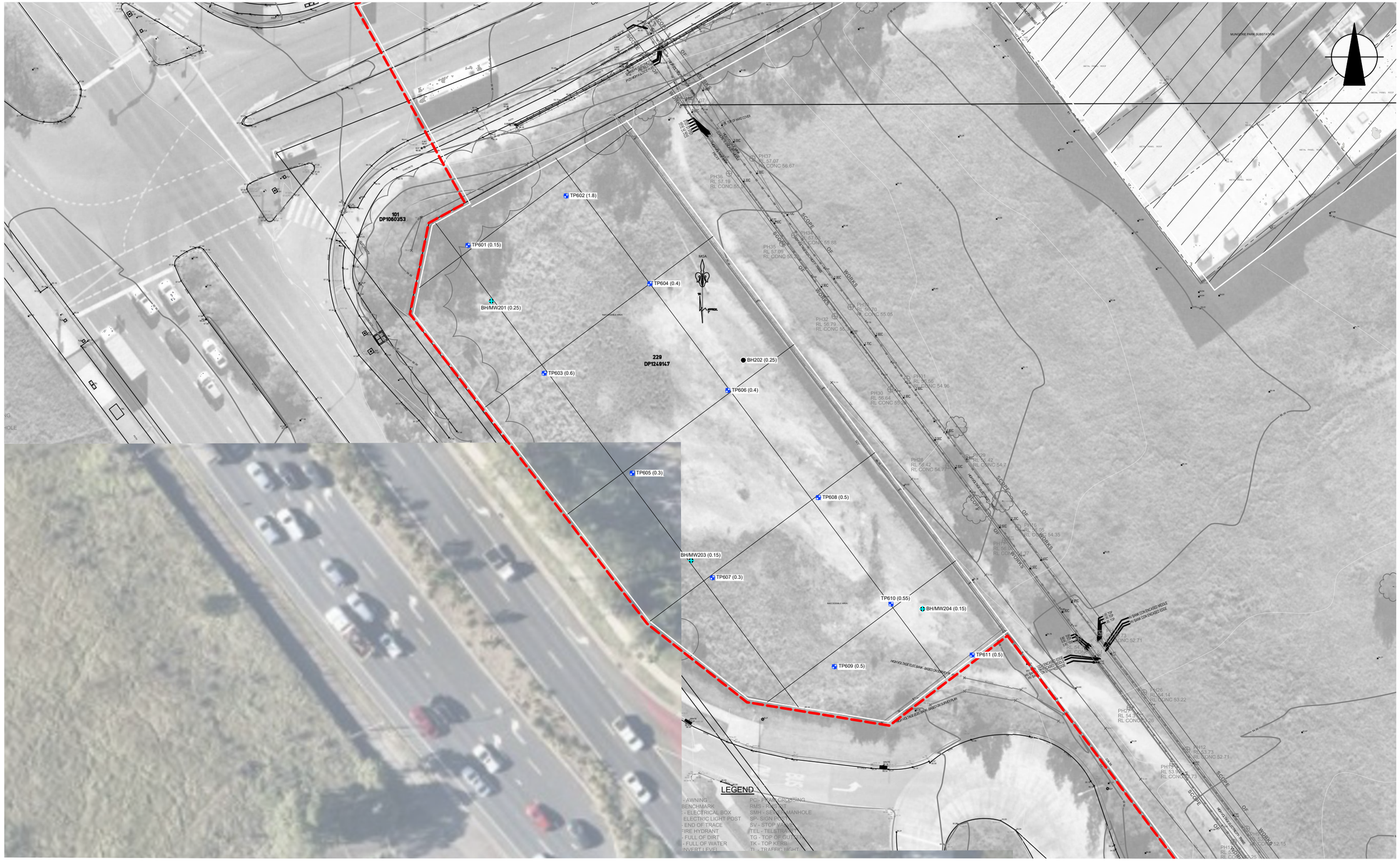
Location: CNR WINDSOR AND COMMERCIAL ROAD, ROUSE HILL, NSW

Project No: E37757B

Figure No: 2

JKEnvironments

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



LEGEND

— — —	APPROXIMATE SITE BOUNDARY
BH202	BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
BH/MW201	BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
TP601	TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 5 10 15 20 25

SCALE 1:500 @A3 METRES

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

Title: **SAMPLE LOCATION PLAN**
DPHI SITE

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

Project No: E37757B

Figure No: 2a

JKEnvironments

PLOT DATE: 27/08/2025 11:17:35 AM DWG FILE: K:\5C EIS JOBS\37000'S\E37757B ROUSE HILL HOSPITAL\CADIE37757B.DWG

MW201		WUP201
Chromium	55µg/L	49µg/L
Copper	4µg/L	4µg/L
Zinc	14µg/L	13µg/L
PFOS	0.012µg/L	0.012µg/L

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE DPHI SITE BOUNDARY
- BH202 — BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)
- BH/MW201 — BOREHOLE AND GROUNDWATER MONITORING WELL LOCATION, NUMBER AND DEPTH OF FILL (m)
- TP601 — TEST PIT LOCATION, NUMBER AND DEPTH OF FILL (m)

SAMPLE ID	-
CHEMICAL	CONCENTRATION (µg/L)

GROUNDWATER SAMPLE EXCEEDANCE

GROUNDWATER CONTAMINATION ABOVE SAC

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 5 10 15 20 25

SCALE 1:500 @A3 METRES

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

Title: **SAC EXCEEDANCE PLAN DPHI SITE**

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

Project No: E37757B

Figure No: 3

JKEnvironments

PLOT DATE: 29/08/2025 4:08:56 PM DWG FILE: K:\SC EIS JOBS\37000\SIE37757B ROUSE HILL HOSPITAL\CAD\E37757B.DWG

Appendix B: JKE DSI 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 high traffic have been quoted).

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-D: 'Commercial/Industrial'

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)			3000	900	3600	240000	1500	730	6000	400000	4000	40	80	2000	2500	45	530	3600	50	2000	7	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
TP601	0-0.1	F: Silty Clay	**7**	<0.4	**13**	**18**	**20**	<0.1	**7**	**55**	**0.78**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP601 - [LAB_DUP]	0-0.1	Lab Duplicate	**6**	<0.4	**13**	**20**	**23**	<0.1	**10**	**66**	**20**	**1.7**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP601 - [TRIPLICATE]	0-0.1	Lab Triplicate	NA	NA	NA	NA	NA	NA	NA	NA	**0.3**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP602	0-0.1	F: Silty Clay	**4**	<0.4	**13**	**15**	**19**	<0.1	**9**	**65**	**2.8**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP602	0.2-0.3	F: Sandy Clay	<4	<0.4	**24**	**23**	**12**	<0.1	**28**	**65**	**0.06**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP603	0-0.1	F: Silty Clayey Sand	**6**	<0.4	**18**	**25**	**30**	<0.1	**14**	**47**	**6.5**	**1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP603	0.2-0.3	F: Gravelly Sand	<4	<0.4	**15**	**15**	**19**	<0.1	**7**	**49**	**2.8**	**0.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP604	0-0.1	F: Silty Clay	**5**	<0.4	**18**	**25**	**16**	<0.1	**22**	**40**	**0.76**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP605	0-0.1	F: Silty Gravelly Sand	<4	<0.4	**10**	**8**	**22**	<0.1	**4**	**26**	**1.3**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP606	0-0.1	F: Silty Gravelly Sand	<4	<0.4	**15**	**46**	**120**	<0.1	**11**	**68**	**3**	**0.6**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP607	0-0.1	F: Silty Clay	**6**	<0.4	**17**	**26**	**28**	**0.1**	**17**	**56**	**7.1**	**1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP608	0-0.1	F: Silty Gravelly Sand	<4	<0.4	**20**	**22**	**16**	<0.1	**29**	**36**	**0.4**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP608	0.2-0.3	F: Sandy Gravel	<4	<0.4	**20**	**22**	**96**	<0.1	**21**	**100**	**2.7**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP609	0-0.1	F: Silty Clayey Sand	**4**	<0.4	**14**	**19**	**18**	<0.1	**19**	**42**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP609 - [LAB_DUP]	0-0.1	Lab Duplicate	<4	<0.4	**9**	**12**	**24**	<0.1	**10**	**40**	**0.3**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP609 - [TRIPLICATE]	0-0.1	Lab Triplicate	<4	<0.4	**9**	**11**	**15**	<0.1	**7**	**31**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP609	0.3-0.4	F: Silty Sandy Clay	<4	<0.4	**11**	**23**	**17**	<0.1	**9**	**36**	**0.3**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP610	0-0.1	F: Silty Gravelly Sand	<4	<0.4	**18**	**25**	**18**	<0.1	**21**	**47**	**2.6**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP611	0-0.1	F: Silty Gavelly Sand	**6**	<0.4	**21**	**50**	**34**	<0.1	**14**	**56**	**0.09**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
SDUP601	0-0.1	Duplicate of TP606	<4	**1**	**13**	**42**	**33**	<0.1	**13**	**51**	**2.4**	**0.5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP602	0-0.1	Duplicate of TP608	<4	<0.4	**21**	**20**	**11**	<0.1	**26**	**34**	**0.3**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP603	0.3-0.4	Duplicate of TP609	**7.4**	<0.4	**16**	**23**	**17**	<0.1	**16**	**50**	**0.53**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP604	0-0.1	Duplicate of TP607	**5.5**	<0.4	**20**	**25**	**29**	<0.1	**18**	**51**	**5.7**	**0.82**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
Total Number of Samples			22	22	22	22	22	22	22	22	22	22	15	15	15	15	15	15	15	15	14	11
Maximum Value			7.4	1	24	50	120	0.1	29	100	20	1.7	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Not Detected

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

Standard deviation exceeds data assessment criteria **VALUE**

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-D: COMMERCIAL/INDUSTRIAL**							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
TP601	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
TP601 - [LAB_DUP]	0-0.1	Lab Duplicate	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
TP602	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.7
TP602	0.2-0.3	F: Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.5
TP603	0-0.1	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.2
TP603	0.2-0.3	F: Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.3
TP604	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.3
TP605	0-0.1	F: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.2
TP606	0-0.1	F: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.3
TP607	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.4
TP608	0-0.1	F: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.2
TP608	0.2-0.3	F: Sandy Gravel	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.2
TP609	0-0.1	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
TP609 - [LAB_DUP]	0-0.1	Lab Duplicate	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
TP609	0.3-0.4	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
TP610	0-0.1	F: Silty Gravelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.2
TP611	0-0.1	F: Silty Gavelly Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
SDUP601	0-0.1	Duplicate of TP606	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP602	0-0.1	Duplicate of TP608	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP603	0.3-0.4	Duplicate of TP609	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP604	0-0.1	Duplicate of TP607	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
Total Number of Samples					21	21	21	21	21	21	21	15
Maximum Value					<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	0.7

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
TP601	0-0.1	F: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP601 - [LAB_DUP]	0-0.1	Lab Duplicate	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP602	0-0.1	F: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP602	0.2-0.3	F: Sandy Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP603	0-0.1	F: Silty Clayey Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP603	0.2-0.3	F: Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP604	0-0.1	F: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP605	0-0.1	F: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP606	0-0.1	F: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP607	0-0.1	F: Silty Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP608	0-0.1	F: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP608	0.2-0.3	F: Sandy Gravel	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP609	0-0.1	F: Silty Clayey Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP609 - [LAB_DUP]	0-0.1	Lab Duplicate	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP609	0.3-0.4	F: Silty Sandy Clay	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP610	0-0.1	F: Silty Gravelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
TP611	0-0.1	F: Silty Gavelly Sand	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP601	0-0.1	Duplicate of TP606	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP602	0-0.1	Duplicate of TP608	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP603	0.3-0.4	Duplicate of TP609	0m to <1m	Sand	260	NL	3	NL	NL	230	NL
SDUP604	0-0.1	Duplicate of TP607	0m to <1m	Sand	260	NL	3	NL	NL	230	NL

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			**COMMERCIAL/INDUSTRIAL**			
Sample Reference	**Sample Depth**	**Soil Texture**				
TP601	0-0.1	Coarse	<25	<50	**170**	**130**
TP601 - [LAB_DUP]	0-0.1	Coarse	<25	<50	**200**	**130**
TP601 - [TRIPLICATE]	0-0.1	Coarse	NA	NA	NA	NA
TP602	0-0.1	Coarse	<25	<50	<100	<100
TP602	0.2-0.3	Coarse	<25	<50	<100	<100
TP603	0-0.1	Coarse	<25	<50	<100	<100
TP603	0.2-0.3	Coarse	<25	<50	**160**	**240**
TP604	0-0.1	Coarse	<25	<50	<100	<100
TP605	0-0.1	Coarse	<25	<50	<100	<100
TP606	0-0.1	Coarse	<25	<50	**130**	**170**
TP607	0-0.1	Coarse	<25	<50	<100	<100
TP608	0-0.1	Coarse	<25	<50	**110**	**140**
TP608	0.2-0.3	Coarse	<25	<50	<100	<100
TP609	0-0.1	Coarse	<25	<50	<100	**100**
TP609 - [LAB_DUP]	0-0.1	Coarse	<25	<50	<100	<100
TP609 - [TRIPLICATE]	0-0.1	Coarse	NA	NA	NA	NA
TP609	0.3-0.4	Coarse	<25	<50	<100	<100
TP610	0-0.1	Coarse	<25	<50	<100	<100
TP611	0-0.1	Coarse	<25	<50	<100	<100
SDUP601	0-0.1	Coarse	<25	<50	<100	**120**
SDUP602	0-0.1	Coarse	<25	<50	<100	<100
SDUP603	0.3-0.4	Coarse	<25	<50	<100	<100
SDUP604	0-0.1	Coarse	<25	<50	<100	<100
Total Number of Samples			21	21	21	21
Maximum Value			<PQL	<PQL	200	240

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

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		26,000	20,000	27,000	38,000	430	99,000	27,000	81,000	11,000	
Site Use		**COMMERCIAL/INDUSTRIAL - DIRECT SOIL CONTACT**									
Sample Reference	**Sample Depth**										
TP601	0-0.1	<25	<50	**170**	**130**	<0.2	<0.5	<1	<1	<1	**0.1**
TP601 - [LAB_DUP]	0-0.1	<25	<50	**200**	**130**	<0.2	<0.5	<1	<1	<1	-
TP602	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.7**
TP602	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.5**
TP603	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.2**
TP603	0.2-0.3	<25	<50	**160**	**240**	<0.2	<0.5	<1	<1	<1	**0.3**
TP604	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.3**
TP605	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.2**
TP606	0-0.1	<25	<50	**130**	**170**	<0.2	<0.5	<1	<1	<1	**0.3**
TP607	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.4**
TP608	0-0.1	<25	<50	**110**	**140**	<0.2	<0.5	<1	<1	<1	**0.2**
TP608	0.2-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.2**
TP609	0-0.1	<25	<50	<100	**100**	<0.2	<0.5	<1	<1	<1	**0.1**
TP609 - [LAB_DUP]	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
TP609	0.3-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
TP610	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.2**
TP611	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
SDUP601	0-0.1	<25	<50	<100	**120**	<0.2	<0.5	<1	<1	<1	-
SDUP602	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
SDUP603	0.3-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
SDUP604	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
Total Number of Samples		21	21	21	21	21	21	21	21	21	15
Maximum Value		<PQL	<PQL	200	240	<PQL	<PQL	<PQL	<PQL	<PQL	0.7

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

TABLE S5
ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS
HIL-D:Commercial/Industrial

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**					**0.05**			**0.001**			**0.001**											**0.05**	**0.001**
21/07/2025	TP601	0-0.1	No	10	1,020	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	386637	TP601	0-0.1	467.04	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
22/07/2025	TP602	0-0.1	No	10	1,010	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	386637	TP602	0-0.1	785.81	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
22/07/2025	TP602	0.1-0.4	No	10	1,040	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22/07/2025	TP602	0.4-0.9	No	10	1,140	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22/07/2025	TP602	0.9-1.4	No	10	1,040	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22/07/2025	TP602	1.4-1.8	No	10	1,010	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21/07/2025	TP603	0-0.1	No	10	1,015	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	386637	TP603	0-0.1	702.76	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
21/07/2025	TP603	0.1-0.3	No	10	1,165	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21/07/2025	TP603	0.3-0.6	No	10	1,295	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22/07/2025	TP604	0-0.1	No	10	1,055	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	386637	TP604	0-0.1	781.3	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
22/07/2025	TP604	0.1-0.2	No	10	1,030	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
22/07/2025	TP605	0-0.1	No	10	1,185	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	386637	TP605	0-0.1	1006.65	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
22/07/2025	TP605	0.1-0.3	No	10	1,040	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21/07/2025	TP606	0-0.1	No	10	1,295	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	386637	TP606	0-0.1	1006.9	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
21/07/2025	TP606	0.2-0.35	No	10	1,205	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21/07/2025	TP607	0-0.1	No	10	1,025	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	386637	TP607	0-0.1	667.19	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
21/07/2025	TP607	0.15-0.3	No	10	1,130	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21/07/2025	TP608	0-0.1	No	10	1,055	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	386637	TP608	0-0.1	981.93	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
21/07/2025	TP608	0.2-0.4	No	10	1,270	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21/07/2025	TP608	0.4-0.5	No	10	1,300	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21/07/2025	TP609	0-0.1	No	10	1,160	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	386637	TP609	0-0.1	644.59	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
21/07/2025	TP609	0.2-0.5	No	10	1,010	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21/07/2025	TP610	0-0.1	No	10	1,035	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	386637	TP610	0-0.1	1047.46	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
21/07/2025	TP610	0.2-0.5	No	10	1,010	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--
21/07/2025	TP611	0-0.1	No	10	1,140	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	386637	TP611	0-0.1	961.94	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
21/07/2025	TP611	0.2-0.4	No	10	1,420	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Concentration above the SAC **VALUE**

JKEnvironments

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

Land Use Category				COMMERCIAL/INDUSTRIAL																	
							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	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																				
TP601	0-0.1	F: Silty Clay	Coarse	NA	NA	NA	**7**	**13**	**18**	**20**	**7**	**55**	<1	<0.1	<25	<50	**170**	**130**	<0.2	<0.5	<1	<1	**0.08**
TP601 - [LAB_DUP]	0-0.1	Lab Duplicate	Coarse	NA	NA	NA	**6**	**13**	**20**	**23**	**10**	**66**	<1	<0.1	<25	<50	**200**	**130**	<0.2	<0.5	<1	<1	**1.2**
TP601 - [TRIPLICATE]	0-0.1	Lab Triplicate	Coarse	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.08**
TP602	0-0.1	F: Silty Clay	Coarse	NA	NA	NA	**4**	**13**	**15**	**19**	**9**	**65**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.3**
TP602	0.2-0.3	F: Sandy Clay	Coarse	NA	NA	NA	<4	**24**	**23**	**12**	**28**	**65**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.06**
TP603	0-0.1	F: Silty Clayey Sand	Coarse	NA	NA	NA	**6**	**18**	**25**	**30**	**14**	**47**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.66**
TP603	0.2-0.3	F: Gravelly Sand	Coarse	NA	NA	NA	<4	**15**	**15**	**19**	**7**	**49**	<1	NA	<25	<50	**160**	**240**	<0.2	<0.5	<1	<1	**0.3**
TP604	0-0.1	F: Silty Clay	Coarse	NA	NA	NA	**5**	**18**	**25**	**16**	**22**	**40**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.1**
TP605	0-0.1	F: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	**10**	**8**	**22**	**4**	**26**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.2**
TP606	0-0.1	F: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	**15**	**46**	**120**	**11**	**68**	<1	<0.1	<25	<50	**130**	**170**	<0.2	<0.5	<1	<1	**0.4**
TP607	0-0.1	F: Silty Clay	Coarse	NA	NA	NA	**6**	**17**	**26**	**28**	**17**	**56**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.72**
TP608	0-0.1	F: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	**20**	**22**	**16**	**29**	**36**	<1	<0.1	<25	<50	**110**	**140**	<0.2	<0.5	<1	<1	**0.1**
TP608	0.2-0.3	F: Sandy Gravel	Coarse	NA	NA	NA	<4	**20**	**22**	**96**	**21**	**100**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.3**
TP609	0-0.1	F: Silty Clayey Sand	Coarse	NA	NA	NA	**4**	**14**	**19**	**18**	**19**	**42**	<1	<0.1	<25	<50	<100	**100**	<0.2	<0.5	<1	<1	<0.05
TP609 - [LAB_DUP]	0-0.1	Lab Duplicate	Coarse	NA	NA	NA	<4	**9**	**12**	**24**	**10**	**40**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.08**
TP609 - [TRIPLICATE]	0-0.1	Lab Triplicate	Coarse	NA	NA	NA	<4	**9**	**11**	**15**	**7**	**31**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP609	0.3-0.4	F: Silty Sandy Clay	Coarse	NA	NA	NA	<4	**11**	**23**	**17**	**9**	**36**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.09**
TP610	0-0.1	F: Silty Gravelly Sand	Coarse	NA	NA	NA	<4	**18**	**25**	**18**	**21**	**47**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.3**
TP611	0-0.1	F: Silty Gavelly Sand	Coarse	NA	NA	NA	**6**	**21**	**50**	**34**	**14**	**56**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.09**
SDUP601	0-0.1	Duplicate of TP606	Coarse	NA	NA	NA	<4	**13**	**42**	**33**	**13**	**51**	<1	<0.1	<25	<50	<100	**120**	<0.2	<0.5	<1	<1	**0.3**
SDUP602	0-0.1	Duplicate of TP608	Coarse	NA	NA	NA	<4	**21**	**20**	**11**	**26**	**34**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.08**
SDUP603	0.3-0.4	Duplicate of TP609	Coarse	NA	NA	NA	**7.4**	**16**	**23**	**17**	**16**	**50**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.11**
SDUP604	0-0.1	Duplicate of TP607	Coarse	NA	NA	NA	**5.5**	**20**	**25**	**29**	**18**	**51**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.53**
Total Number of Samples				0	0	0	22	22	22	22	22	22	21	15	21	21	21	21	21	21	21	21	22
Maximum Value				NA	NA	NA	7.4	24	50	120	29	100	<PQL	<PQL	<PQL	<PQL	200	240	<PQL	<PQL	<PQL	<PQL	1.2

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**				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
TP601	0-0.1	F: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP601 - [LAB_DUP]	0-0.1	Lab Duplicate	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP601 - [TRIPLICATE]	0-0.1	Lab Triplicate	Coarse	NA	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	72
TP602	0-0.1	F: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP602	0.2-0.3	F: Sandy Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP603	0-0.1	F: Silty Clayey Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP603	0.2-0.3	F: Gravelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP604	0-0.1	F: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP605	0-0.1	F: Silty Gravelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP606	0-0.1	F: Silty Gravelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP607	0-0.1	F: Silty Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP608	0-0.1	F: Silty Gravelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP608	0.2-0.3	F: Sandy Gravel	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP609	0-0.1	F: Silty Clayey Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP609 - [LAB_DUP]	0-0.1	Lab Duplicate	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP609 - [TRIPLICATE]	0-0.1	Lab Triplicate	Coarse	NA	NA	NA	160	320	110	2000	60	230	--	--	--	--	--	--	--	--	--	--	--
TP609	0.3-0.4	F: Silty Sandy Clay	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
TP610	0-0.1	F: Silty Gravelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
TP611	0-0.1	F: Silty Gavelly Sand	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
SDUP601	0-0.1	Duplicate of TP606	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72
SDUP602	0-0.1	Duplicate of TP608	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
SDUP603	0.3-0.4	Duplicate of TP609	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	--	215	170	1700	3300	75	135	165	180	72
SDUP604	0-0.1	Duplicate of TP607	Coarse	NA	NA	NA	160	320	110	2000	60	230	370	640	215	170	1700	3300	75	135	165	180	72

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

ADWG:	AustralianDrinking Water Guidelines
ANZG	Australian and New Zealand Guidelines
B(a)P:	Benzo(a)pyrene
CRC:	Cooperative Research Centre
CT:	Contaminant Threshold
ESLs:	Ecological Screening Levels
FTS:	Fluorotelomer sulfonic acid
GIL:	Groundwater Investigation Levels
HILs:	Health Investigation Levels
HSLs:	Health Screening Levels
HSL-SSA:	Health Screening Level-SiteSpecific Assessment
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
ppm:	Parts per million
PCBs:	Polychlorinated Biphenyls
PCE:	Perchloroethylene (Tetrachloroethylene or Tetrachloroethene)
PFAS	Per- and polyfluoroalkyl substances
PFHxS	Perfluorohexanesulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PQL:	Practical Quantitation Limit
RS:	Rinsate Sample
RSL:	Regional Screening Levels
SAC:	Site Assessment Criteria
SSA:	Site Specific Assessment
SSHSLs:	Site Specific Health Screening Levels
TB:	Trip Blank
TCA:	1,1,1 Trichloroethane (methyl chloroform)
TCE:	Trichloroethylene (Trichloroethene)
TCLP:	Toxicity Characteristics Leaching Procedure
TS:	Trip Spike
TRH:	Total Recoverable Hydrocarbons
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:

Groundwater Ecology Tables:

- 95% refers to a concentration that has been derived to protect 95% of aquatic species
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

TABLE G1
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO ECOLOGICAL GILs SAC
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	ANZG 2018 Fresh Waters	SAMPLES MW201	MW201 - [LAB_DUP]	WDUP201 (MW201)
Inorganic Compounds and Parameters					
pH		6.5 - 8.5	8.1	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	**970**	NA	NA
Turbidity (NTU)		NSL	92	NA	NA
Redox Potential (Eh)	-	NSL	74	NA	NA
Total Dissolved Solids (TDS) (mg/L)	5	NSL	**640**	NA	NA
Total Suspended Solids (TSS) (mg/L)	5	NSL	**95**	NA	NA
Total Organic Carbon (TOC) (mg/L)	1	NSL	**8**	NA	NA
Dissolved Oxygen (mg/L)	0.1	NSL	**8.3**	NA	NA
Total Hardness (mg/L)	3	NSL	**360**	NA	NA
Silica (SiO2) (mg/L)	0.1	NSL	**33**	NA	NA
Phosphorus (mg/L)	0.05	NSL	<0.05	NA	NA
Acidity (as CaCO3)	5	NSL			
Metals and Metalloids					
Arsenic (As III)	1	24	<1	[NT]	<1
Cadmium	0.1	0.2	<0.1	NA	<0.1
Chromium (total)	1	3.3	**55**	NA	**49**
Copper	1	1.4	**4**	NA	**4**
Lead	1	3.4	<1	NA	<1
Total Mercury (inorganic)	0.05	0.06	<0.05	<0.05	<0.05
Nickel	1	11	**2**	NA	**2**
Zinc	1	8	**14**	NA	**13**
Aluminium	10	55	<10	NA	NA
Antimony	1	NSL	**1**	NA	NA
Barium	1	NSL	**42**	NA	NA
Boron	20	940	**60**	NA	NA
Beryllium	0.05	NSL	<0.5	NA	NA
Cobalt	1	NSL	**1**	NA	NA
Iron	10	NSL	<10	NA	NA
Lithium	1	NSL	**12**	NA	NA
Manganese	5	1900	**65**	NA	NA
Molybdenum	1	NSL	**5**	NA	NA
Selenium	1	5	**1**	NA	NA
Silver	1	0.05	<1	NA	NA
Strontium	1	NSL	**390**	NA	NA
Uranium	0.5	NSL	**4.2**	NA	NA
Vanadium	1	NSL	**5**	NA	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)					
Benzene	1	950	<1	<1	<1
Toluene	1	180	<1	<1	<1
Ethylbenzene	1	80	<1	<1	<1
m+p-xylene	2	75	<2	<2	<2
o-xylene	1	350	<1	<1	<1
Total xylenes	2	NSL	<2	<2	<2
Total Recoverable Hydrocarbons (TRHs)					
TRH F1	10	NSL	<10	<10	<10
TRH F2	50	NSL	<50	<50	<50
TRH F3	100	NSL	<100	<100	<100
TRH F4	100	NSL	<100	<100	<100
Volatile Organic Compounds (VOCs), including chlorinated VOCs					
Dichlorodifluoromethane	10	NSL	<10	<10	<10
Chloromethane	10	NSL	<10	<10	<10
Vinyl Chloride	10	100	<10	<10	<10
Bromomethane	10	NSL	<10	<10	<10
Chloroethane	10	NSL	<10	<10	<10
Trichlorofluoromethane	10	NSL	<10	<10	<10
1,1-Dichloroethene	**1**	700	<1	<1	<1
Trans-1,2-dichloroethene	1	NSL	<1	<1	<1
1,1-dichloroethane	1	90	<1	<1	<1
Cis-1,2-dichloroethene	1	NSL	<1	<1	<1
Bromochloromethane	1	NSL	<1	<1	<1
Chloroform	1	370	<1	<1	<1
2,2-dichloropropane	1	NSL	<1	<1	<1
1,2-dichloroethane	1	1900	<1	<1	<1
1,1,1-trichloroethane	1	270	<1	<1	<1
1,1-dichloropropene	1	NSL	<1	<1	<1
Cyclohexane	1	NSL	<1	<1	<1
Carbon tetrachloride	1	240	<1	<1	<1
Benzene	1	950	<1	<1	<1
Dibromomethane	1	NSL	<1	<1	<1
1,2-dichloropropane	1	900	<1	<1	<1
Trichloroethene	1	330	<1	<1	<1
Bromodichloromethane	1	NSL	<1	<1	<1
trans-1,3-dichloropropene	1	NSL	<1	<1	<1
cis-1,3-dichloropropene	1	NSL	<1	<1	<1
1,1,2-trichloroethane	1	6500	<1	<1	<1
Toluene	1	180	<1	<1	<1
1,3-dichloropropane	1	1100	<1	<1	<1
Dibromochloromethane	1	NSL	<1	<1	<1
1,2-dibromoethane	1	NSL	<1	<1	<1
Tetrachloroethene	1	70	<1	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	<1	<1
Chlorobenzene	1	55	<1	<1	<1
Ethylbenzene	1	80	<1	<1	<1
Bromoform	1	NSL	<1	<1	<1
m+p-xylene	2	75	<2	<2	<2
Styrene	1	NSL	<1	<1	<1
1,1,2,2-tetrachloroethane	1	400	<1	<1	<1
o-xylene	1	350	<1	<1	<1
1,2,3-trichloropropane	1	NSL	<1	<1	<1
Isopropylbenzene	1	30	<1	<1	<1
Bromobenzene	1	NSL	<1	<1	<1
n-propyl benzene	1	NSL	<1	<1	<1
2-chlorotoluene	1	NSL	<1	<1	<1
4-chlorotoluene	1	NSL	<1	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	<1	<1
Tert-butyl benzene	1	NSL	<1	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	<1	<1
1,3-dichlorobenzene	1	260	<1	<1	<1
Sec-butyl benzene	1	NSL	<1	<1	<1
1,4-dichlorobenzene	1	60	<1	<1	<1
4-isopropyl toluene	1	NSL	<1	<1	<1
1,2-dichlorobenzene	1	160	<1	<1	<1
n-butyl benzene	1	NSL	<1	<1	<1
1,2-dibromo-3-chloropropane	1	NSL	<1	<1	<1
1,2,4-trichlorobenzene	1	85	<1	<1	<1
1,2,3-trichlorobenzene	1	3	<1	<1	<1
Hexachlorobutadiene	1	NSL	<1	<1	<1
Polycyclic Aromatic Hydrocarbons (PAHs)					
Naphthalene	0.2	16	<0.1	<0.1	<0.1
Acenaphthylene	0.1	NSL	<0.1	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	<0.1	<0.1
Phenanthrene	0.1	0.6	<0.1	<0.1	<0.1
Anthracene	0.1	0.01	<0.1	<0.1	<0.1
Fluoranthene	0.1	1	<0.1	<0.1	<0.1
Pyrene	0.1	NSL	<0.1	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	<0.1	<0.1
Anions and Cations					
Calcium (mg/L)	0.5	NSL	**100**	NA	NA
Potassium (mg/L)	0.5	NSL	**9.4**	NA	NA
Sodium (mg/L)	0.5	NSL	**61**	NA	NA
Magnesium (mg/L)	0.5	NSL	**24**	NA	NA
Hydroxide Alkalinity (as CaCO3) (mg/L)	5	NSL	<5	NA	NA
Bicarbonate Alkalinity (as CaCO3) (mg/L)	5	NSL	**300**	NA	NA
Carbonate Alkalinity (as CaCO3) (mg/L)	5	NSL	<5	NA	NA
Total Alkalinity (as CaCO3) (mg/L)	5	NSL	**300**	NA	NA
Sulphate (mg/L)	1	NSL	**83**	NA	NA
Chloride (mg/L)	1	NSL	**37**	NA	NA
Ionic Balance (%)	-	NSL	7	NA	NA
Sodium Adsorption Ratio (SAR)	0.01	NSL	**1.4**	NA	NA
Nutrients					
Ammonia (mg/L) (pH dependent)	0.005	0.9	**0.04**	NA	NA
Nitrate (mg/L)	0.005	NSL	**0.31**	NA	NA
Nitrite (mg/L)	0.005	NSL	**0.04**	NA	NA
Nitrogen Oxides (NOX) (mg/L)	0.005	NSL	**0.35**	NA	NA
Total Nitrogen (mg/L)	0.1	NSL	**0.6**	NA	NA
Phosphate (mg/L)	0.005	NSL	**0.02**	NA	NA
Microbiological Organisms					
Faecal Coliforms (MPN/100mL)	1	NSL	**100**	NA	NA
E Coli (MPN/100mL)	1	NSL	<10	NA	NA

Concentration above the SAC	**Bold**
Positive result	**Bold**
GIL >PQL	Red
Draft GIL	Orange

TABLE G2
SUMMARY OF GROUNDWATER LABORATORY RESULTS COMPARED TO HUMAN CONTACT GILs
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	Recreational (10 x NHMRC ADWG)	SAMPLES		
			MW201	MW201 - [LAB_DUP]	WDUP201 (MW201)
Inorganic Compounds and Parameters					
pH		6.5 - 8.5	8.1	NA	NA
Electrical Conductivity (µS/cm)	1	NSL	**970**	NA	NA
Turbidity (NTU)		NSL	92	NA	NA
Redox Potential (Eh)	-	NSL	74	NA	NA
Total Dissolved Solids (TDS) (mg/L)	5	NSL	**640**	NA	NA
Total Suspended Solids (TSS) (mg/L)	5	NSL	**95**	NA	NA
Total Organic Carbon (TOC) (mg/L)	1	NSL	**8**	NA	NA
Dissolved Oxygen (mg/L)	0.1	NSL	**8.3**	NA	NA
Total Hardness (mg/L)	3	NSL	**360**	NA	NA
Silica (SiO2) (mg/L)	0.1	NSL	**33**	NA	NA
Phosphorus (mg/L)	0.05	NSL	<0.05	NA	NA
Acidity (as CaCO3)	5	NSL			
Metals and Metalloids					
Arsenic (As III)	1	100	<1	[NT]	<1
Cadmium	0.1	20	<0.1	NA	<0.1
Chromium (total)	1	500	**55**	NA	**49**
Copper	1	20000	**4**	NA	**4**
Lead	1	100	<1	NA	<1
Total Mercury (inorganic)	0.05	10	<0.05	<0.05	<0.05
Nickel	1	200	**2**	NA	**2**
Zinc	1	30000	**14**	NA	**13**
Aluminium	10	NSL	<10	NA	NA
Antimony	1	30	**1**	NA	NA
Barium	1	20000	**42**	NA	NA
Boron	20	40000	**60**	NA	NA
Beryllium	0.05	600	<0.5	NA	NA
Cobalt	1	NSL	**1**	NA	NA
Iron	10	NSL	<10	NA	NA
Lithium	1	NSL	**12**	NA	NA
Manganese	5	5000	**65**	NA	NA
Molybdenum	1	500	**5**	NA	NA
Selenium	1	100	**1**	NA	NA
Silver	1	1000	<1	NA	NA
Strontium	1	NSL	**390**	NA	NA
Uranium	0.5	200	**4.2**	NA	NA
Vanadium	1	NSL	**5**	NA	NA
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)					
Benzene	1	10	<1	<1	<1
Toluene	1	8000	<1	<1	<1
Ethylbenzene	1	3000	<1	<1	<1
m+p-xylene	2	NSL	<2	<2	<2
o-xylene	1	NSL	<1	<1	<1
Total xylenes	2	6000	<2	<2	<2
Total Recoverable Hydrocarbons (TRHs)					
TRH F1	10	NSL	<10	<10	<10
TRH F2	50	NSL	<50	<50	<50
TRH F3	100	NSL	<100	<100	<100
TRH F4	100	NSL	<100	<100	<100
Volatile Organic Compounds (VOCs), including chlorinated VOCs					
Dichlorodifluoromethane	10	NSL	<10	<10	<10
Chloromethane	10	NSL	<10	<10	<10
Vinyl Chloride	10	3	<10	<10	<10
Bromomethane	10	NSL	<10	<10	<10
Chloroethane	10	NSL	<10	<10	<10
Trichlorofluoromethane	10	NSL	<10	<10	<10
1,1-Dichloroethene	**1**	300	<1	<1	<1
Trans-1,2-dichloroethene	1	600	<1	<1	<1
1,1-dichloroethane	1	NSL	<1	<1	<1
Cis-1,2-dichloroethene	1	600	<1	<1	<1
Bromochloromethane	1	2500	<1	<1	<1
Chloroform	1		<1	<1	<1
2,2-dichloropropane	1	NSL	<1	<1	<1
1,2-dichloroethane	1	30	<1	<1	<1
1,1,1-trichloroethane	1	NSL	<1	<1	<1
1,1-dichloropropene	1	NSL	<1	<1	<1
Cyclohexane	1	NSL	<1	<1	<1
Carbon tetrachloride	1	30	<1	<1	<1
Benzene	1	10	<1	<1	<1
Dibromomethane	1	NSL	<1	<1	<1
1,2-dichloropropane	1	NSL	<1	<1	<1
Trichloroethene	1	NSL	<1	<1	<1
Bromodichloromethane	1	NSL	<1	<1	<1
trans-1,3-dichloropropene	1	1000	<1	<1	<1
cis-1,3-dichloropropene	1	1000	<1	<1	<1
1,1,2-trichloroethane	1	NSL	<1	<1	<1
Toluene	1	8000	<1	<1	<1
1,3-dichloropropane	1	NSL	<1	<1	<1
Dibromochloromethane	1	NSL	<1	<1	<1
1,2-dibromoethane	1	NSL	<1	<1	<1
Tetrachloroethene	1	500	<1	<1	<1
1,1,1,2-tetrachloroethane	1	NSL	<1	<1	<1
Chlorobenzene	1	3000	<1	<1	<1
Ethylbenzene	1	3000	<1	<1	<1
Bromoform	1	NSL	<1	<1	<1
m+p-xylene	2	NSL	<2	<2	<2
Styrene	1	300	<1	<1	<1
1,1,2,2-tetrachloroethane	1	NSL	<1	<1	<1
o-xylene	1	NSL	<1	<1	<1
1,2,3-trichloropropane	1	NSL	<1	<1	<1
Isopropylbenzene	1	NSL	<1	<1	<1
Bromobenzene	1	NSL	<1	<1	<1
n-propyl benzene	1	NSL	<1	<1	<1
2-chlorotoluene	1	NSL	<1	<1	<1
4-chlorotoluene	1	NSL	<1	<1	<1
1,3,5-trimethyl benzene	1	NSL	<1	<1	<1
Tert-butyl benzene	1	NSL	<1	<1	<1
1,2,4-trimethyl benzene	1	NSL	<1	<1	<1
1,3-dichlorobenzene	1	200	<1	<1	<1
Sec-butyl benzene	1	NSL	<1	<1	<1
1,4-dichlorobenzene	1	400	<1	<1	<1
4-isopropyl toluene	1	NSL	<1	<1	<1
1,2-dichlorobenzene	1	15000	<1	<1	<1
n-butyl benzene	1	NSL	<1	<1	<1
1,2-dibromo-3-chloropropane	1	NSL	<1	<1	<1
1,2,4-trichlorobenzene	1	300	<1	<1	<1
1,2,3-trichlorobenzene	1	300	<1	<1	<1
Hexachlorobutadiene	1	7	<1	<1	<1
Polycyclic Aromatic Hydrocarbons (PAHs)					
Naphthalene	0.2	NSL	<0.1	<0.1	<0.1
Acenaphthylene	0.1	NSL	<0.1	<0.1	<0.1
Acenaphthene	0.1	NSL	<0.1	<0.1	<0.1
Fluorene	0.1	NSL	<0.1	<0.1	<0.1
Phenanthrene	0.1	NSL	<0.1	<0.1	<0.1
Anthracene	0.1	NSL	<0.1	<0.1	<0.1
Fluoranthene	0.1	NSL	<0.1	<0.1	<0.1
Pyrene	0.1	NSL	<0.1	<0.1	<0.1
Benzo(a)anthracene	0.1	NSL	<0.1	<0.1	<0.1
Chrysene	0.1	NSL	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	0.2	NSL	<0.2	<0.2	<0.2
Benzo(a)pyrene	0.1	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	0.1	NSL	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	0.1	NSL	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	0.1	NSL	<0.1	<0.1	<0.1
Anions and Cations					
Calcium (mg/L)	0.5	NSL	**100**	NA	NA
Potassium (mg/L)	0.5	NSL	**9.4**	NA	NA
Sodium (mg/L)	0.5	NSL	**61**	NA	NA
Magnesium (mg/L)	0.5	NSL	**24**	NA	NA
Hydroxide Alkalinity (as CaCO3) (mg/L)	5	NSL	<5	NA	NA
Bicarbonate Alkalinity (as CaCO3) (mg/L)	5	NSL	**300**	NA	NA
Carbonate Alkalinity (as CaCO3) (mg/L)	5	NSL	<5	NA	NA
Total Alkalinity (as CaCO3) (mg/L)	5	NSL	**300**	NA	NA
Sulphate (mg/L)	1	NSL	**83**	NA	NA
Chloride (mg/L)	1	NSL	**37**	NA	NA
Ionic Balance (%)	-	NSL	7	NA	NA
Sodium Adsorption Ratio (SAR)	0.01	NSL	**1.4**	NA	NA
Nutrients					
Ammonia (mg/L) (pH dependent)	0.005	NSL	**0.04**	NA	NA
Nitrate (mg/L)	0.005	500000	**0.31**	NA	NA
Nitrite (mg/L)	0.005	30000	**0.04**	NA	NA
Nitrogen Oxides (NOX) (mg/L)	0.005	NSL	**0.35**	NA	NA
Total Nitrogen (mg/L)	0.1	NSL	**0.6**	NA	NA
Phosphate (mg/L)	0.005	NSL	**0.02**	NA	NA
Microbiological Organisms					
Faecal Coliforms (MPN/100mL)	1	NA	**100**	NA	NA
E Coli (MPN/100mL)	1	NA	<10	NA	NA

Concentration above the SAC	**Bold**
Positive result	**Bold**
GIL >PQL	Red
Draft GIL	Orange

TABLE G3
GROUNDWATER LABORATORY RESULTS COMPARED TO SITE SPECIFIC HSLs - RISK ASSESSMENT
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NHMRC ADWG 2011	WHO 2008	USEPA RSL Tapwater 2017	SAMPLES		
					MW201	MW201 - [LAB_DUP]	WDUP201 (MW201)
Total Recoverable Hydrocarbons (TRH)							
C_6-C_9 Aliphatics (assessed using F1)	10	-	100	-	<10	<10	<10
>C_9-C_{14} Aliphatics (assessed using F2)	50	-	100	-	<50	<50	<50
Monocyclic Aromatic Hydrocarbons (BTEX Compounds)							
Benzene	1	1	-	-	<1	<1	<1
Toluene	1	800	-	-	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	<1	<1
Total xylenes	2	600	-	-	<2	<2	<2
Polycyclic Aromatic Hydrocarbons (PAHs)							
Naphthalene	1	-	-	6.1	<1	<1	<1
Volatile Organic Compounds (VOCs), including chlorinated VOCs							
Dichlorodifluoromethane	10	-	-	-	<10	<10	<10
Chloromethane	10	-	-	-	<10	<10	<10
Vinyl Chloride	10	0.3	-	-	<10	<10	<10
Bromomethane	10	-	-	-	<10	<10	<10
Chloroethane	10	-	-	-	<10	<10	<10
Trichlorofluoromethane	10	-	-	-	<10	<10	<10
1,1-Dichloroethene	1	30	-	-	<1	<1	<1
Trans-1,2-dichloroethene	1	60	-	-	<1	<1	<1
1,1-dichloroethane	1	-	-	-	<1	<1	<1
Cis-1,2-dichloroethene	1	60	-	-	<1	<1	<1
Bromochloromethane	1	250	-	-	<1	<1	<1
Chloroform	1		-	-	<1	<1	<1
2,2-dichloropropane	1	-	-	-	<1	<1	<1
1,2-dichloroethane	1	3	-	-	<1	<1	<1
1,1,1-trichloroethane	1	-	-	-	<1	<1	<1
1,1-dichloropropene	1	-	-	-	<1	<1	<1
Cyclohexane	1	-	-	-	<1	<1	<1
Carbon tetrachloride	1	3	-	-	<1	<1	<1
Benzene	1	1	-	-	<1	<1	<1
Dibromomethane	1	-	-	-	<1	<1	<1
1,2-dichloropropane	1	-	-	-	<1	<1	<1
Trichloroethene	1	-	-	-	<1	<1	<1
Bromodichloromethane	1	-	-	-	<1	<1	<1
trans-1,3-dichloropropene	1	100	-	-	<1	<1	<1
cis-1,3-dichloropropene	1	100	-	-	<1	<1	<1
1,1,2-trichloroethane	1	-	-	-	<1	<1	<1
Toluene	1	800	-	-	<1	<1	<1
1,3-dichloropropane	1	-	-	-	<1	<1	<1
Dibromochloromethane	1	-	-	-	<1	<1	<1
1,2-dibromoethane	1	-	-	-	<1	<1	<1
Tetrachloroethene	1	50	-	-	<1	<1	<1
1,1,1,2-tetrachloroethane	1	-	-	-	<1	<1	<1
Chlorobenzene	1	300	-	-	<1	<1	<1
Ethylbenzene	1	300	-	-	<1	<1	<1
Bromoform	1	-	-	-	<1	<1	<1
m+p-xylene	2	-	-	-	<2	<2	<2
Styrene	1	30	-	-	<1	<1	<1
1,1,2,2-tetrachloroethane	1	-	-	-	<1	<1	<1
o-xylene	1	-	-	-	<1	<1	<1
1,2,3-trichloropropane	1	-	-	-	<1	<1	<1
Isopropylbenzene	1	-	-	-	<1	<1	<1
Bromobenzene	1	-	-	-	<1	<1	<1
n-propyl benzene	1	-	-	-	<1	<1	<1
2-chlorotoluene	1	-	-	-	<1	<1	<1
4-chlorotoluene	1	-	-	-	<1	<1	<1
1,3,5-trimethyl benzene	1	-	-	-	<1	<1	<1
Tert-butyl benzene	1	-	-	-	<1	<1	<1
1,2,4-trimethyl benzene	1	-	-	-	<1	<1	<1
1,3-dichlorobenzene	1	20	-	-	<1	<1	<1
Sec-butyl benzene	1	-	-	-	<1	<1	<1
1,4-dichlorobenzene	1	40	-	-	<1	<1	<1
4-isopropyl toluene	1	-	-	-	<1	<1	<1
1,2-dichlorobenzene	1	1500	-	-	<1	<1	<1
n-butyl benzene	1	-	-	-	<1	<1	<1
1,2-dibromo-3-chloropropane	1	-	-	-	<1	<1	<1
1,2,4-trichlorobenzene	1	30	-	-	<1	<1	<1
1,2,3-trichlorobenzene	1		-	-	<1	<1	<1
Hexachlorobutadiene	1	7	-	-	<1	<1	<1

Concentration above the SAC — **VALUE**
Concentration above the PQL — **Bold**
GIL >PQL — Red

TABLE G5
SUMMARY OF PFAS CONCENTRATIONS IN GROUNDWATER - ECOLOGY
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NEMP 2025 99% Freshwater	SAMPLES	
			MW201	WDUP201 (MW201)
PFAS Compound				
Perfluorobutanesulfonic acid	0.0004	NSL	**0.003**	**0.002**
Perfluoropentanesulfonic acid	0.0002	NSL	<0.001	<0.001
Perfluorohexanesulfonic acid - PFHxS	0.0002	NSL	**0.0028**	**0.0027**
Perfluoroheptanesulfonic acid	0.0002	NSL	<0.001	<0.001
Perfluorooctanesulfonic acid PFOS	0.0002	0.00023	**0.012**	**0.012**
Perfluorodecanesulfonic acid	0.002	NSL	<0.002	<0.002
Perfluorobutanoic acid	0.02	NSL	<0.02	<0.02
Perfluoropentanoic acid	0.002	NSL	**0.006**	**0.005**
Perfluorohexanoic acid	0.0004	NSL	**0.0072**	**0.0069**
Perfluoroheptanoic acid	0.0004	NSL	**0.0051**	**0.0046**
Perfluorooctanoic acid PFOA	0.0002	19	**0.0097**	**0.01**
Perfluorononanoic acid	0.001	NSL	**0.002**	**0.001**
Perfluorodecanoic acid	0.002	NSL	<0.002	<0.002
Perfluoroundecanoic acid	0.002	NSL	<0.002	<0.002
Perfluorododecanoic acid	0.005	NSL	<0.005	<0.005
Perfluorotridecanoic acid	0.01	NSL	<0.01	<0.01
Perfluorotetradecanoic acid	0.05	NSL	<0.05	<0.05
4:2 FTS	0.001	NSL	<0.001	<0.001
6:2 FTS	0.0004	NSL	**0.0006**	**0.0006**
8:2 FTS	0.0004	NSL	<0.0004	<0.0004
10:2 FTS	0.002	NSL	<0.002	<0.002
Perfluorooctane sulfonamide	0.01	NSL	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	0.05	NSL	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	0.1	NSL	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	0.05	NSL	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	0.5	NSL	<0.5	<0.5
MePerfluorooctanesulf-amid oacetic acid	0.002	NSL	<0.002	<0.002
EtPerfluorooctanesulf-amid oacetic acid	0.002	NSL	<0.002	<0.002
Total Positive PFHxS & PFOS	0.0002	NSL	**0.015**	**0.015**
Total Positive PFOS & PFOA	0.0002	NSL	**0.022**	**0.022**
Total Positive PFAS	0.0002	NSL	**0.047**	**0.046**

Positive PFAS result	**Bold**
PFAS result above the SAC	**Bold**

TABLE G6
SUMMARY OF PFAS CONCENTRATIONS IN GROUNDWATER - HUMAN HEALTH
All results in µg/L unless stated otherwise.

	PQL Envirolab Services	NEMP 2025 Recreational	SAMPLES	
			MW201	WDUP201 (MW201)
PFAS Compound				
Perfluorobutanesulfonic acid - PFBS	0.0004	NSL	**0.003**	**0.002**
Perfluoropentanesulfonic acid	0.0002	NSL	<0.001	<0.001
Perfluorohexanesulfonic acid - PFHxS	0.0002	NSL	**0.0028**	**0.0027**
Perfluoroheptanesulfonic acid	0.0002	NSL	<0.001	<0.001
Perfluorooctanesulfonic acid - PFOS	0.0002	NSL	**0.012**	**0.012**
Perfluorodecanesulfonic acid	0.002	NSL	<0.002	<0.002
Perfluorobutanoic acid	0.02	NSL	<0.02	<0.02
Perfluoropentanoic acid	0.002	NSL	**0.006**	**0.005**
Perfluorohexanoic acid	0.0004	NSL	**0.0072**	**0.0069**
Perfluoroheptanoic acid	0.0004	NSL	**0.0051**	**0.0046**
Perfluorooctanoic acid - PFOA	0.0002	10	**0.0097**	**0.01**
Perfluorononanoic acid	0.001	NSL	**0.002**	**0.001**
Perfluorodecanoic acid	0.002	NSL	<0.002	<0.002
Perfluoroundecanoic acid	0.002	NSL	<0.002	<0.002
Perfluorododecanoic acid	0.005	NSL	<0.005	<0.005
Perfluorotridecanoic acid	0.01	NSL	<0.01	<0.01
Perfluorotetradecanoic acid	0.05	NSL	<0.05	<0.05
4:2 FTS	0.001	NSL	<0.001	<0.001
6:2 FTS	0.0004	NSL	**0.0006**	**0.0006**
8:2 FTS	0.0004	NSL	<0.0004	<0.0004
10:2 FTS	0.002	NSL	<0.002	<0.002
Perfluorooctane sulfonamide	0.01	NSL	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	0.05	NSL	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	0.1	NSL	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	0.05	NSL	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	0.5	NSL	<0.5	<0.5
MePerfluorooctanesulf-amid oacetic acid	0.002	NSL	<0.002	<0.002
EtPerfluorooctanesulf-amid oacetic acid	0.002	NSL	<0.002	<0.002
Total Positive PFHxS & PFOS	0.0002	2	**0.015**	**0.015**
Total Positive PFOS & PFOA	0.0002	NSL	**0.022**	**0.022**
Total Positive PFAS	0.0002	NSL	**0.047**	**0.046**

Positive PFAS result **Bold**
PFAS result above the SAC **Bold**

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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	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			25	50	100	100	0.2	0.5	1	2	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
PQL Envirolab VIC			25	50	100	100	0.2	0.5	1	2	1	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	TP606	0-0.1	<25	<50	130	170	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.4	0.4	0.2	0.2	0.6	0.4	0.3	<0.1	0.4
laboratory	SDUP601	0-0.1	<25	<50	<100	120	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.3	0.3	0.2	0.2	0.4	0.3	0.2	<0.1	0.3
duplicate	MEAN		nc	nc	90	145	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.15	nc	0.35	0.35	0.2	0.2	0.5	0.35	0.25	nc	0.35
	RPD %		nc	nc	89%	34%	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	nc	29%	29%	0%	0%	40%	29%	40%	nc	29%
Intra	TP608	0-0.1	<25	<50	110	140	<0.2	<0.5	<1	<2	<1	<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
laboratory	SDUP602	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.2	0.08	<0.1	<0.1	0.1
duplicate	MEAN		nc	nc	80	95	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.08	0.1	nc	nc	nc	0.09	nc	nc	0.1
	RPD %		nc	nc	75%	95%	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	67%	0%	nc	nc	nc	22%	nc	nc	0%
Inter	TP609	0.3-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.2	0.09	<0.1	<0.1	<0.1
laboratory	SDUP603	0.3-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.16	0.16	<0.1	<0.1	<0.2	0.11	<0.1	<0.1	0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.13	0.13	nc	nc	nc	0.1	nc	nc	0.08
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	46%	46%	nc	nc	nc	20%	nc	nc	67%
Inter	TP607	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	1.4	1.2	0.5	0.5	1	0.72	0.4	<0.1	0.6
laboratory	SDUP604	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<0.1	<0.1	<0.1	<0.1	0.39	<0.1	1	0.93	0.37	0.48	0.97	0.53	0.5	<0.1	0.54
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.5	nc	1.2	1.07	0.44	0.49	0.99	0.63	0.45	nc	0.57
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	42%	nc	33%	25%	30%	4%	3%	30%	22%	nc	11%
Field	TB-601	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<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
Blank	21/07/25																									
Field	FR-Shovel-601	µg/L	<10	<50	<100	<100	<1	<1	<1	<2	<1	<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
Rinsate	21/07/25																									
Trip	TS-601		-	-	-	-	95%	96%	96%	97%	96%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	21/07/25																									

			HCB	alpha- BHC	gamma- BHC	beta- BHC	Heptachlor	delta- BHC	Aldrin	Heptachlor Epoxide	Gamma- Chlordane	alpha- chlordane	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	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	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Intra	TP606	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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP601	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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	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	nc	nc	nc	nc	nc
Intra	TP608	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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP602	0-0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
duplicate	MEAN		nc	nc	nc	nc	nc	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	nc	nc	nc	nc	nc
Inter	TP609	0.3-0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
laboratory	SDUP603	0.3-0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
duplicate	MEAN		nc	nc	nc	nc	nc	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	nc	nc	nc	nc	nc
Inter	TP607	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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
laboratory	SDUP604	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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	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	nc	nc	nc	nc	nc
Field	TB-601	-	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Blank	21/07/25																					
Field	FR-Shovel-601	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	21/07/25																					
Trip	TS-601		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	21/07/25																					

			Azinphos-methyl (Guthion)	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
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	4	0.4	1	1	1	0.1	1	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	4	0.4	1	1	1	0.1	1	1
Intra	TP606	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	<4	<0.4	15	46	120	<0.1	11	68
laboratory	SDUP601	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	<4	1	13	42	33	<0.1	13	51
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.6	14	44	76.5	nc	12	59.5
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	133%	14%	9%	114%	nc	17%	29%
Intra	TP608	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	<4	<0.4	20	22	16	<0.1	29	36
laboratory	SDUP602	0-0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<4	<0.4	21	20	11	<0.1	26	34
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	20.5	21	13.5	nc	27.5	35
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	5%	10%	37%	nc	11%	6%
Inter	TP609	0.3-0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<4	<0.4	11	23	17	<0.1	9	36
laboratory	SDUP603	0.3-0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.4	<0.4	16	23	17	<0.1	16	50
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	4.7	nc	13.5	23	17	nc	12.5	43
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	115%	nc	37%	0%	0%	nc	56%	33%
Inter	TP607	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	6	<0.4	17	26	28	0.1	17	56
laboratory	SDUP604	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	NA	5.5	<0.4	20	25	29	<0.1	18	51
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	5.75	nc	18.5	25.5	28.5	0.08	17.5	53.5
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	9%	nc	16%	4%	4%	67%	6%	9%
Field	TB-601	-	<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	<4	<0.4	3	<1	4	<0.1	<1	3
Blank	21/07/25																						
Field	FR-Shovel-601	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.05	<0.01	<0.01	0.3	<0.03	<0.000	<0.02	0.08
Rinsate	21/07/25																						
Trip	TS-601		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	21/07/25																						

Result outside of QA/QC acceptance criteria

Rinsate metals results in mg/L

TABLE Q2
GROUNDWATER QA/QC SUMMARY

		Dichlorodifluoromethane	Chloromethane	Vinyl Chloride	Bromomethane	Chloroethane	Trichlorofluoromethane	1,1-Dichloroethene	Trans-1,2-dichloroethene	1,1-dichloroethane	Cis-1,2-dichloroethene	Bromochloromethane	Chloroform	2,2-dichloropropane	1,2-dichloroethane	1,1,1-trichloroethane	1,1-dichloropropene	Cyclohexane	Carbon tetrachloride	Benzene	Dibromomethane	1,2-dichloropropane	Trichloroethene	Bromodichloromethane	trans-1,3-dichloropropene	cis-1,3-dichloropropene	1,1,2-trichloroethane	Toluene	1,3-dichloropropane	Dibromochloromethane
	PQL Envirolab SYD	*10*	*10*	*10*	*10*	*10*	*10*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
	PQL Envirolab VIC	*10*	*10*	*10*	*10*	*10*	*10*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Intra	MW201	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP201 (MW201)	<10	<10	<10	<10	<10	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	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	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field	TB-201	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blank	4/08/2025																													
Field	FR-DIP-201	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rinsate	4/08/2025																													

		1,2-dibromoethane	Tetrachloroethene	1,1,1,2-tetrachloroethane	Chlorobenzene	Ethylbenzene	Bromoform	m+p-xylene	Styrene	1,1,2,2-tetrachloroethane	o-xylene	1,2,3-trichloropropane	Isopropylbenzene	Bromobenzene	n-propyl benzene	2-chlorotoluene	4-chlorotoluene	1,3,5-trimethyl benzene	Tert-butyl benzene	1,2,4-trimethyl benzene	1,3-dichlorobenzene	Sec-butyl benzene	1,4-dichlorobenzene	4-isopropyl toluene	1,2-dichlorobenzene	n-butyl benzene	1,2-dibromo-3-chloropropane	1,2,4-trichlorobenzene	Hexachlorobutadiene	1,2,3-trichlorobenzene
	PQL Envirolab SYD	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
	PQL Envirolab VIC	*1*	*1*	*1*	*1*	*1*	*1*	*2*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Intra	MW201	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
laboratory	WDUP201 (MW201)	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	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	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field	TB-201	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Blank	4/08/2025																													
Field	FR-DIP-201	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rinsate	4/08/2025																													

		TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	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	Total PCBS	Arsenic	Cadmium	Chromium VI	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD	*10*	*50*	*100*	*100*	*1*	*1*	*1*	*2*	*1*	*0.2*	*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*	*0.01*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*
	PQL Envirolab VIC	*10*	*50*	*100*	*100*	*1*	*1*	*1*	*2*	*1*	*0.2*	*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*	*0.01*	*1*	*0.1*	*1*	*1*	*1*	*0.05*	*1*	*1*
Intra	MW201	<10	<50	<100	<100	<1	<1	<1	<2	<1	<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	NA	<1	<0.1	55	4	<1	<0.05	2	14
laboratory	WDUP201 (MW201)	<10	<50	<100	<100	<1	<1	<1	<2	<1	<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	NA	<1	<0.1	49	4	<1	<0.05	2	13
duplicate	MEAN	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	52	4	nc	nc	2	13.5
	RPD %	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	12%	0%	nc	nc	0%	7%
Field	TB-201	<10	<50	<100	<100	<1	<1	<1	<2	<1	<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	0	<1	<0.1	<1	<1	<1	<0.05	<1	<1
Blank	4/08/2025																																	
Field	FR-DIP-201	<10	180	<100	<100	<1	<1	<1	<2	<1	<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	0	<1	<0.1	<1	2	<1	<0.05	<1	6
Rinsate	4/08/2025																																	
Trip	TS-201	-	-	-	-	104%	101%	102%	97%	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Spike	4/08/2025																																	

Result outside of QA/QC acceptance criteria Value

TABLE Q3
SUMMARY OF PFAS FIELD QA/QC IN GROUNDWATER
Units are µg/L unless stated otherwise.

		Perfluorobutanesulfonic acid	Perfluoropentanesulfonic acid	Perfluorohexanesulfonic acid - PFHxS	Perfluoroheptanesulfonic acid	Perfluorooctanesulfonic acid PFOS	Perfluorodecanesulfonic acid	Perfluorobutanoic acid	Perfluoropentanoic acid	Perfluorohexanoic acid	Perfluoroheptanoic acid	Perfluorooctanoic acid PFOA	Perfluorononanoic acid	Perfluorodecanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	4:2 FTS	6:2 FTS	8:2 FTS	10:2 FTS	Perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctanesulfon amide	N-Me perfluorooctanesulfonamid oethanol	N-Et perfluorooctanesulfonamid oethanol	MePerfluorooctanesulf-amid oacetic acid	EtPerfluorooctanesulf-amid oacetic acid	Total Positive PFHxS & PFOS	Total Positive PFOS & PFOA	Total Positive PFAS
PQL Envirolab		*0.0004*	*0.001*	*0.0002*	*0.001*	*0.0002*	*0.002*	*0.02*	*0.002*	*0.0004*	*0.0004*	*0.0002*	*0.001*	*0.002*	*0.002*	*0.005*	*0.01*	*0.05*	*0.001*	*0.0004*	*0.0004*	*0.002*	*0.01*	*0.05*	*0.1*	*0.05*	*0.5*	*0.002*	*0.002*	*0.0002*	*0.0002*	*0.0002*
Intra laboratory duplicate	MW201	0.003	<0.001	0.0028	<0.001	0.012	<0.002	<0.02	0.006	0.0072	0.0051	0.0097	0.002	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	0.0006	<0.0004	<0.002	<0.01	<0.05	<0.1	<0.05	<0.5	<0.002	<0.002	0.015	0.022	0.047
	WDUP201	0.002	<0.001	0.0027	<0.001	0.012	<0.002	<0.02	0.005	0.0069	0.0046	0.01	0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	0.0006	<0.0004	<0.002	<0.01	<0.05	<0.1	<0.05	<0.5	<0.002	<0.002	0.015	0.022	0.046
	MEAN	0.0025	nc	0.00275	nc	0.012	nc	nc	0.0055	0.00705	0.00485	0.00985	0.0015	nc	nc	nc	nc	nc	nc	0.0006	nc	nc	nc	nc	nc	nc	nc	nc	nc	0.015	0.022	0.0465
	RPD %	40%	nc	4%	nc	0%	nc	nc	18%	4%	10%	3%	67%	nc	nc	nc	nc	nc	nc	0%	nc	nc	nc	nc	nc	nc	nc	nc	nc	0%	0%	2%
Field Blank	TB-201 4/08/2025	<0.0004	-	<0.0002	-	<0.0002	-	-	-	-	-	<0.0002	-	-	-	-	-	-	-	<0.0004	<0.0004	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002
Field Rinsate	FR-DIP-201 4/08/2025	<0.0004	-	<0.0002	-	<0.0002	-	-	-	-	-	<0.0002	-	-	-	-	-	-	-	<0.0004	<0.0004	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002

Result outside of QA/QC acceptance criteria Value

Appendix C: Borehole and Testpit Logs

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BOREHOLE LOG

Borehole No. 201

1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED ROUSE HILL HOSPITAL

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No.: 37756LF **Method:** SPIRAL AUGER **R.L. Surface:** 58.60 m

Date: 28/7/25 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** S.W./O.F.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty clay, medium plasticity, brown, trace of fine to medium grained igneous, sandstone and ironstone gravel.	w~PL			GRASS COVER
					N = 16 9,8,8	58	1		CI	Silty CLAY: medium plasticity, red brown, trace of fine to medium grained ironstone gravel.	w~PL	Hd	>600 >600 >600	RESIDUAL
						57			-	SILTSTONE: dark grey and brown.	DW	L / M		ASHFIELD SHALE LOW 'TC' BIT RESISTANCE MODERATE RESISTANCE HIGH RESISTANCE
							2			END OF BOREHOLE AT 1.80 m				'TC' BIT REFUSAL ON HIGH STRENGTH BEDROCK GROUNDWATER MONITORING WELL INSTALLED TO 1.8m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 0.5m TO 1.8m. CASING 0.75m ABOVE SURFACE TO 0.5m DEPTH. 2mm SAND FILTER PACK 0.3m TO 1.8m. BENTONITE SEAL 0.1m TO 0.3m. CONCRETED AT SURFACE.
						56	3							
						55	4							
						54	5							
						53	6							
						52								

JKGeotechnics

BOREHOLE LOG

Borehole No. 202 1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED ROUSE HILL HOSPITAL

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No.: 37756LF **Method:** SPIRAL AUGER **R.L. Surface:** 56.95 m

Date: 28/7/25 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** S.W./O.F.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										ASPHALTIC CONCRETE: 300mm.t				
									-	FILL: Silty gravelly sand, fine to coarse grained, yellow brown, fine to coarse grained sandstone gravel, trace of clay.	M			
					N=SPT 18/ 150mm REFUSAL				-	SILTSTONE: grey and brown.	DW	VL		ASHFIELD SHALE
						56	1					M		MODERATE 'TC' BIT RESISTANCE
						55	2			END OF BOREHOLE AT 1.80 m				'TC' BIT REFUSAL ON HIGH STRENGTH BEDROCK
						54	3							
						53	4							
						52	5							
						51	6							
						50								

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BOREHOLE LOG

Borehole No. 203 1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED ROUSE HILL HOSPITAL

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No.: 37756LF **Method:** SPIRAL AUGER **R.L. Surface:** 56.81 m

Date: 28/7/25 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** S.W./O.F.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION										FILL: Silty gravelly sand, fine to coarse grained, yellow brown, fine to coarse grained sandstone gravel, trace of clay.	M			GRASS COVER
									CI	Silty CLAY: medium plasticity, red brown and light grey, trace of fine to medium grained ironstone gravel.	w~PL	Hd		RESIDUAL
					N = 24 7,11,13	56	1		-	Extremely Weathered siltstone: silty CLAY, medium plasticity, orange brown and light grey, with very low strength siltstone bands.	XW	Hd	540 520 >600	ASHFIELD SHALE
											DW	VL		VERY LOW 'TC' BIT RESISTANCE
										SILTSTONE: grey and brown.		L - M		LOW TO MODERATE RESISTANCE
						55	2			SILTSTONE: dark grey.	SW	M - H		MODERATE TO HIGH RESISTANCE
										END OF BOREHOLE AT 2.20 m				'TC' BIT REFUSAL ON HIGH STRENGTH BEDROCK GROUNDWATER MONITORING WELL INSTALLED TO 2.2m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 0.7m TO 2.2m. CASING 1.1m ABOVE SURFACE TO 0.7m DEPTH. 2mm SAND FILTER PACK 0.5m TO 2.2m. BENTONITE SEAL 0.1m TO 0.5m. CONCRETED AT SURFACE.
						54	3							
						53	4							
						52	5							
						51	6							
						50								

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BOREHOLE LOG

Borehole No. 204

1 / 1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED ROUSE HILL HOSPITAL

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No.: 37756LF **Method:** SPIRAL AUGER **R.L. Surface:** 55.40 m

Date: 28/7/25 **Datum:** AHD

Plant Type: JK400 **Logged/Checked By:** S.W./O.F.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	RL (m AHD)	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel Density	Hand Penetrometer Readings (kPa)	Remarks
DRY ON COMPLETION						55				FILL: Silty gravelly sand, fine to medium grained, brown, fine to coarse grained igneous gravel, trace of asphaltic concrete and concrete fragments.	D			
									CI		w~PL	Hd		RESIDUAL
					N = 21 10,9,12					Silty CLAY: medium plasticity, red brown and light grey, trace of fine to medium grained ironstone gravel.			550 580 >600	
							1		-	SILTSTONE: grey and orange brown, with extremely weathered bands.	DW	VL		ASHFIELD SHALE VERY LOW 'TC' BIT RESISTANCE
						54				SILTSTONE: dark grey.		L		LOW TO MODERATE RESISTANCE
												M - H		MODERATE TO HIGH RESISTANCE
							2			END OF BOREHOLE AT 2.00 m				'TC' BIT REFUSAL ON HIGH STRENGTH BEDROCK GROUNDWATER MONITORING WELL INSTALLED TO 2.0m. CLASS 18 MACHINE SLOTTED 50mm DIA. PVC STANDPIPE 0.0m TO 2.0m. CASING 0.8m ABOVE SURFACE TO 0.0m DEPTH. 2mm SAND FILTER PACK 0.2m TO 2.0m. BENTONITE SEAL 0.0m TO 0.2m. CONCRETED AT SURFACE.
						53	3							
						52	4							
						51	5							
						50	6							
						49								

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP601** **1/1**

Client: NSW HEALTH INFRASTRUCTURE

Project: DETAILED SITE INVESTIGATION

Location: CORNER OF WINDSOR ROAD AND COMMERICAL ROAD, ROUSE HILL, NSW

Job No.: E37757B **Method:** TEST PIT **R.L. Surface:** 58.57m

Date: 21/7/25 **Datum:** AHD

Plant Type: JKX **Logged/Checked by:** V.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	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, dark brown, with root fibres, trace of ironstone gravel, plastic and concrete fragments.	w<PL			GRASS COVER
									CI-CH	FILL: Silty clay, medium to high plasticity, light grey and light brown, with ironstone and igneous gravel, trace of plastic fragments.	w<PL			SCREEN: 10.20kg 0-0.1m, NO FCF
							0.5			Silty CLAY: medium to high plasticity, red brown mottled light grey, trace of ironstone gravel.				INSUFFICIENT RETURN FOR BULK SCREEN
	■		■											RESIDUAL
										END OF TEST PIT AT 0.8m				
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP602 **1/1**

Client: NSW HEALTH INFRASTRUCTURE

Project: DETAILED SITE INVESTIGATION

Location: CORNER OF WINDSOR ROAD AND COMMERICAL ROAD, ROUSE HILL, NSW

Job No.: E37757B **Method:** TEST PIT **R.L. Surface:** 58.29m

Date: 22/7/25 **Datum:** AHD

Plant Type: JKX **Logged/Checked by:** V.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	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, brown, with root fibres, trace of ironstone and igneous gravel.	w<PL			GRASS COVER SCREEN: 10.10kg 0-0.1m, NO FCF
										FILL: Sandy clay, medium plasticity, light brown, with igneous and ironstone gravel, trace of concrete fragments and slag.				SCREEN: 10.40kg 0.1-0.4m, NO FCF
							0.5			FILL: Silty clay, medium plasticity, brown, with igneous and ironstone gravel, trace of asphaltic concrete, plastic, metal and concrete fragments, and geofabric.	w≈PL			SCREEN: 11.40kg 0.4-0.9m, NO FCF
							1							SCREEN: 10.40kg 0.9-1.4m, NO FCF
							1.5							SCREEN: 10.10kg 1.4-1.8m, NO FCF
									CI	Silty CLAY: medium plasticity, light grey mottled orange brown, with siltstone and ironstone gravel, and root fibres.	w<PL			RESIDUAL
							2		-		XW			
										Extremely Weathered siltstone: silty CLAY, low to medium plasticity, light grey and red brown, with siltstone and ironstone gravel.				
										END OF TEST PIT AT 2.1m				
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP603** **1/1**

Client: NSW HEALTH INFRASTRUCTURE

Project: DETAILED SITE INVESTIGATION

Location: CORNER OF WINDSOR ROAD AND COMMERICAL ROAD, ROUSE HILL, NSW

Job No.: E37757B **Method:** TEST PIT **R.L. Surface:** 58.22m

Date: 21/7/25 **Datum:** AHD

Plant Type: JKX **Logged/Checked by:** V.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	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 clayey sand, fine to medium grained, brown, with igneous and ironstone gravel, and root fibres, trace of plastic fragments.	D			GRASS COVER SCREEN: 10.15kg 0-0.1m, NO FCF
										FILL: Gravelly sand, fine to medium grained, brown, with ironstone, igneous and sandstone gravel, trace of slag and root fibres.				SCREEN: 11.65kg 0.1-0.3m, NO FCF
							0.5			as above,				SCREEN: 12.95kg 0.3-0.6m, NO FCF
									CI-CH	but yellow brown, with ironstone, igneous and sandstone gravel, trace of plastic fragments.	w<PL			RESIDUAL
	■		■				1			Silty CLAY: medium to high plasticity, red brown mottled light grey, trace of ironstone gravel and root fibres.				
										END OF TEST PIT AT 1.0m				
							1.5							
							2							
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP604** **1/1**

Client: NSW HEALTH INFRASTRUCTURE

Project: DETAILED SITE INVESTIGATION

Location: CORNER OF WINDSOR ROAD AND COMMERICAL ROAD, ROUSE HILL, NSW

Job No.: E37757B **Method:** TEST PIT **R.L. Surface:** 57.43m

Date: 22/7/25 **Datum:** AHD

Plant Type: JKX **Logged/Checked by:** V.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	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, light brown, with ironstone and igneous gravel, slag and root fibres, trace of plastic and concrete fragments.	w<PL			GRASS COVER / ASPHALTIC CONCRETE
										FILL: Asphaltic concrete and concrete, with ironstone and igneous gravel, and slag.				SCREEN: 10.55kg 0-0.1m, NO FCF
	■		■				0.5		CI-CH	Silty CLAY: medium to high plasticity, red brown mottled light grey, trace of ironstone gravel.	w<PL			SCREEN: 10.30kg 0.1-0.2m, NO FCF
														INSUFFICIENT RETURN FOR BULK SCREEN
														RESIDUAL
							1			END OF TEST PIT AT 1.0m				
							1.5							
							2							
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP605** **1/1**

Client: NSW HEALTH INFRASTRUCTURE

Project: DETAILED SITE INVESTIGATION

Location: CORNER OF WINDSOR ROAD AND COMMERICAL ROAD, ROUSE HILL, NSW

Job No.: E37757B **Method:** TEST PIT **R.L. Surface:** 57.31m

Date: 22/7/25 **Datum:** AHD

Plant Type: JKX **Logged/Checked by:** V.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	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 gravelly sand, medium to coarse grained, light brown and yellow brown, with igneous and ironstone gravel, and concrete fragments, trace of terracotta tile and ceramic fragments.	D			ASPHALTIC CONCRETE / ROAD BASE COVER
									CI-CH	as above, but with ironstone and sandstone gravel, trace of igneous gravel.	w<PL			SCREEN: 11.85kg 0-0.1m, NO FCF
	■	■	■		■		0.5			Silty CLAY: medium to high plasticity, red brown mottled light grey, trace of ironstone gravel.				SCREEN: 10.40kg 0.1-0.3m, NO FCF
														RESIDUAL
							1			END OF TEST PIT AT 0.9m				
							1.5							
							2							
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP606 1/1

SDUP601: 0-0.1m

Client: NSW HEALTH INFRASTRUCTURE

Project: DETAILED SITE INVESTIGATION

Location: CORNER OF WINDSOR ROAD AND COMMERICAL ROAD, ROUSE HILL, NSW

Job No.: E37757B **Method:** TEST PIT **R.L. Surface:** 56.93m

Date: 21/7/25 **Datum:** AHD

Plant Type: JKX **Logged/Checked by:** V.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	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 gravelly sand, fine to medium grained, light brown, with igneous and ironstone gravel, trace of glass and metal fragments.	D			ASPHALTIC CONCRETE / ROAD BASE COVER
	■	■	■		■					FILL: Sandy gravel, coarse grained, igneous, dark brown, fine to medium grained sand.				SCREEN: 12.95kg 0-0.1m, NO FCF
	■	■	■				0.5		CI-CH	FILL: Sand, fine to coarse grained, yellow brown, trace of sandstone gravel.	w<PL			BALLAST
									-	Silty CLAY: medium to high plasticity, red brown mottled grey, with fine to medium grained sand, trace of ironstone gravel.	XW			SCREEN: 12.05kg 0.2-0.35m, NO FCF
	■	■												INSUFFICIENT RETURN FOR BULK SCREEN
							1			Extremely Weathered siltstone: silty CLAY, low to medium plasticity, light grey and red brown, trace of ash.				RESIDUAL
										END OF TEST PIT AT 0.9m				
							1.5							
							2							
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP607 **1/1**

SDUP604: 0-0.1m

Client: NSW HEALTH INFRASTRUCTURE

Project: DETAILED SITE INVESTIGATION

Location: CORNER OF WINDSOR ROAD AND COMMERICAL ROAD, ROUSE HILL, NSW

Job No.: E37757B **Method:** TEST PIT **R.L. Surface:** 56.59m

Date: 21/7/25 **Datum:** AHD

Plant Type: JKX **Logged/Checked by:** V.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	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, brown, with igneous and ironstone gravel, and root fibres.	w<PL			GRASS COVER
	■		■							FILL: Sand, fine to medium grained, yellow brown.	D			SCREEN: 10.25kg 0-0.1m, NO FCF
					■		0.5		CI-CH	Silty CLAY: medium to high plasticity, red brown, trace of ironstone and siltstone gravel.	w<PL			SCREEN: 11.30kg 0.15-0.3m, NO FCF
	■		■											RESIDUAL
										END OF TEST PIT AT 0.8m				
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. TP608 1/1

SDUP602: 0-0.1m

Client: NSW HEALTH INFRASTRUCTURE

Project: DETAILED SITE INVESTIGATION

Location: CORNER OF WINDSOR ROAD AND COMMERICAL ROAD, ROUSE HILL, NSW

Job No.: E37757B **Method:** TEST PIT **R.L. Surface:** 56.21m

Date: 21/7/25 **Datum:** AHD

Plant Type: JKX **Logged/Checked by:** V.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	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 gravelly sand, fine to medium grained, light brown, with igneous and ironstone gravel, trace of ceramic and concrete fragments, and root fibres.	D			ASPHALTIC CONCRETE / ROAD BASE COVER SCREEN: 10.55kg 0-0.1m, NO FCF
	■	■	■	■	■					FILL: Sandy gravel, fine to coarse grained, igneous, dark brown, with fine to medium grained sand.				SCREEN: 12.70kg 0.2-0.4m, NO FCF
	■	■	■	■	■		0.5		-	FILL: Sand, fine to medium grained, yellow brown, trace of ironstone and sandstone gravel.	XW			SCREEN: 13.00kg 0.4-0.5m, NO FCF
										Extremely Weathered siltstone: silty CLAY, low to medium plasticity, light grey mottled red brown, with ironstone gravel.				
							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. TP609 **1/1**

SDUP603: 0.3-0.4m

Client: NSW HEALTH INFRASTRUCTURE

Project: DETAILED SITE INVESTIGATION

Location: CORNER OF WINDSOR ROAD AND COMMERICAL ROAD, ROUSE HILL, NSW

Job No.: E37757B **Method:** TEST PIT **R.L. Surface:** 55.76m

Date: 21/7/25 **Datum:** AHD

Plant Type: JKX **Logged/Checked by:** V.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	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 clayey sand, fine to medium grained, light brown, igneous and ironstone gravel, trace of sandstone gravel, roots and root fibres.	D			GRASS COVER SCREEN: 11.60kg 0-0.1m, NO FCF
	■		■							FILL: Silty sandy clay, medium to high plasticity, brown, with fine to medium grained sand, and igneous and ironstone gravel.	w<PL			SCREEN: 10.10kg 0.2-0.5m, NO FCF
	■		■				0.5		CI-CH	Silty CLAY: medium to high plasticity, red brown mottled light grey, trace of ironstone and siltstone gravel, and slag.	w<PL			RESIDUAL
										END OF TEST PIT AT 0.8m				
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP610** **1/1**

Client: NSW HEALTH INFRASTRUCTURE

Project: DETAILED SITE INVESTIGATION

Location: CORNER OF WINDSOR ROAD AND COMMERICAL ROAD, ROUSE HILL, NSW

Job No.: E37757B **Method:** TEST PIT **R.L. Surface:** 55.64m

Date: 21/7/25 **Datum:** AHD

Plant Type: JKX **Logged/Checked by:** V.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	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 gravelly sand, fine to medium grained, light brown, with igneous and ironstone gravel, and concrete fragments, trace of metal fragments and root fibres.	D			ASPHALTIC CONCRETE / ROAD BASE COVER
											w<PL			SCREEN: 10.35kg 0-0.1m, NO FCF
	■		■		■					FILL: Silty sandy clay, medium to high plasticity, brown, with fine to medium grained sand.				SCREEN: 10.10kg 0.2-0.5m, NO FCF
							0.5				D			
	■		■						CI-CH	FILL: Sand, fine to medium grained, yellow brown, trace of sandstone gravel.	w<PL			INSUFFICIENT RETURN FOR BULK SCREEN
										Silty CLAY: medium to high plasticity, red brown, trace of ironstone gravel and root fibres.				RESIDUAL
									-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, light grey mottled red brown, trace of ironstone gravel.	XW			
							1			END OF TEST PIT AT 1.0m				
							1.5							
							2							
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. **TP611** **1/1**

Client: NSW HEALTH INFRASTRUCTURE

Project: DETAILED SITE INVESTIGATION

Location: CORNER OF WINDSOR ROAD AND COMMERICAL ROAD, ROUSE HILL, NSW

Job No.: E37757B **Method:** TEST PIT **R.L. Surface:** 55.03m

Date: 21/7/25 **Datum:** AHD

Plant Type: JKX **Logged/Checked by:** V.R./V.B.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES PFAS	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 gravelly sand, fine to medium grained, brown, with ironstone and igneous gravel, trace of metal, concrete and ceramic fragments and root fibres.	D			GRASS COVER / ASPHALTIC CONCRETE
	■		■							FILL: Sandy gravel, fine to coarse grained, dark brown, with igneous gravel and fine to medium grained sand, trace of concrete fragments and slag.				SCREEN: 11.40kg 0-0.1m, NO FCF
	■		■		■		0.5		CI-CH	FILL: Sand, fine to coarse grained, yellow brown, trace of sandstone gravel.	w<PL			SCREEN: 14.20kg 0.2-0.4m, NO FCF
										Silty CLAY: medium to high plasticity, red brown mottled light grey, trace of ironstone gravel and ash.				INSUFFICIENT RETURN FOR BULK SCREEN
							1			END OF TEST PIT AT 1.0m				RESIDUAL
							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:

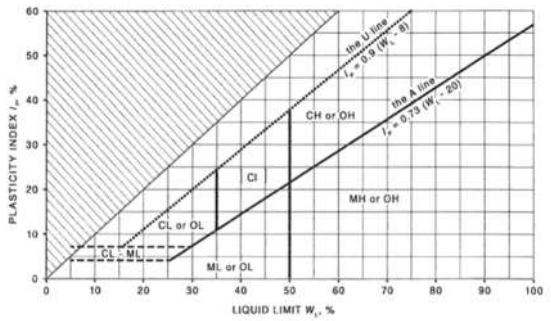
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

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 PID = 100	Vane shear reading in kPa of undrained shear strength. Photoionisation detector reading in ppm (soil sample headspace test).
Moisture Condition (Fine Grained Soils)	w > PL $w \approx$ PL w < PL $w \approx$ LL w > LL	Moisture content estimated to be greater than plastic limit. Moisture content estimated to be approximately equal to plastic limit. Moisture content estimated to be less than plastic limit. Moisture content estimated to be near liquid limit. Moisture content estimated to be wet of liquid limit.
(Coarse Grained Soils)	D M W	DRY – runs freely through fingers. MOIST – does not run freely but no free water visible on soil surface. WET – free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS S F St VSt Hd Fr ( )	VERY SOFT – unconfined compressive strength ≤ 25kPa. SOFT – unconfined compressive strength > 25kPa and ≤ 50kPa. FIRM – unconfined compressive strength > 50kPa and ≤ 100kPa. STIFF – unconfined compressive strength > 100kPa and ≤ 200kPa. VERY STIFF – unconfined compressive strength > 200kPa and ≤ 400kPa. HARD – unconfined compressive strength > 400kPa. FRIABLE – strength not attainable, soil crumbles. Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.
Density Index/ Relative Density (Cohesionless Soils)	VL L MD D VD ( )	**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)** VERY LOOSE ≤ 15 / 0 – 4 LOOSE > 15 and ≤ 35 / 4 – 10 MEDIUM DENSE > 35 and ≤ 65 / 10 – 30 DENSE > 65 and ≤ 85 / 30 – 50 VERY DENSE > 85 / > 50 Bracketed symbol indicates estimated density based on ease of drilling or other assessment.

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

Classification of Material Weathering

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

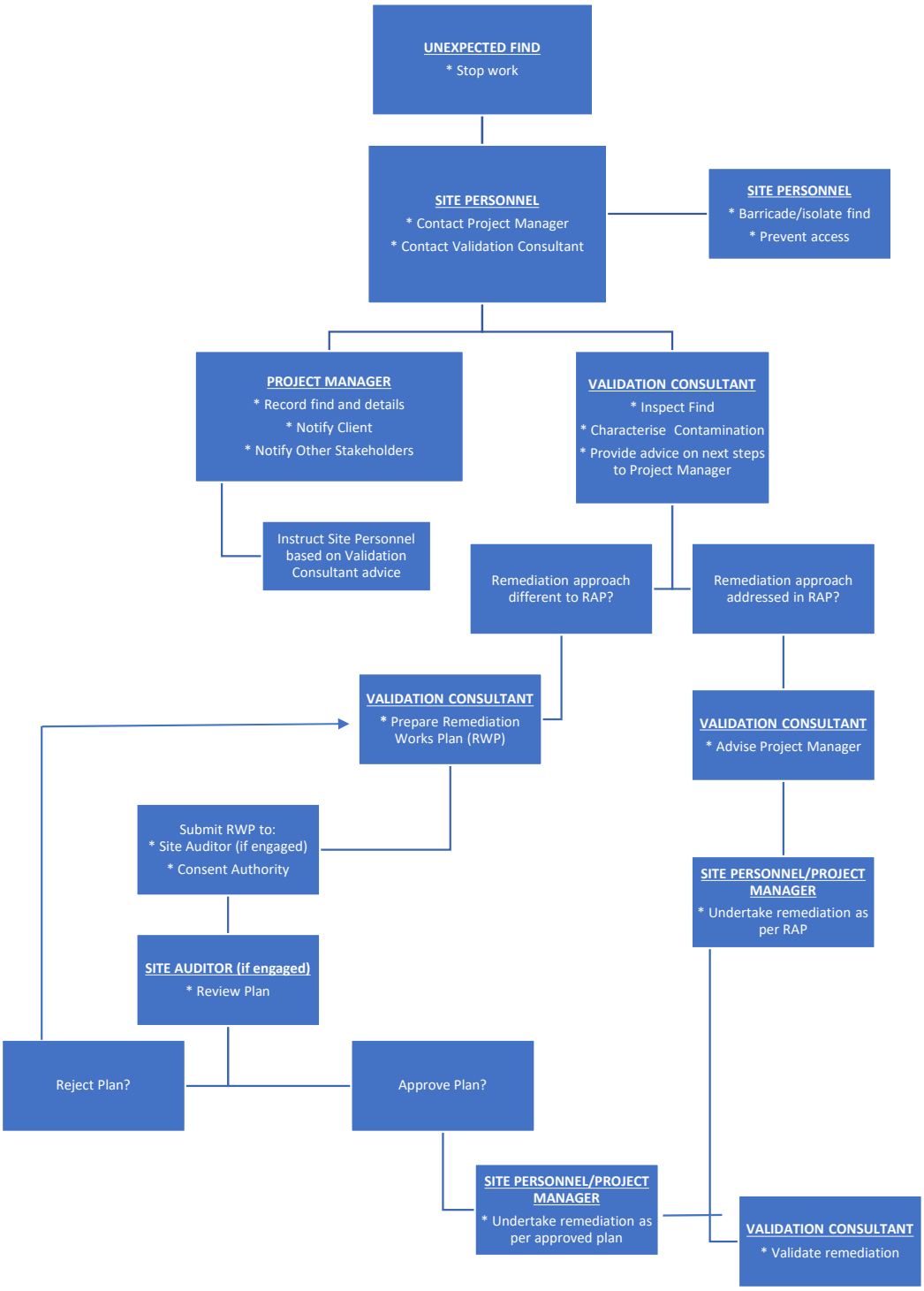
NOTE 1: The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: *'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining.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

Rock Material Strength Classification

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

Appendix D: UFP Flow Chart

UNEXPECTED FINDS PROTOCOL FLOW-CHART



Appendix E: Example Waste and Imported Materials Registers

Offsite Disposal

Waste Classification Report/ Letter			Source Area Matches Area in Classification Letter/ Report?	Stockpile [2]					Material Observations		Treatments [7]				Statistics [7]	
Reference	Classification Under Letter[1]	Volume Classified Under Letter (m^3)		ID	Volume	Temporary Storage Area/ Reference	Volume (m^3)	Bulking Factor Used	Description	Evidence of Contamination	Treatment Details	Post-Treatment	Post Treatment Sampling	Post Treatment Classification [1]	Type	Results

[1] After NSW EPA Waste Classification Guidelines/ The excavated natural material order 2014 / Meets POEO VENM Definition / other

[2] If material was excavated and stockpiled post classification

[3] Samples must include those collected specifically for waste classification purposes and samples collected from the source area for purposes other than waste classification

[4] Keep Units Consistant

[5] If volume on docket is different to volume on Waste Classification Letter

[6] If one is available

[7] If undertaken

Disposal						
Receiving Facility	Receiving Facility Licence Numbr	Disposal Docket Reference	Quantity on Docket (m^3/ tonnes) [4]	Bulking Factor [5]	Consignment Note Reference [6]	Running Total Under the Waste Classification Letter (m3/ tonnes) [4]

Appendix F: Report References

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