REPORT TO

BARKER COLLEGE

C/- EPM PROJECTS PTY LTD

ON

PRELIMINARY (STAGE 1) SITE INVESTIGATION

FOR

PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

AT

91 PACIFIC HIGHWAY, HORNSBY, NSW

Date: 18 August 2022

Ref: E34849BTrpt2.rev2

JKEnvironments

www.jkenvironments.com.au

T: +61 2 9888 5000

JK Environments Pty Ltd

ABN 90 633 911 403

Report prepared by:

Katrina Taylor
Associate | Environmental Scientist

Report reviewed and revised by:

Vittal Boggaram
Principal Associate | Environmental Scientist

For and on behalf of
JKE
PO BOX 976
NORTH RYDE BC NSW 1670

DOCUMENT REVISION RECORD

Report Reference	Report Status	Report Date
E34849BTrpt2	Final Report	3 June 2022
E34849BTrpt2.rev1	Revised Report	19 July 2022
E34849BTrpt2.rev2	Revised Report	18 August 2022

Executive Summary

Barker College ('the client') commissioned JK Environments (JKE) to undertake a Preliminary (Stage 1) Site Investigation (PSI) for the proposed alterations and additions to college campus at Barker College, 91 Pacific Highway, Hornsby, NSW. The purpose of the PSI is to make a preliminary assessment of inground site contamination. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2 attached in the appendices.

This report has been prepared with reference to Chapter 4 and Clause 4.6 of State Environmental Planning Policy (SEPP Resilience and Hazards) 2021 (formerly known as SEPP55) to support the lodgement of a State Significant Development Application (SSDA) for the proposed development. In accordance with section 4.39 of the Environmental Planning & Assessment Act 1979 (EP&A Act), the Secretary's Environmental Assessment Requirements (SEARs) for SSD-31822612 was issued on 15 December 2021.

JKE have previously undertaken a desktop PSI for the proposed development and within the wider college campus. JKE has also completed a Preliminary Contamination and Waste Classification Screening at the Barker College Junior School tennis courts, and a Preliminary Desktop Site Assessment and Preliminary Intrusive Investigation for the proposed cafeteria and administration building within the wider college property. Relevant information and results are summarised in Section 2.

JKE understand that the development is currently in the concept stage, however it is understood to include, demolition of school buildings; a new performing arts and exam centre with basement carpark; aquatic and tennis centre with basement carpark; maintenance shed and associate carpark; upgraded campus infrastructure facilities; comprehensive landscape strategy; and increased capacity of the school population. In addition, Stage 1 of the development includes: upgraded campus infrastructure including a new elevated walkway and pedestrian paths; improvements to the Chapel Drive pick-up and drop-off area; and landscaping works along The Avenue. Selected development plans issued to JKE are attached in the appendices.

The primary aims of the investigation were to make a preliminary assessment of the soil contamination conditions. The objectives were to:

- Assess the current site conditions and use(s) via a site walkover inspection;
- Assess the soil contamination conditions via implementation of a preliminary sampling and analysis program;
- Review and update the conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- 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 existing JKE project information;
- Review and update of the 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.

Soil sampling was undertaken from 17 boreholes across the site as shown on Figure 3. The boreholes generally encountered fill material to depths ranging from approximately 0.15mBGL to 0.7mBGL, with several boreholes terminated in the fill at a maximum depth of approximately 0.45m. The fill typically comprised silty sandy clay with inclusions of ironstone, sandstone, igneous and quartz gravel, building rubble (plastic, ceramic, glass metal and concrete fragments), ash, root fibres and organic matter.

A selection of soil samples was analysed for the Contaminants of Potential Concern (CoPC) identified in the CSM. Carcinogenic PAH were detected in fill above the health based criteria in one location. JKE also note that building rubble was encountered in fill material at several locations, asbestos has previously been encountered in fill material on the

wider College Campus and in close proximity to the site, and sampling was undertaken from boreholes which poses limitation for identifying asbestos in fill.

The PSI did not identify contamination that would preclude the proposed development of the site. However, a Detailed Site Investigation (DSI) is required to characterise the extent of contamination and risks posed by the carcinogenic PAH and other AEC in order to inform site remediation. Due to the staged nature of the development, JKE are of the opinion that the DSI can be staged and conditioned as part of the concept stage approval process.

Based on the results of the PSI, JKE recommend the following:

1. Undertake a DSI to better assess the extent of contamination. A Sampling Analysis Quality Plan (SAQP) is to be prepared prior to commencement of the DSI;
2. Develop and implement a Remediation Action Plan (RAP), utilising the PSI and DSI datasets;
3. A hazardous building materials survey is undertaken to confirm the presence of any hazardous building materials (i.e. asbestos) prior to demolition of the existing buildings and structures within the site. Where hazardous building materials are identified, and following removal, a clearance certificate should be provided to reduce the risk of potential contamination from poor demolition practices; and
4. Prepare a site validation assessment report for the remediation works undertaken at the site.

It is acknowledged that the current site use and existing buildings/structures are likely to limit the scope of the DSI. A staged approach could be considered for the DSI in the event that sampling cannot be undertaken to the extent required. However, the client must accept that this may result in uncertainty regarding the nature and extent of remediation. The RAP would need to outline the requirements to address this uncertainty via a robust post-demolition data gap investigation (DGI) procedure.

At this stage, JKE consider that there is currently no requirement to report any site contamination to the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015). This will be further evaluated as part of the DSI.

The conclusions and recommendations should be read in conjunction with the limitations presented in the body of this report.

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Abbreviations

Asbestos Fines/Fibrous Asbestos	**AF/FA**
Ambient Background Concentrations	**ABC**
Added Contaminant Limits	**ACL**
Asbestos Containing Material	**ACM**
Australian Drinking Water Guidelines	**ADWG**
Area of Environmental Concern	**AEC**
Australian Height Datum	**AHD**
Acid Sulfate Soil	**ASS**
Below Ground Level	**BGL**
Benzo(a)pyrene Toxicity Equivalent Factor	**BaP TEQ**
Benzene, Toluene, Ethylbenzene, Xylene	**BTEX**
Cation Exchange Capacity	**CEC**
Contaminated Land Management	**CLM**
Contaminant(s) of Potential Concern	**CoPC**
Chain of Custody	**COC**
Conceptual Site Model	**CSM**
Dial Before You Dig	**DBYD**
Data Quality Indicator	**DQI**
Data Quality Objective	**DQO**
Data Gap Investigation	**DGI**
Detailed (Stage 2) Site Investigation	**DSI**
Ecological Investigation Level	**EIL**
Ecological Screening Level	**ESL**
Environment Protection Authority	**EPA**
Health Investigation Level	**HILs**
Health Screening Level	**HSL**
International Organisation of Standardisation	**ISO**
JK Environments	**JKE**
Lab Control Spike	**LCS**
Light Non-Aqueous Phase Liquid	**LNAPL**
Map Grid of Australia	**MGA**
National Association of Testing Authorities	**NATA**
National Environmental Protection Measure	**NEPM**
Organochlorine Pesticides	**OCP**
Organophosphate Pesticides	**OPP**
Polycyclic Aromatic Hydrocarbons	**PAH**
Polychlorinated Biphenyls	**PCBs**
Per-and Polyfluoroalkyl Substances	**PFAS**
Photo-ionisation Detector	**PID**
Protection of the Environment Operations	**POEO**
Practical Quantitation Limit	**PQL**
Quality Assurance	**QA**
Quality Control	**QC**
Remediation Action Plan	**RAP**
Relative Percentage Difference	**RPD**
Site Assessment Criteria	**SAC**
Sampling, Analysis and Quality Plan	**SAQP**
State Environmental Planning Policy	**SEPP**
Site Specific Assessment	**SSA**
Source, Pathway, Receptor	**SPR**
Specific Contamination Concentration	**SCC**
Standard Penetration Test	**SPT**
Standing Water Level	**SWL**

Trip Blank	**TB**
Toxicity Characteristic Leaching Procedure	**TCLP**
Total Recoverable Hydrocarbons	**TRH**
Trip Spike	**TS**
Upper Confidence Limit	**UCL**
United States Environmental Protection Agency	**USEPA**
Virgin Excavated Natural Material	**VENM**
Volatile Organic Compounds	**VOC**
World Health Organisation	**WHO**
Work Health and Safety	**WHS**

Units

Litres	**L**
Metres BGL	**mBGL**
Metres	**m**
Millilitres	**ml or mL**
Micrograms per Litre	**µg/L**
Milligrams per Kilogram	**mg/kg**
Milligrams per Litre	**mg/L**
Parts Per Million	**ppm**
Percentage	**%**
Percentage weight for weight	**%w/w**

1 INTRODUCTION

Barker College ('the client') commissioned JK Environments (JKE) to undertake a Preliminary (Stage 1) Site Investigation (PSI) for the proposed alterations and additions to college campus at Barker College, 91 Pacific Highway, Hornsby, NSW. The purpose of the PSI is to make a preliminary assessment of inground site contamination. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2 attached in the appendices.

This report has been prepared with reference to Chapter 4 and Clause 4.6 of State Environmental Planning Policy (SEPP Resilience and Hazards) 2021[1] (formerly known as SEPP55) to support the lodgement of a State Significant Development Application (SSDA) for the proposed development.

In accordance with section 4.39 of the Environmental Planning & Assessment Act 1979 (EP&A Act), the Secretary's Environmental Assessment Requirements (SEARs) for SSD-31822612 was issued on 15 December 2021. This report has been prepared to respond to the following SEARs:

Table 1-1: SEARs

SEARs	Relevant section of report
15. Contamination and Remediation Address contaminant and remediation conditions imposed under SSD-31822612.	This report relates to the preliminary site contamination investigation (PSI). The results of the investigation are presented in Section 7, the discussion of impacts is presented in Section 9 and the conclusions of the investigation are presented in Section 10.

JKE have previously undertaken a desktop PSI at the site and within the wider college campus. JKE has also completed a Preliminary Contamination and Waste Classification Screening at the Barker College Junior School tennis courts, and a Preliminary Desktop Site Assessment and Preliminary Intrusive Investigation for the proposed cafeteria and administration building within the wider college property. Relevant information and results are summarised in Section 2.

1.1 Proposed Development Details

JKE understand that the development is currently in the concept stage, however it is understood to include the following:

- The demolition of selected school buildings;
- Building envelopes for a new:
  - Performing arts and exam centre with basement carpark;
  - Aquatic and tennis centre with basement carpark;
  - Maintenance shed and associate carpark;
- Upgraded campus infrastructure facilities;
- Comprehensive landscape strategy; and
- Increased capacity of the school population.

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

Stage 1 of the development includes:

- Upgraded campus infrastructure including a new elevated walkway and pedestrian paths;
- Improvements to the Chapel Drive pick-up and drop-off area; and
- Landscaping works along The Avenue.

Selected development plans issued to JKE are attached in the appendices.

1.2 Aims and Objectives

The primary aims of the investigation were to make a preliminary assessment of the soil contamination conditions. The objectives were to:

- Assess the current site conditions and use(s) via a site walkover inspection;
- Assess the soil contamination conditions via implementation of a preliminary sampling and analysis program;
- Review and update the conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- 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.

1.3 Scope of Work

The investigation was undertaken generally in accordance with a JKE proposal (Ref: EP55861BT) of 4 February 2022 and written acceptance from the client of 1 March 2022. The scope of work included the following:

- Review of existing JKE project information;
- Review and update of the 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.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)[2], other guidelines made under or with regards to the Contaminated Land Management Act (1997)[3] and SEPP Resilience and Hazards 2021. A list of reference documents/guidelines is included in the appendices.

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

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

2 SITE INFORMATION

2.1 Background information

2.1.1 Desktop PSI (April, 2022)

A desktop study was prepared to support the lodgement of a State Significant Development Application (SSDA) for the proposed development as outlined in Section 1.1. The scope of works included review of site history and site information, a site inspection and preparation of a CSM.

The site history and information review and site inspection identified the following AEC at the site: fill material (imported material); historical agricultural land use; use of pesticides; hazardous building materials; and off-site sources (including neighbouring and up-gradient service station and mechanics).

Based on the potential contamination sources/AEC that were identified during the PSI, further investigation of the contamination conditions via an intrusive investigation was considered to be required. The desktop PSI recommended the following to better assess the risks associated with potential contamination at the site:

- A preliminary intrusive investigation to make an initial assessment of the soil contamination conditions and better inform the scope of detailed (Stage 2) site investigation (DSI);
- A DSI should be undertaken to characterise the site contamination conditions and establish whether the site is suitable for the proposed development, or whether remediation is required; and
- A hazardous building materials survey should be undertaken prior to demolition of any buildings/structures. Following demolition of the buildings (and preferably prior to removal of the hardstand), an asbestos clearance certificate should be obtained.

JKE also recommend that a waste classification be undertaken to classify material to be excavated for the proposed development.

2.1.2 Previous Investigations in the Wider College Campus

JKE has also undertaken several phases of investigation at the wider college campus including the following:

- Preliminary Contamination and Waste Classification Screening (Junior School Investigation)[4];
- Preliminary Desktop Site Assessment (Proposed Cafeteria Building)[5]; and
- Preliminary Intrusive Investigation (Proposed Cafeteria and Administration Building)[6].

Relevant information from the previous reports has been summarised in the following table:

[4] JKE, (2020). *Report to PMDL Architecture and Design on Preliminary Contamination and Waste Classification Screening for Proposed Junior School Extensions at Barker College, Clark Street, Hornsby, NSW* (Ref: E29993Brpt, dated 9 January 2020). (referred to as Junior School Investigation)

[5] JKE, (2020). *Report to Barker College c/- EPM Projects Pty Ltd on Preliminary Desktop Site Assessment for Proposed Cafeteria Building at Barker College at 91 Pacific Highway, Hornsby, NSW* (Ref: E33017Brpt_rev3, dated 9 July 2020). (referred to as Desktop)

[6] JKE, (2020). *Report to Barker College c/- EPM Projects Pty Ltd on Preliminary Intrusive Investigation for Proposed Cafeteria and Administration Building at Barker College at 91 Pacific Highway, Hornsby, NSW* (Ref: E33017Brpt2, dated 21 May 2020). (referred to as PII)

Table 2-1: Summary of Previous Investigations and Relevant Findings

Investigation phase	Relevant findings to the site
Junior School Investigation, 2020	• Located to the west of the proposed Aquatics and Tennis Centre and the south of Rosewood Walk (refer to Figure 2); • Included the drilling of seven boreholes (BH101 to BH107 inclusive) within the existing tennis courts and to the north and south of the Copeland Building; • Pavement and/or fill was encountered within all boreholes at depths ranging from approximately 0.3m below ground level (BGL) to 0.7mBGL; • The fill generally contained inclusion of igneous, sandstone and siltstone gravel, sand, wood, clay fines and ash. A fibre cement fragment (FCF) was identified in the fill within BH107 at depth between 0-0.2mBGL; • Residual silty clay natural soil was encountered beneath the fill, and siltstone bedrock was encountered in two locations at a maximum depth of approximately 0.5mBGL; • Friable asbestos (AF/FA) in the form of matted Asbestos Containing Material (ACM) was identified within the fill at one location. JKE were of the opinion that the asbestos impacted fill was likely to be confined to surficial fill soils and recommended further validation during excavation; • Based on the results of the investigation, the fill soil was assigned a preliminary waste classification as **General Solid Waste (non-putrescible) containing Special Waste (asbestos)** for the purpose of off-site disposal. The natural soil was deemed as likely to meet the definition of VENM and the VENM classification should be confirmed following the removal of the overlying fill during development; • JKE recommended that additional sampling to be undertaken during excavation work to characterise the extent of asbestos impacted fill; and • An Asbestos Management Plan (AMP) was also recommended to be implemented during the development as potential for widespread asbestos contamination at the site was considered to be relatively high.
Desktop for Cafeteria Building, 2020	• The desktop study included a historical assessment comprising a review of historical land titles, historical aerial photographs, council records, NSW EPA records and Section 10.7 certificates; • The review of historical information indicated the following site uses: o Pre-1969 – residential land use including residential houses and associated yards. The historical land titles prior to this time period indicated private individual ownerships of the site; o Circa 1970 – Filling of the site had occurred. The former residences located onsite had been demolished; o 1970 to present – Re-development and use of the site for use as part of the wider property of Barker College; • The CSM identified the following AEC: fill material, use of pesticides, hazardous building material and off-site area including former motor garages and a current service station located approximately 100m to the north-east and up-gradient to the site; and • Based on the identified AEC, the report recommended further intrusive investigation to characterise the contamination conditions at the site and a hazardous building materials survey of the structures at the site.
PSI for Cafeteria and Administration Building, 2020	• Soil sampling undertaken from eight boreholes; • Fill material was encountered to depths of approximately 0.3mBGL and 3.4mBGL, underlain by residual silty clay soils;

Investigation phase	Relevant findings to the site
	• The fill contained inclusions of siltstone, ironstone, sandstone and igneous gravel, brick fragments, wood, slag, root fibres and ash. A selection of the soil samples were analysed for the contaminants of potential concern identified in the CSM; • All soil results were below the human health site assessment criteria (SAC); • Nickel and TRH F3 were encountered in fill soil above the ecological SAC; • Due to locations of ecological exceedances, there were not considered to be a SPR linkage for potential onsite ecological receptors post development. Hence, the risk to ecological receptors at the site was considered to be low; and • Potential risks associated with widespread subsurface contamination at the investigation site were considered to be low and the site was considered to be suitable for the proposed development, provided an unexpected finds protocol (UFP) is implemented during the development works. As far as JKE is aware, additional sampling and preparation of an AMP for the Junior School has not been undertaken following completion of the above reports.

2.2 Site Identification

Table 2-2: Site Identification

Current Site Owner (certificate of title):	The Council of Barker College
Site Address:	Barker College, 91 Pacific Highway, Hornsby
Lot & Deposited Plan:	**Part of Lot 100 in DP1262386** (C-Block; The Avenue; Rosewood walk; Chapel drive drop-off and pick-up; and Aquatics & Tennis Centre); and **Part of Lot 100 in DP232343** Co-Curricular Performing Arts and Exam Centre (including maintenance facility)
Current Land Use:	College campus (kindergarten to year 12) Public domain (The Avenue) Low density residential (1 Clarke Road)
Proposed Land Use:	Primary and secondary school building
Local Government Authority (LGA):	Hornsby Shire Council
Current Zoning:	R2: Low density residential
Site Area (m^2) (approx.):	**Site total – 16,200** C-Block - 1,600 The Avenue - 1,600 Rosewood walk - 1,000 Chapel drive drop-off and pick-up - 1,600 Aquatics & Tennis Centre - 4,400

	Co-Curricular Performing Arts and Exam Centre (including maintenance facility) - 6,000
Geographical Location (decimal degrees) (approx. centre of site):	Latitude: -33.7131487 Longitude: 151.1007514
Site plans:	Appendix A

2.3 Site Location and Regional Setting

The site is located within the Barker College Campus which itself is located in a mixed-use part of Hornsby, and is bound by Unwin Road to the east as shown on Figure 1. Clarke Road runs in an east-west direction separating the main College Campus and office/maintenance sheds and other outbuildings/areas of the College. The site is located approximately 295m to the north-east of Waitara Creek.

2.4 Topography

The regional topography is characterised by a south-west facing hillside that falls towards Waitara Creek. The site is located towards the top of the hillside and has a gentle slope towards the south and west with localised areas of levelling to accommodate the existing development.

2.5 Site Inspection

A walkover inspection of the site was undertaken by JKE for the PSI on 22 April 2022. The site was generally similar to the inspection undertaken as part of the desktop PSI, with key observations summarised below:

- At the time of the inspection, the site was utilised as follows:
  - C-Block – a walkway running in an east-west direction on the southern side of the existing C-Block, across and internal road (Chapel Drive) and extending along R.B.Finlay Walk;
  - The Avenue – an internal road entering the site off Unwin Road to the east;
  - Rosewood Walk – western side of playing fields (Rosewood playing fields);
  - Chapel drive drop-off and pick-up – internal turning circle road from Chapel Drive and the western side of playing fields (Phipps Field and Peter Taylor Field);
  - Aquatics & Tennis Centre – undercroft car park with tennis court above;
  - Co-Curricular Performing Arts and Exam Centre (including maintenance facility) – along the northern portion of this area was a residence, afterschool care, and learning precinct building. To the south of this was an internal carpark access from Unwin Road to the east and the print room. To the south of this was the maintenance office and sheds with separate access off Unwin Road to the east;
- The entire college property was fenced with security access for both pedestrian and vehicles. Minimal evidence of erosion was observed in areas of landscaping, with the exception of playing fields due to use and the interface between hardstand and soft scaping;
- Cut and fill was evident at the site based on the levels observed and the wider College topography. Fill material (inclusions of igneous gravels) was observed at the interface soft scaping and hardstand in

the Rosewood Walk, Chapel Drive drop off and pick up, and landscaped areas of the Co-Curricular Performing Arts and Exam Centre, and Maintenance Facility;

- No visible or olfactory indicators of contamination were observed during the site inspection;
- Drainage across the site would expect to flow in sympathy with the overall topography of the College and site, in a south direction. A number of onsite stormwater drains were observed throughout the College, these would be expected to discharge into the regional stormwater system; and
- A majority of the site was paved, with the exception of Rosewood Walk and Chapel Drive drop off and pick up, and landscaped areas of the Co-Curricular Performing Arts and Exam Centre, and Maintenance Facility which were grass covered. No visible signs of plant stress or dieback were observed during the site inspection. No visible signs of plant stress were observed in the landscaped or vegetated areas of the College outside of the site.

2.6 Surrounding Land Use

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

- North – wider college campus with commercial properties including a service station, food retailer, Kennards hire and motor mechanics, beyond;
- South – wider college campus with residential properties beyond;
- East – wider college campus, with a pub/hotel, residential properties, a park and a secondary college campus beyond; and
- West – wider college campus, with residential properties and the main northern railway line beyond.

JKE is of the opinion that the service station and motor mechanic to the north of the wider College campus is a potential off-site contamination source as these properties are within 20-60m upgradient of the site boundary. The approximate location of these sites are shown on Figure 2.

2.7 Underground Services

The 'Dial Before You Dig' (DBYD) plans were reviewed for the PSI in order to establish whether any major underground services exist at the site or in the immediate vicinity that could act as a preferential pathway for contamination migration. A sewer main extends in an east-west direction along the southern portion of the neighbouring mechanics where it then enters the site through C-Block and The Avenue sections. A second sewer runs through the Co-curricular Performing Arts and exam Centre, and the Maintenance Facility. A gas main extends through The Avenue section of the site. These services are likely to be at depths of approximately 1.5m to 3m below ground. Considering the geological conditions (discussed in Section 3), there is a potential for the sewer and gas trenches to act as preferential pathways for contamination migration (i.e. through relatively permeable backfill).

Copies of the relevant plans are attached in the appendices.

2.8 Summary of Site History

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

Table 2-3: Summary of Historical Land Uses / Activities

Year(s)	Potential Land Use / Activities
Circa 1900 to 1940	• Land use onsite included mixed-use: residential and potentially agricultural (grazing); • Likely (minor) filling in areas of structures for levelling purposes on site and in the wider college property; • Use of hazardous building materials in the buildings and structures on site and the wider college property; and • Application of pesticides around and beneath site structures and on the wider college property; and • Off-site areas included mixed-use lad use: commercial, residential and some grazing.
1940 onwards	• The Council of Barker College took proprietorship of parts of the site progressively from 1940 onwards; • Ongoing development of the all sections of the site and wider college property including demolition and construction of buildings and structures; • Continued (minor) filling in areas of structures for levelling purposes onsite and in the wider college property; • Use of hazardous building materials in the buildings and structures on site and the wider college property; • Potential application of pesticides around and beneath site structures on site and the wider college property; and • Continued mixed-use including: commercial, residential and potentially some grazing; and Former and existing service stations and mechanics operational upgradient of the site.

3 SUMMARY OF GEOLOGY AND HYDROGEOLOGY

3.1 Regional Geology

A review of the regional geological information indicated that the site is underlain by Ashfield Shale of the Wianamatta Group, which typically consists of black to dark grey shale and laminite.

3.2 Acid Sulfate Soil (ASS) Risk and Planning

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

3.3 Hydrogeology and Groundwater

A review of hydrogeological information indicates that the regional aquifer on-site and in the areas immediately surrounding the site includes porous, extensive aquifers of low to moderate productivity. There were three registered bores within 2km of the site. In summary:

- The nearest registered bore was located approximately 1.06km to the east of the site. This was utilised for recreation purposes;
- There were no nearby bores (i.e. within 2km) registered for domestic or irrigation uses; and
- The drillers log information from the closest registered bores typically identified fill and/or clay soil to depths of 5-11mBGL, underlain by sandstone bedrock. Standing water levels (SWL) in the bores ranged from approximately 1.87mBGL to 78.5mBGL.

Based on this information, there are not considered to be any groundwater 'users' (e.g. use for drinking or irrigation) within 2km radius of the site.

Based on the above the subsurface conditions at the site are likely to consist of relatively low permeability (residual) soils overlying shallow bedrock. The potential for viable groundwater abstraction and use of groundwater under these conditions is considered to be low. There is a reticulated water supply in the area and consumption of groundwater is not expected to occur. Use of groundwater is not proposed as part of the development.

Considering the local topography and surrounding land features, JKE anticipate groundwater to flow towards the south-west.

The nearest surface water body is Waitara Creek located approximately 295m to the south-west and down gradient of site. Waitara Creek is considered to be a potential receptor, although it is a reasonable distance from the site and the potential for direct migration of groundwater contamination from the site and into this receptor is unlikely to occur.

4 CONCEPTUAL SITE MODEL

4.1 Potential Contamination Sources/AEC and CoPC

The potential contamination sources/AEC and CoPC are presented in the following table:

Table 4-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern

Source / AEC	CoPC
Fill material – The site appears to have been historically filled to achieve the existing levels. The fill may have been imported from various sources and could be contaminated. Previous investigations on the wider college campus have encountered fill to depths of approximately 0.3mBGL to 3.4mBGL. The fill was found to contain asbestos in the friable form (AF/FA) above the adopted health-based SAC and nickel and TRH F3 above the adopted ecological SAC.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.
Historical agricultural use – Historical title records indicate the site may have been used for grazing and agricultural purposes. This could have resulted in contamination across the site via use of machinery, application of pesticides and building/ demolition of various structures.	Heavy metals, TRH, PAHs, OCPs, PCBs and asbestos JKE note that OCPs only became commercially available in the 1940s. Prior to this time pesticides were predominantly heavy metal compounds. Based on the site inspection and historical assessment, JKE is of the opinion that there is a low potential for the site to have been used for activities associated with point sources of PFAS (as outlined in Appendix B of the PFAS National Environmental Management Plan 2020[7]).
Use of pesticides – Pesticides may have been used beneath the buildings and/or around the site.	Heavy metals and OCPs
Hazardous Building Material – Hazardous building materials may be present as a result of former building and demolition activities. These materials may also be present in the existing buildings/ structures on site.	Asbestos and lead Given the age of the former buildings and structures PCBs are considered unlikely to form a CoPC associated with this AEC.

4.2 Mechanism for Contamination, Affected Media, Receptors and Exposure Pathways

The mechanisms for contamination, affected media, receptors and exposure pathways relevant to the potential contamination sources/AEC are outlined in the following CSM table:

Table 4-2: CSM

Potential mechanism for contamination	Potential mechanisms for contamination include: • Fill material – importation of impacted material, 'top-down' impacts (e.g. placement of fill, leaching from surficial material etc), or sub-surface release (e.g. impacts from buried material);

[7] Heads of EPA Australia and New Zealand, (2020). *PFAS National Environmental Management Plan Version 2.0* (referred to as PFAS NEMP)

	• Historical agricultural use – 'top-down' and spills (e.g. application of pesticides, refuelling or repairing machinery, and other activities at the ground surface level); • Use of pesticides – 'top-down' and spills (e.g. during normal use, application and/or improper storage); • Hazardous building materials – 'top-down' (e.g. demolition resulting in surficial impacts in unpaved areas); and • Off-site land uses – 'top-down', spill or sub-surface release. Impacts to the site could occur via migration of contaminated groundwater.
Affected media	Soil and groundwater have been identified as potentially affected media.
Receptor identification	Human receptors include site occupants/users (including adults and children in a school/college setting), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users, and groundwater users. Ecological receptors include terrestrial organisms and plants within unpaved areas (including the proposed landscaped areas), and (although unlikely to be impacted) freshwater ecology in Waitara Creek.
Potential exposure pathways	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, naphthalene and BTEX). The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Potential exposure pathways for ecological receptors include primary contact and ingestion. Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens, inhalation of airborne asbestos fibres during soil disturbance, or inhalation of vapours within enclosed spaces such as buildings and basements.
Potential exposure mechanisms	The following have been identified as potential exposure mechanisms for site contamination: • Vapour intrusion into the proposed basement and/or building (either from soil contamination or volatilisation of contaminants from groundwater); • Contact (dermal, ingestion or inhalation) with exposed soils in landscaped areas and/or unpaved areas; • Migration of groundwater off-site and into nearby water bodies, including aquatic ecosystems and those being used for recreation; and • Leaching of contamination from soils to groundwater, and subsequent migration of groundwater into down-gradient water bodies.
Presence of preferential pathways for contaminant movement	A sewer line and a gas main are located at the site. The backfill around these services could act as potential preferential pathway for contaminant migrations. This could occur via groundwater/seepage if present, or via soil/vapour migration through the backfill.

5 SAMPLING, ANALYSIS AND QUALITY PLAN

5.1 Data Quality Objectives (DQO)

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

The DQO process is validated in part by the Data Quality Assurance/Quality Control (QA/QC) Evaluation. The Data (QA/QC) Evaluation is summarised in Section 7.1 and the detailed evaluation is provided in the appendices.

5.1.1 Step 1 - State the Problem

The CSM identified potential sources of contamination/AEC at the site that may pose a risk to human health and the environment. Investigation data is required to assess the contamination status of the site, assess the risks posed by the contaminants in the context of the proposed development/intended land use, and assess whether remediation is required. This information will be considered by the consent authority in exercising its planning functions in relation to the development proposal.

A waste classification is required prior to off-site disposal of excavated soil/bedrock.

5.1.2 Step 2 - Identify the Decisions of the Study

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

- Are any results above the SAC?
- Do potential risks associated with contamination exist, and if so, what are they?
- Is further investigation or remediation required?
- Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

5.1.3 Step 3 - Identify Information Inputs

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

- Existing relevant environmental data from previous reports;
- Site information, including site observations and site history documentation;
- Sampling of soil media;
- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, odours and staining;
- Laboratory analysis of soils for the CoPC identified in the CSM; and
- Field and laboratory QA/QC data.

5.1.4 Step 4 - Define the Study Boundary

The sampling was confined to the site boundaries as shown in Figure 2 and was limited vertically to a depth of 2.4mBGL (spatial boundary). The sampling was completed between 20 and 22 April 2022 (temporal boundary).

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

5.1.5.1 Tier 1 Screening Criteria

The laboratory data will be assessed against relevant Tier 1 screening criteria (referred to as SAC), as outlined in Section 6. Exceedances of the SAC do not necessarily indicate a requirement for remediation or a risk to human health and/or the environment. Exceedances are considered in the context of the CSM and valid SPR-linkages.

For this investigation, the individual results have been assessed as either above or below the SAC. Statistical evaluation of the dataset via calculation of mean values and/or 95% upper confidence limit (UCL) values has not been undertaken due to the spatial distribution of the data.

5.1.5.2 Field and Laboratory QA/QC

Field QA/QC included analysis of inter-laboratory duplicates, intra-laboratory duplicates, trip spike, trip blank and rinsate samples. Further details regarding the sampling and analysis undertaken, and the acceptable limits adopted, is provided in the Data Quality (QA/QC) Evaluation in the appendices.

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

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence are reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, JKE typically adopt the most conservative concentration reported (or in some cases, consider the data from the affected sample as an estimate).

5.1.5.3 Appropriateness of Practical Quantitation Limits (PQLs)

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

5.1.6 Step 6 – Specify Limits on Decision Errors

To limit the potential for decision errors, a range of quality assurance processes are adopted. A quantitative assessment of the potential for false positives and false negatives in the analytical results is undertaken with reference to Schedule B(3) of NEPM (2013) using the data quality assurance information collected.

Decision errors can be controlled through the use of hypothesis testing. The test can be used to show either that the baseline condition is false or that there is insufficient evidence to indicate that the baseline condition is false. The null hypothesis is an assumption that is assumed to be true in the absence of contrary evidence. For this investigation, the null hypothesis has been adopted which is that, there is considered to be a complete SPR linkage for the CoPC identified in the CSM unless this linkage can be proven not to (or unlikely to) exist. The null hypothesis has been adopted for this investigation.

Quantitative limits on decision errors were not established as the sample plan was not probabilistic.

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

5.1.7 Step 7 - Optimise the Design for Obtaining Data

The most resource-effective design will be used in an optimum manner to achieve the investigation objectives. Adjustment of the investigation design can occur following consultation or feedback from project stakeholders. For this investigation, the design was optimised via consideration of the various lines of evidence used to select the sample locations, the media being sampled, and also by the way in which the data were collected.

The sampling plan and methodology are outlined in the following sub-sections.

5.2 Soil Sampling Plan and Methodology

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

Table 5-1: Soil Sampling Plan and Methodology

Aspect	Input
Sampling Density	Samples were collected from 17 locations as shown on the attached Figure 2. Based on the total site area (16,200m^2), this number of locations corresponded to a sampling density of approximately one sample per 953m^2. The sampling plan was not designed to meet the minimum sampling density for hotspot identification, as outlined in the NSW EPA Contaminated Sites Sampling Design Guidelines (1995)[8].
Sampling Plan	The sampling locations were placed on a judgemental sampling plan and were broadly positioned for site coverage, taking into consideration areas that were not easily accessible. This sampling plan was considered suitable to make a preliminary assessment of potential risks associated with the AEC and CoPC identified in the CSM, and assess whether further investigation is warranted.

[8] NSW EPA, (1995), *Contaminated Sites Sampling Design Guidelines.* (referred to as EPA Sampling Design Guidelines 1995)

Aspect	Input
Set-out and Sampling Equipment	Sampling locations were set out using a tape measure. In-situ sampling locations were checked for underground services by an external contractor prior to sampling. Samples were collected using a hand auger and a push tube drill rig. Soil samples were obtained from disposable polyethylene push tube samplers.
Sample Collection and Field QA/QC	Soil samples were obtained on 20-22 April 2022 in accordance with our standard field procedures. Soil samples were collected from the fill and natural profiles based on field observations. The sample depths are shown on the logs attached in the appendices. Samples were placed in glass jars with plastic caps and teflon seals with minimal headspace. Samples for asbestos analysis were placed in zip-lock plastic bags. During sampling, soil at selected depths was split into primary and duplicate samples for field QA/QC analysis. The field splitting procedure included alternately filling the sampling containers to obtain a representative split sample.
Field Screening	A portable Photoionisation Detector (PID) fitted with a 10.6mV lamp was used to screen the samples for the presence of volatile organic compounds (VOCs). PID screening for VOCs was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. PID calibration records are maintained on file by JKE. The field screening for asbestos quantification included the following: • A representative 10L sample was collected from fill at 1m intervals, or from each distinct fill profile. The bulk sample intervals are shown on the attached borehole logs; • Each 10L sample was weighed using an electronic scale; • Each bulk sample was passed through a sieve with a 7.1mm aperture and inspected for the presence of fibre cement; • The condition of fibre cement or any other suspected asbestos materials was noted on the field records; and • If observed, any fragments of fibre cement in the 10L sample were collected, placed in a zip-lock bag and assigned a unique identifier. Calculations for asbestos content were undertaken based on the requirements outlined in Schedule B1 of NEPM (2013), as summarised in Section 6.1. Bulk 10L samples could not be obtained during soil sampling from all fill profiles due to the lack of sample return from augers. However, 500mL samples were obtained from all sampling locations for asbestos analysis. A calibration/check of the accuracy of the scale used for weighing the fibre cement fragments was undertaken using a set of calibration weights. Calibration/check records are maintained on file by JKE. The scale used to weigh the 10L samples was not calibrated, however this is not considered significant as this method of providing a weight for the bulk sample is considered to be considerably more accurate than applying a nominal soil density conversion.
Decontami-nation and	Sampling personnel used disposable nitrile gloves during sampling activities. Re-usable sampling equipment was decontaminated using Decon and potable water.

Aspect	Input
Sample Preservation	Soil samples were preserved by immediate storage in an insulated sample container with ice. On completion of the fieldwork, the samples were stored temporarily in fridges in the JKE warehouse before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures.

5.2.1 Laboratory Analysis

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

Table 5-2: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples and field QA/QC samples including (intra-laboratory duplicates, trip blanks, trip spikes and field rinsate samples)	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	293990 and 293990-A
Inter-laboratory duplicates	Envirolab Services Pty Ltd VIC, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	31111

6 SITE ASSESSMENT CRITERIA (SAC)

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

6.1 Soil

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

6.1.1 Human Health

- Health Investigation Levels (HILs) for a 'residential with accessible soils' exposure scenario (HIL-A). This is considered suitable given the site includes areas and use by both junior and senior college students (Kindergarten to Year 12);
- Health Screening Levels (HSLs) for a 'low-high density residential' exposure scenario (HSL-A & HSL-B). HSLs were calculated based on conservative assumptions including a 'sand' type and a depth interval of 0m to 1m;
- HSLs for direct contact presented in the CRC Care Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document (2011)[9]; and
- Asbestos was assessed against the HSL-A criteria and on presence/absence. A summary of the asbestos criteria is provided in the table below:

Table 6-1: Details for Asbestos SAC

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

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

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

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

6.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for an 'urban residential and public open space' (URPOS) exposure scenario. These have only been applied to the top 2m of soil as outlined in NEPM (2013). The criterion for benzo(a)pyrene has been increased from the value presented in NEPM (2013) based on the Canadian Soil Quality Guidelines[11];
- ESLs were adopted based on the soil type; and
- EILs for selected metals were calculated using site-specific soil parameters for pH, cation exchange capacity and clay content for sandy fill profiles and averaged for clayey fill profiles. These data were used to select the added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013), and published ambient background concentration (ABC) presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)[12]. This method is considered to be adequate for the Tier 1 screening.

Table 6-2: Site Specific Soil Parameters

Location	Depth	Material type	pH	CEC	Clay content
BH3	0-0.1	Fill: silty sandy clay	8	35	NA
BH5	0.1-0.3	Fill: silty sand	8.3	24	NA
BH10	0.13-0.2	Fill: silty clayey sand	9.1	42	NA
BH11	0.13-0.17	Fill: silty clayey sand	10.8	35	NA
SDUP3	-	Field duplicate	8	35	NA

*It should be noted that the pH and CEC values for the primary sample BH3 (0-0.1m) were applied to its field duplicate SDUP3.

6.1.3 Management Limits for Petroleum Hydrocarbons

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

6.1.4 Waste Classification

Data for the waste classification assessment were assessed in accordance with the Waste Classification Guidelines, Part 1: Classifying Waste (2014)[13] as outlined in the following table:

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

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

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

Table 6-3: Waste Categories

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

7 RESULTS

7.1 Summary of Data (QA/QC) Evaluation

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

7.2 Subsurface Conditions

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

Table 7-1: Summary of Subsurface Conditions

Profile	Description
Pavement	Concrete or asphaltic concrete pavement was encountered at the surface in BH1, BH4, BH5, BH10 to BH14, BH16 and BH17 and ranged in thickness between 120mm and 200mm.
Fill	Fill was encountered at the surface or beneath the pavement in all boreholes and extended to depths of between 0.15mBGL to 0.7mBGL. BH3, and BH8 to BH13 were terminated in the fill at a maximum depth of approximately 0.45m. The fill typically comprised silty sandy clay with inclusions of ironstone, sandstone, igneous and quartz gravel, building rubble (plastic, ceramic, glass metal and concrete fragments), ash, root fibres and organic matter. Neither staining nor odours were observed in the fill material during the field work. No suspected asbestos containing materials were encountered in the fill material during the field work.
Natural Soil	Natural residual silty clay soils were encountered below the fill material in BH1, BH2, BH4 to BH7, and BH14 to BH17. The natural soils extended to depths of between 0.4mBGL and 2.4mBGL. Neither staining nor odours were observed in the natural soils during the field work.
Bedrock	Siltstone and sandstone bedrock was encountered beneath the natural soils in BH5 at a depth of 0.8mBGL and in BH15 at a depth of 0.9mBGL. Neither staining nor odours were observed in the bedrock material during the field work.
Groundwater	Groundwater seepage was not encountered in the boreholes during drilling. All boreholes remained dry on completion of drilling and a short time after.

7.3 Field Screening

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

Table 7-2: Summary of Field Screening

Aspect	Details
PID Screening of Soil Samples for VOCs	PID soil sample headspace readings are presented in attached report tables and the COC documents attached in the appendices. The results ranged from 0ppm to 0.1ppm equivalent isobutylene. These results indicate a lack of significant PID detectable VOCs.
Bulk Screening for Asbestos	The bulk field screening results are summarised in the attached report Table S5. All results were below the SAC. Suspected ACM was not identified in any sample.

7.4 Soil Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 6.1. Individual SAC are shown in the report tables attached in the appendices. A summary of the results is presented below:

7.4.1 Human Health and Environmental (Ecological) Assessment

Table 7-3: Summary of Soil Laboratory Results – Human Health and Environmental (Ecological)

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Arsenic	25	9	0	0	-
Cadmium	25	1	0	NSL	-
Chromium (total)	25	46	0	0	-
Copper	25	160	0	0	-
Lead	25	140	0	0	-
Mercury	25	0.4	0	NSL	-
Nickel	25	78	0	0	-
Zinc	25	180	0	0	-
Total PAHs	25	47	0	NSL	-
Benzo(a)pyrene	25	3.4	NSL	0	-
Carcinogenic PAHs (as BaP TEQ)	25	4.7	1	NSL	The carcinogenic PAH concentration of in fill sample BH17 (0.2-0.3m) exceeded the health based criterion of 3mg/kg.
Naphthalene	25	<1	0	NSL	
DDT+DDE+DDD	17	<0.1	0	NSL	
DDT	17	<0.1	NSL	0	

Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Aldrin and dieldrin	17	<0.1	0	NSL	-
Chlordane	17	<0.1	0	NSL	-
Heptachlor	17	<0.1	0	NSL	-
Chlorpyrifos (OPP)	17	<0.1	0	NSL	-
PCBs	17	<0.1	0	NSL	-
TRH F1	25	<25	0	0	-
TRH F2	25	56	0	0	-
TRH F3	25	310	0	0	-
TRH F4	25	200	0	0	-
Benzene	25	<0.2	0	0	-
Toluene	25	<0.5	0	0	-
Ethylbenzene	25	<1	0	0	-
Xylenes	25	<1	0	0	-
Asbestos (in soil) (%w/w)	13	<0.01%w/w ACM <0.001%w/w AF/FA	0	NA	Asbestos was not detected.

Notes:

N: Total number (primary samples)

NSL: No set limit

NL: Not limiting

7.4.2 Waste Classification Assessment

The laboratory results were assessed against the criteria presented in Section 6.1.4. A summary of the results is presented in the following table:

Table 7-4: Summary of Soil Laboratory Results Compared to CT and SCC Criteria

Analyte	N	N > CT Criteria	N > SCC Criteria	Comments
Arsenic	25	0	0	-
Cadmium	25	0	0	-
Chromium	25	0	0	-
Copper	28	NSL	NSL	-
Lead	25	1	0	The lead concentration exceeded the CT1 criterion in one fill sample collected from BH17 (0.4-1.0m). The lead concentration was 140mg/kg.
Mercury	25	0	0	-
Nickel	25	1	0	The nickel concentration exceeded the CT1 criterion in one fill sample collected from BH5 (0.1-0.3m). The nickel concentration was 78mg/kg.
Zinc	25	NSL	NSL	-
TRH (C_6-C_9)	25	0	0	-
TRH (C_{10}-C_{36})	25	0	0	-
BTEX	25	0	0	-
Total PAHs	25	0	0	-
Benzo(a)pyrene	25	1	0	The benzo(a)pyrene concentration exceeded the CT1 criterion in one fill sample collected from BH17 (0.2-0.3m). The benzo(a)pyrene concentration was 3.4mg/kg.
OCPs & OPPs	25	0	0	-
PCBs	25	0	0	-
Asbestos	13	-	-	Asbestos was not detected in the samples analysed.

N: Total number (primary samples)

NSL: No set limit

Table 7-5: Summary of Soil Laboratory Results Compared to TCLP Criteria

Analyte	N	N > TCLP Criteria	Comments
Lead	1	0	-
Nickel	1	0	-
Benzo(a)pyrene	1	0	-

N: Total number (primary samples)

8 WASTE CLASSIFICATION ASSESSMENT

8.1 Preliminary Classification of Fill

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

Given asbestos impacted fill material has previously been identified on the wider college campus and in close proximity to the site (to the west of the Tennis and Aquatics Centre and to the south of Rosewood Walk), additional sampling and analysis should be undertaken to confirm the above classification prior to off-site disposal.

8.2 Preliminary Classification of Natural Soil

Based on the scope of work undertaken for this assessment, and at the time of reporting, it is possible that that the natural soil at the site could meet the definition of VENM for off-site disposal or re-use purposes.

In accordance with Part 1 of the Waste Classification Guidelines, the VENM is pre-classified as general solid waste and can also be disposed of accordingly to a facility that is licensed to accept it.

9 DISCUSSION

9.1 Tier 1 Risk Assessment and Review of CSM

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

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

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

9.1.1 Soil

9.1.1.1 Carcinogenic PAHs

Carcinogenic PAH were detected at a concentration above the human health SAC in fill material in the south of the site shown on Figure 4. The source of the elevated carcinogenic PAH encountered is considered likely to be associated with fill material containing ash/slag, rather than on-site activities as no potential point sources were identified in the area. It is also noted that PAHs were not detected in the underlying natural material from the same location.

In the current site configuration, there is not considered to be a complete SPR linkage to the carcinogenic PAH given this section of the site is predominantly paved. In the context of the proposed development, remediation of the carcinogenic PAHs in fill material will likely occur as part of the reprofiling earthworks for the new maintenance facility and access area. This will be captured under the requirements of a RAP.

Further detailed investigation is required to assess the extent of fill impacted by and the risks posed by carcinogenic PAH (relative to the SAC) in the context of proposed development and during construction.

9.1.1.2 Asbestos

No asbestos containing materials were encountered in the fill material at the site during the field work. Asbestos was not detected in any of the soil samples analysed. However, given that building rubble was encountered in the fill material at numerous locations across the site, previous investigations by JKE have identified asbestos in fill and sampling was completed from boreholes using auger drilling methods (to minimise damage of the site during sampling) which limits the disturbance of the soil. It is considered likely that asbestos exists in fill material within the site and may be discovered following removal of the hardstand pavements during development, particularly in areas where historical demolition occurred.

Further investigation is required to adequately assess the risks posed by asbestos (relative to the SAC) in the context of proposed development and on-going land use.

9.2 Decision Statements

The decision statements are addressed below:

Are any results above the SAC?

Yes. Carcinogenic PAHs were detected in fill above the health based SAC.

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

Yes, potential human health risks have been identified associated with the occurrence of carcinogenic PAHs in fill soil.

There are also potential contamination risks to soil and groundwater from both on-site and off-site land-uses associated with asbestos in fill and storage and use of fuels, oils and solvents (i.e. up-gradient off-site service station and mechanics).

Is further investigation or remediation required?

The PSI identified carcinogenic PAHs in the fill soil which will require remediation. JKE recommend undertaking a DSI including additional soil and groundwater sampling to better characterise the contamination issues and inform the preparation of a remediation action plan (RAP).

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

JKE is of the opinion that the site can be made suitable for the proposed development by completing the recommendations outlined in Section 10.

9.3 Data Gaps

An assessment of data gaps is provided in the following table:

Table 9-1: Data Gap Assessment

Data Gap	Assessment
Soil sampling density below minimum guideline density	Sampling was limited to approximately 57% of the minimum sampling density recommended in the EPA Sampling Design Guidelines 1995. It is also noted that sampling occurred from boreholes which poses limitation for identifying asbestos in fill. As this was a preliminary intrusive investigation, a detailed investigation will be required to assess the full extent of soil contamination risks on site. Any risks associated with historical and current land-use should be assessed, along with other identified AEC. It is recommended that additional sampling is undertaken via test pits. Recommendations are included in Section 10 to address this data gap.

Data Gap	Assessment
Groundwater flow direction not confirmed / groundwater assessment limited in scope	Based on the site history and identified off-site upgradient AEC, the potential for groundwater contamination to pose a risk to the receptors is considered to exist. Additional work to address this data gap is recommended and outlined in Section 10 to address this data gap.

10 CONCLUSIONS AND RECOMMENDATIONS

The PSI included a review of existing site information, a site inspection, and soil sampling from 17 boreholes across the site. The boreholes generally encountered fill material to depths of approximately 0.15mBGL to 0.7mBGL, with several boreholes terminated in the fill at a maximum depth of approximately 0.45m. The fill typically comprised silty sandy clay with inclusions of ironstone, sandstone, igneous and quartz gravel, building rubble (plastic, ceramic, glass metal and concrete fragments), ash, root fibres and organic matter.

A selection of soil samples was analysed for the CoPC identified in the CSM. Carcinogenic PAH were detected in fill above the health based criteria in one location. JKE also note that building rubble was encountered in fill material at several locations, asbestos has previously been encountered in fill material on the wider College Campus and in close proximity to the site, and sampling was undertaken from boreholes which poses limitation for identifying asbestos in fill.

The PSI did not identify contamination that would preclude the proposed development of the site. However, a Detailed Site Investigation (DSI) is required to characterise the extent of contamination and risks posed by the carcinogenic PAH and other AEC in order to inform site remediation. Due to the staged nature of the development, JKE are of the opinion that the DSI can be staged and conditioned as part of the concept stage approval process.

Based on the results of the PSI, JKE recommend the following:

1. Undertake a DSI to better assess the extent of contamination. An SAQP is to be prepared prior to commencement of the DSI;
2. Develop and implement a Remediation Action Plan (RAP), utilising the PSI and DSI datasets;
3. A hazardous building materials survey is undertaken to confirm the presence of any hazardous building materials (i.e. asbestos) prior to demolition of the existing buildings and structures within the site. Where hazardous building materials are identified, and following removal, a clearance certificate should be provided to reduce the risk of potential contamination from poor demolition practices; and
4. Prepare a site validation assessment report for the remediation works undertaken at the site.

It is acknowledged that the current site use and existing buildings/structures are likely to limit the scope of the DSI. A staged approach could be considered for the DSI in the event that sampling cannot be undertaken to the extent required. However, the client must accept that this may result in uncertainty regarding the nature and extent of remediation. The RAP would need to outline the requirements to address this uncertainty via a robust post-demolition data gap investigation procedure.

At this stage, JKE consider that there is currently no requirement to report any site contamination to the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015). This will be further evaluated as part of the DSI.

JKE consider that the report objectives outlined in Section 1.2 have been addressed.

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

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

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

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

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

Misinterpretation of Site Investigations by Design Professionals

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

Logs Should not be Separated from the Investigation Report

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

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

Read Responsibility Clauses Closely

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

Appendix A: Report Figures

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

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

Title: **SITE LOCATION PLAN**

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Project No: E34849BT

Figure No: 1

JKEnvironments

PLOT DATE: 7/03/2022 2:35:52 PM DWG FILE: S:\S ES\SC EIS JOBS\3400'S\E34849BT HORNSBY\CAD\E34849BT.DWG

LEGEND

- APPROXIMATE WIDER PROPERTY BOUNDARY
- APPROXIMATE SITE BOUNDARY
- BH — PROPOSED BOREHOLE LOCATION AND NUMBER

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 30 60 90 120 150

SCALE 1:3000 @A3 METRES

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

Title: **SITE FEATURES PLAN**

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Project No: E34849BT

Figure No: 2

JKEnvironments

PLOT DATE: 22/04/2022 10:36:25 AM DWG FILE: S:\S EIS\SC EIS JOBS\34000\SIE34849BT HORNSBY\CAD\E34849BT.DWG

PACIFIC HIGHWAY

COLLEGE STREET

UNWIN ROAD

BH1 (0.2)
BH2 (0.7)
BH3 (0.25)
BH4 (0.4)
BH5 (0.3)
BH8 (0.15)
BH6 (0.3)
BH9 (0.25)
BH7 (0.3)
BH10 (0.2)
BH12 (0.17)
BH11 (0.17)
BH13 (0.13)
BH15 (0.5)
BH14 (1.8)
BH16 (1.0)
BH17 (0.3)

JUNIOR SCHOOL INVESTIGATION 2020
- AF/FA ENCOUNTERED IN FILL

nearmap

LEGEND

———	APPROXIMATE WIDER PROPERTY BOUNDARY
- - - -	APPROXIMATE SITE BOUNDARY
● BH(Fill Depth)	BOREHOLE LOCATION AND NUMBER, NUMBER AND DEPTH OF FILL (m)

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 30 60 90 120 150

SCALE 1:3000 @A3 METRES

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

Title: **SAMPLE LOCATION PLAN**

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Project No: E34849BT

Figure No: 3

JKEnvironments

PLOT DATE: 23/05/2022 3:04:47 PM DWG FILE: K:\5C EIS JOBS\34000\SIE34849BT HORNSBY\CAD\E34849BT.DWG

LEGEND

- APPROXIMATE WIDER PROPERTY BOUNDARY
- APPROXIMATE SITE BOUNDARY
- BH(Fill Depth) — BOREHOLE LOCATION AND NUMBER, NUMBER AND DEPTH OF FILL (m)

SAMPLE ID	DEPTH (metres)
CHEMICAL	CONCENTRATION

SOIL/SURFACE SAMPLE EXCEEDANCE

SOIL CONTAMINATION ABOVE SAC FOR HUMAN HEALTH RISK

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM

0 30 60 90 120 150

SCALE 1:3000 @A3 METRES

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

Title: **SAC EXCEEDANCE PLAN**

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Project No: E34849BT

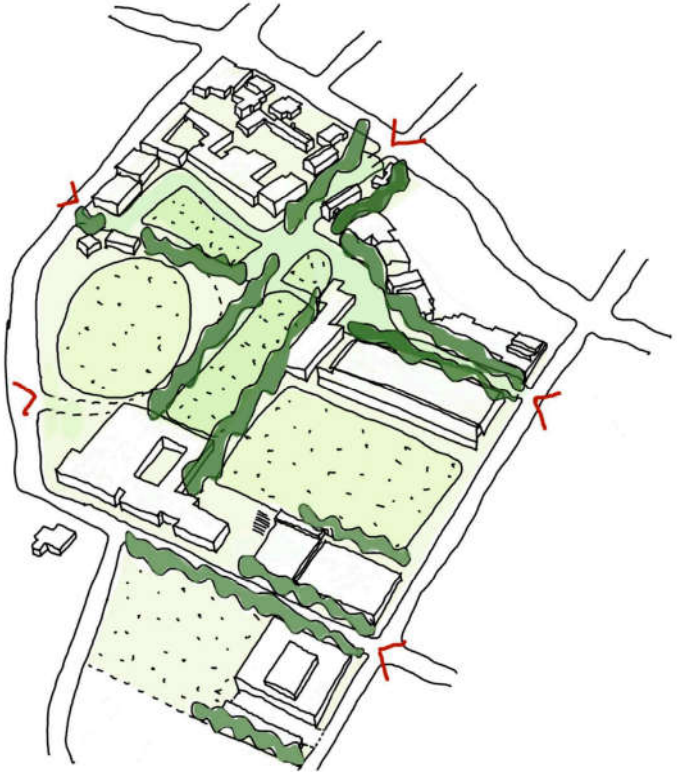
Figure No: 4

JKEnvironments

PLOT DATE: 23/05/2022 3:05:04 PM DWG FILE: K:\5C EIS JOBS\34000'S\E34849BT HORNSBY'CA\DE34849BT.DWG

Appendix B: Site Information and Site History

Proposed Development Plans



BARKER COLLEGE

INSPIRING TOMORROW

Architect: Neeson Murcutt + Neille
Landscape Architect: 360 Degrees
Planning Consultant: Urbis
Structural Engineer: TTW
Services Engineer: Steensen Varming
ESD Consultant: Steensen Varming
Theatre Consultant: Richard Stuart
Traffic Consultant: TTPP

SCOPING REPORT
ISSUE : 20 10 21

STAGING PLAN

SSDA STAGE 1

PEDESTRIAN INFRASTRUCTURE:

(1) NEW ELEVATED WALKWAY SOUTH C-BLOCK

(2) THE AVENUE + R B FINLAY WALK 'PUBLIC DOMAIN' CIVIC LANDSCAPE

(3) ROSEWOOD WEST CONNECTION

(4) RATIONALISATION OF DROP-OFF / PICK-UP

FUTURE STAGE: AQUATICS AND TENNIS CENTRE

(1) AQUATICS + TENNIS

FUTURE STAGE: CO-CURRICULAR PERFORMING ARTS AND EXAM CENTRE

(2) CO-CURRICULAR PERFORMING ARTS & EXAM CENTRE including 90 space carpark under

(3) MAINTENANCE FACILITY relocate existing 2-storey steel framed "shed" 1000m2

S1.1 C-Block Walk

A new walkway will provide a significant transformation to the east- west movement paths through the campus locating a new lift and stair at the pivot point of these two distinct axis.

A new elevated walkway will be provided along the southern elevation of C-block, mediating the various levels and offering safe, equitable and sheltered circulation. The walkway may also allow direct access to the courtyard, and provide spectator viewing to Bowman Field adjacent.

The design will offer a solution that maintains access to natural light to the lower ground floor of C-Block.

C-Block Walk will:

> strengthen east-west campus connections
> significantly improve safe and efficient pedestrian movement
> provide DDA compliance
> provide spectator viewing to Bowman Field

S1.2 The Avenue

A transformation of The Avenue from a vehicular road will provide a beautiful pedestrian-focussed landscape space for the school. This new civic space is to function as a share-way with maintained allowance for service vehicle entry.

Alterations to the Avenue are to ensure pedestrian pathways are DDA compliant while accommodating a smooth transition to R B Finlay walk. Landscape works will respond to the immediate built context and provide a gathering place at the entry points to the Rosewood Centre and the Centenary Design Centre.

ESD principals will guide the design including the selection of plant species and materials such as pavement type (no asphalt.)

The Avenue will:

> strengthen east-west campus connections
> provide a new civic space for the school
> retain and augment existing planting
> replace existing asphalt with more appropriate heat reflective paving
> accommodate a DDA compliant pedestrian pathway between R B Finlay Walk, Rosewood and Centenary Design Centre
> rationalise service infrastructure
> function as a shareway

S1.4 Chapel Drive Drop-Off / Pick-Up

Pedestrian safety and an improved flow of vehicles during pick-up and drop-off hours is the key impetus behind this project. The roadway is modified to improve both vehicle flow and pedestrian safety whilst maintaining the elegance of this important axis.

Material selections will be sustainable with an opportunity to minimise urban heat gain through a carefully considered road surface.

Chapel Drive Drop-Off / Pick-Up will:

> strengthen north-south campus connections
> significantly improve the flow of traffic during on campus drop-off and pick-up

S1.3 Rosewood Walk

A paved pedestrian path along the western edge of Rosewood field will provide a vital connection between the Rosewood Centre & Maths building to the north, and the Junior school at the southern end of the campus. The new pedestrian link anticipates a future stair and lift extending the route from the Rosewood Field to the Junior School, the future Aquatics + Tennis Centre and future Co-Curricular Performing Arts + Exam Centre south of Clarke Road.

Rosewood Walk will:

> strengthen north-south campus connections
> allow for clear movement
> accommodate seating for students (lunchtime) and spectators (Saturday sport)
> retain existing trees

Four discrete projects within the core campus area will:

> improve legibility, accessibility, safety and amenity of principal east-west and north-south pedestrian pathways
> improve flow and safety of on-site drop-off / pick-up
> augment canopy with new tree planting

1:1000

NEESON MURCUTT + NEILLE BARKER COLLEGE - INSPIRING TOMORROW

The proposed **setbacks** are working to existing building alignments, and to allow the retention and augmentation of perimeter tree planting.

Importantly, the proposed south side setback to the maintenance facility envelope retains existing solar access to the adjoining properties.

FUTURE STAGE: AQUATICS AND TENNIS CENTRE

- 6m setback to Unwin Road - matching existing tennis court and parking structure
- 6m setback to Clarke Rd - greater than neighbouring houses

FUTURE STAGE: CO-CURRICULAR PERFORMING ARTS AND EXAM CENTRE

- 9m setback to Unwin Road - greater than existing houses
- 9m setback to Clarke Rd - greater than or equal to existing houses

PROPOSAL
FUTURE STAGES

ISSUE: 20 10 21

Selected Underground Services Plans

A3

PACIFIC HWY

ROMSEY ST

UNWIN RD

CLARKE RD

MARILLIAN AVE

CRES

YARDLEY

Railway

DBYD Address:
n/a Main college - 91
Pacific Highway
Hornsby NSW 2077

DBYD Job No: 31711968

DBYD Sequence No: 210000756

SYDNEY WATER CORPORATION

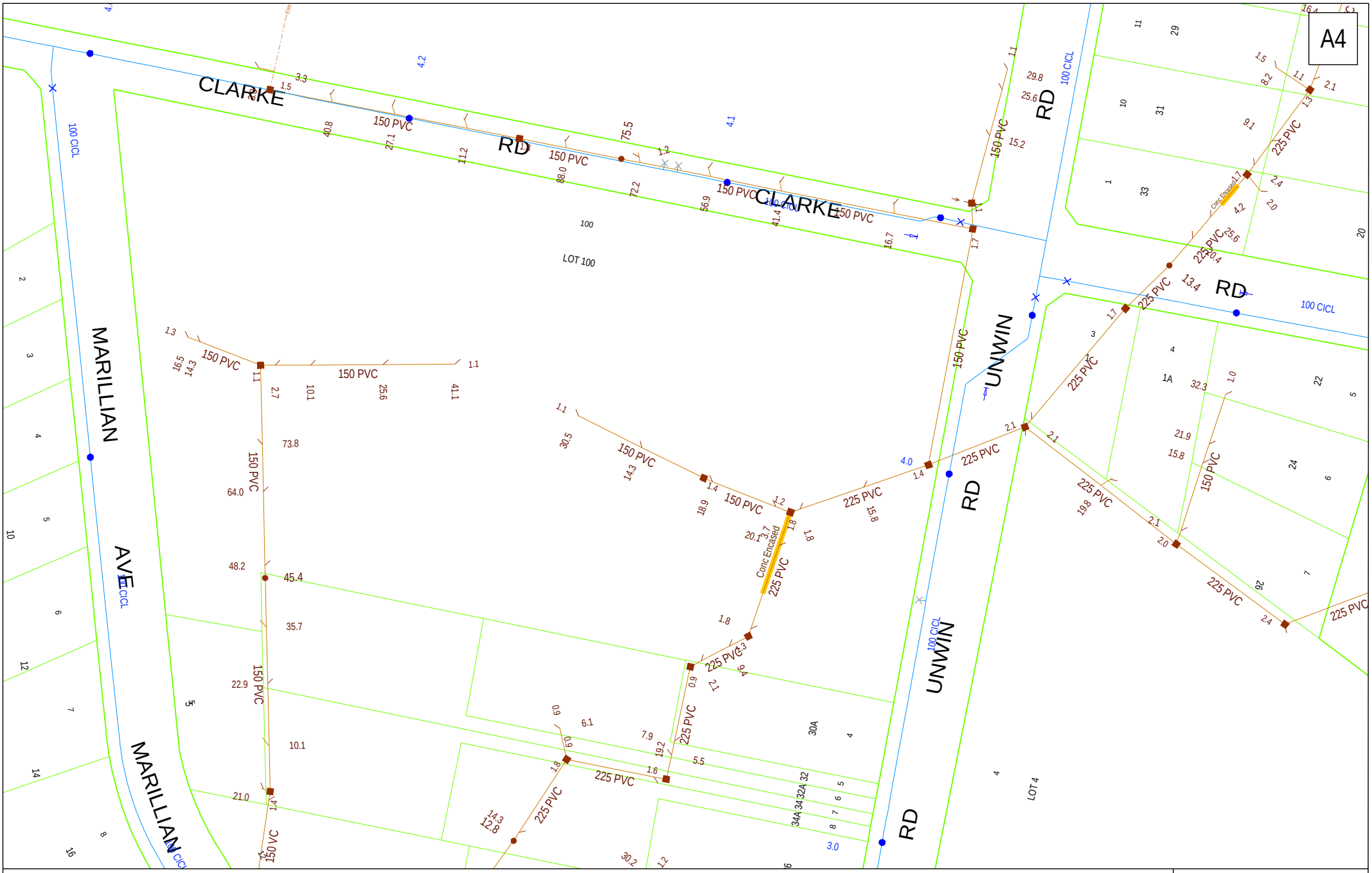
Scale: 1:1500

Date of Production: 05/04/2022

Plan 1 of 1

N

0m 7m 14m 21m 28m



DBYD Address:
28a Unwin Road
Wahroonga NSW
2076

DBYD Job No: 31711984

DBYD Sequence No: 210000849

No warranty is given that the information shown is complete or accurate.

SYDNEY WATER CORPORATION

Scale: 1:1000

Date of Production: 05/04/2022

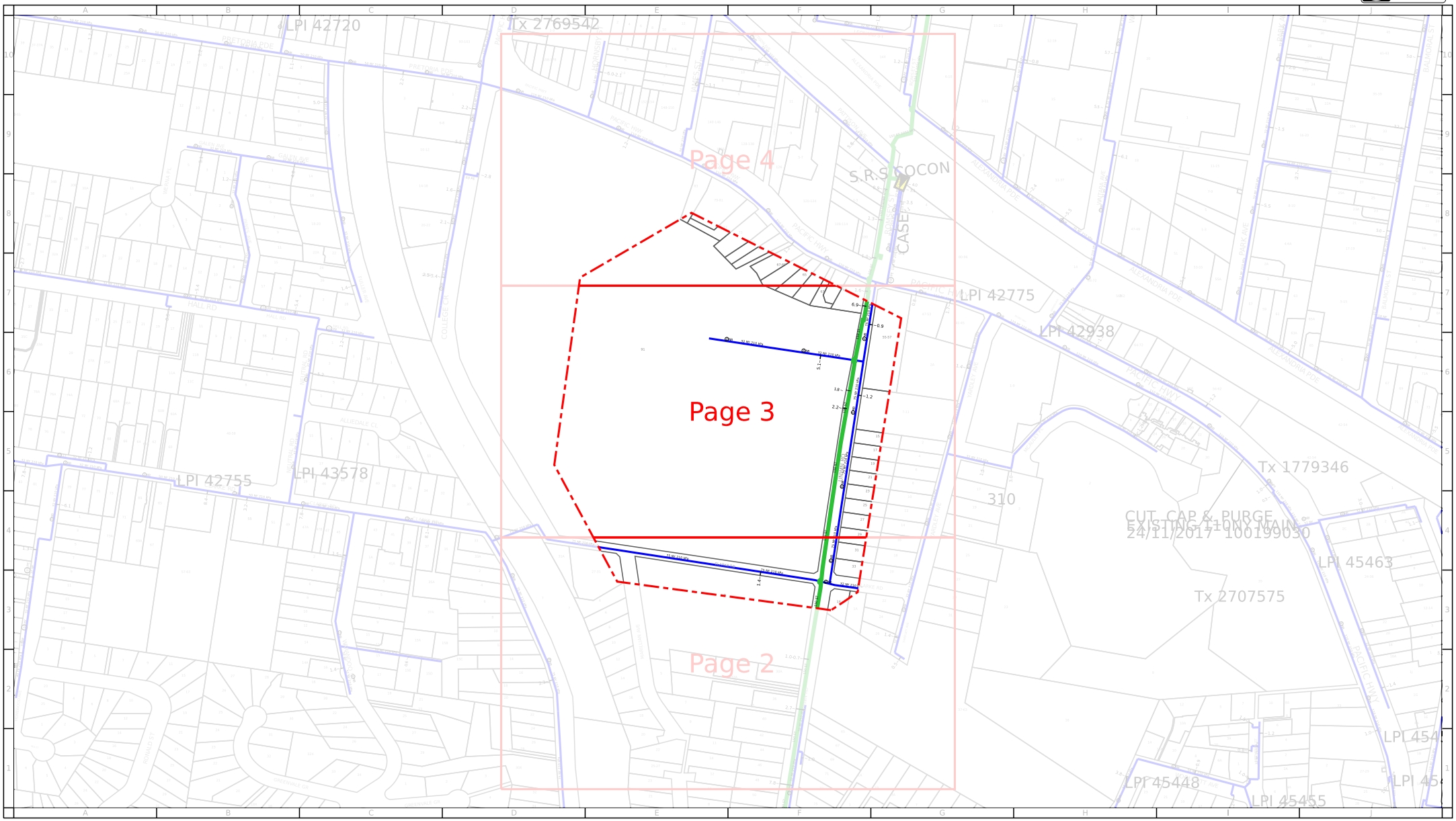
Plan 1 of 1

N

0m 5m 10m 15m 20m

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: Main college - 91 Pacific Highway Hornsby NSW, 2077



Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

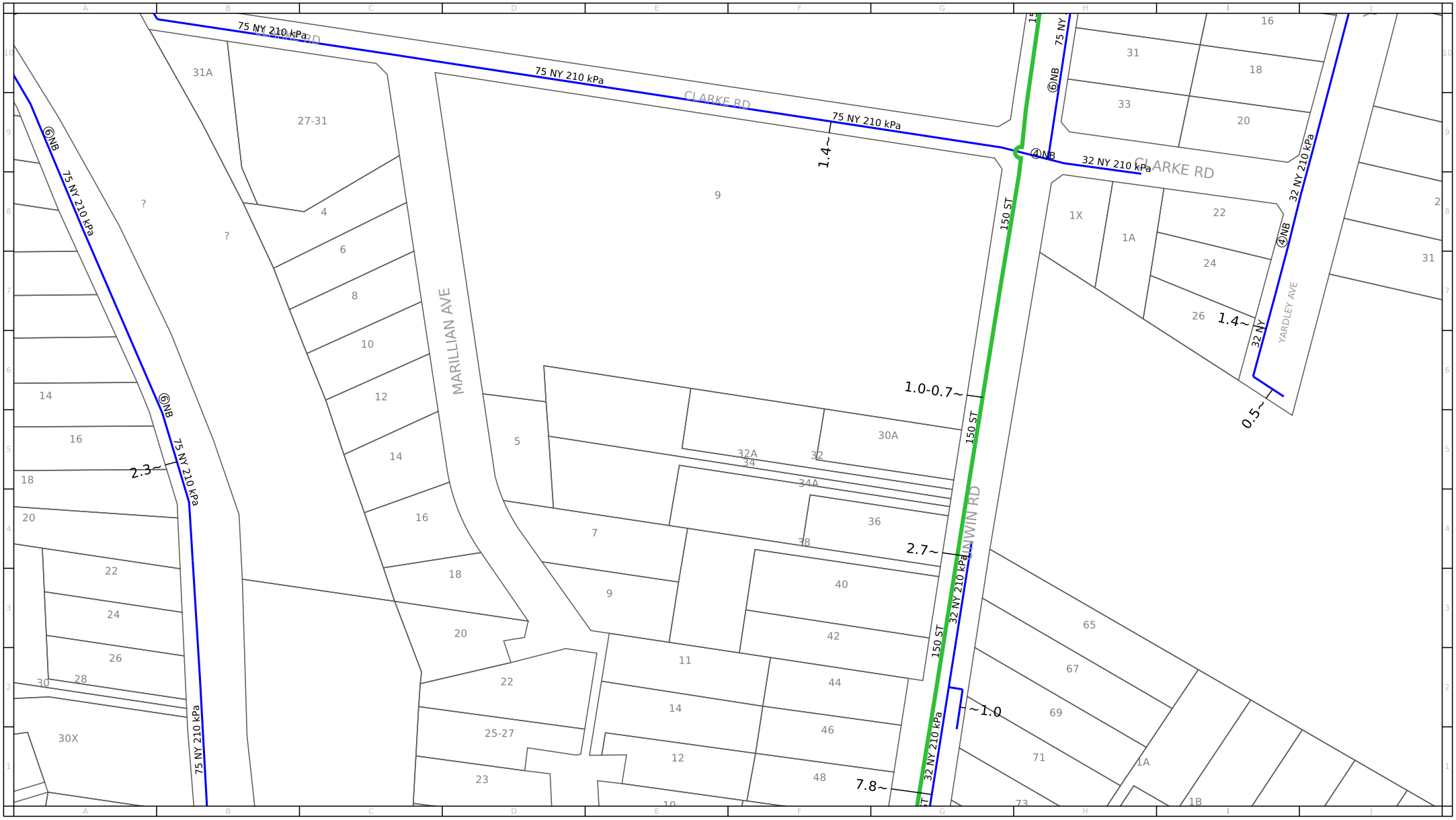
N
W E
S

Scale: 1:6301

Issue Date: 05/04/2022
DBYD Seq No: 210000754
DBYD Job No: 31711968
Overview Page:

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: Main college - 91 Pacific Highway Hornsby NSW, 2077



Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

Issue Date: 05/04/2022
DBYD Seq No: 210000754
DBYD Job No: 31711968

Scale: 1:2000

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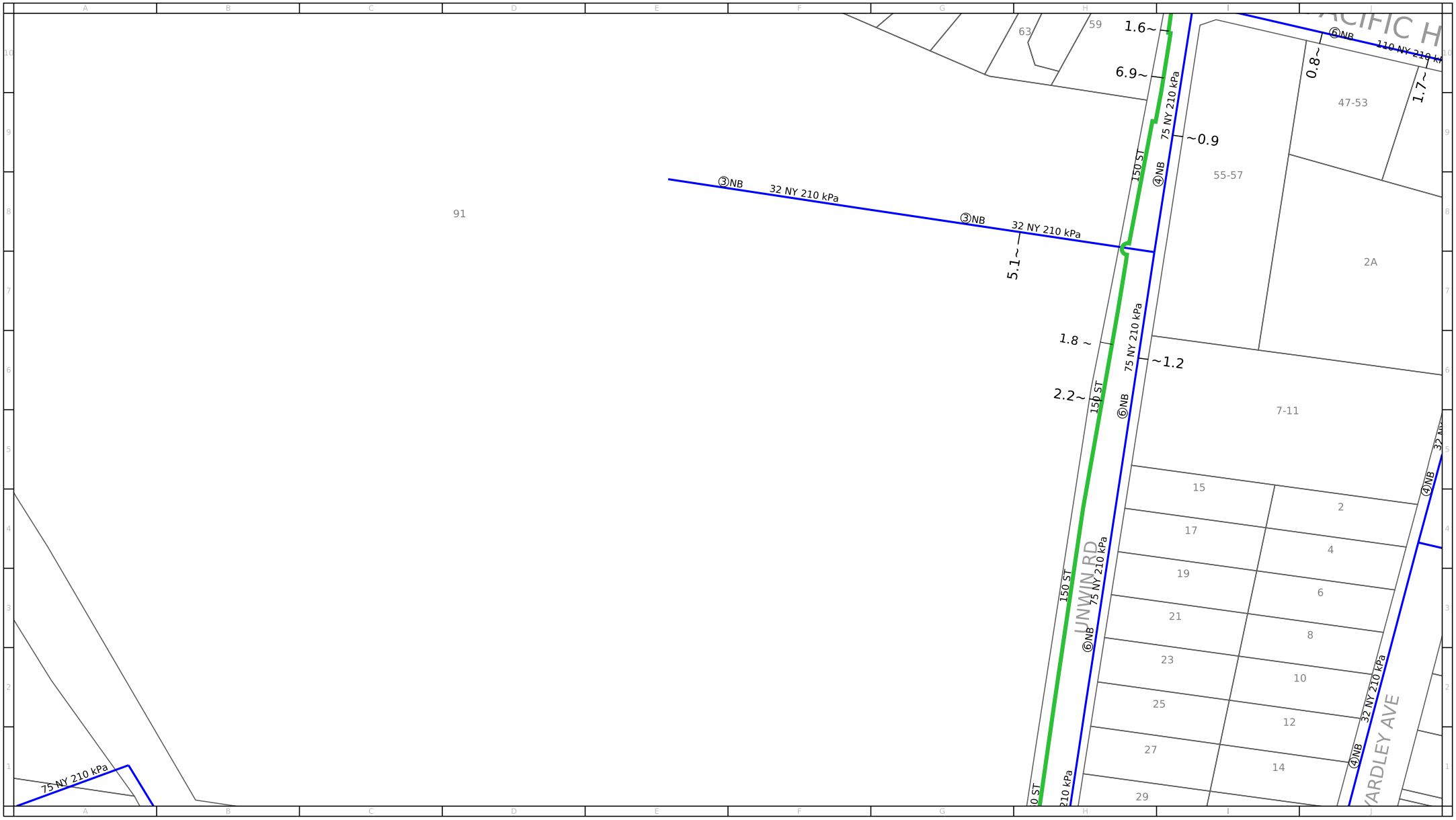
DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: Main college - 91 Pacific Highway Hornsby NSW, 2077



Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

Issue Date: 05/04/2022
DBYD Seq No: 210000754
DBYD Job No: 31711968

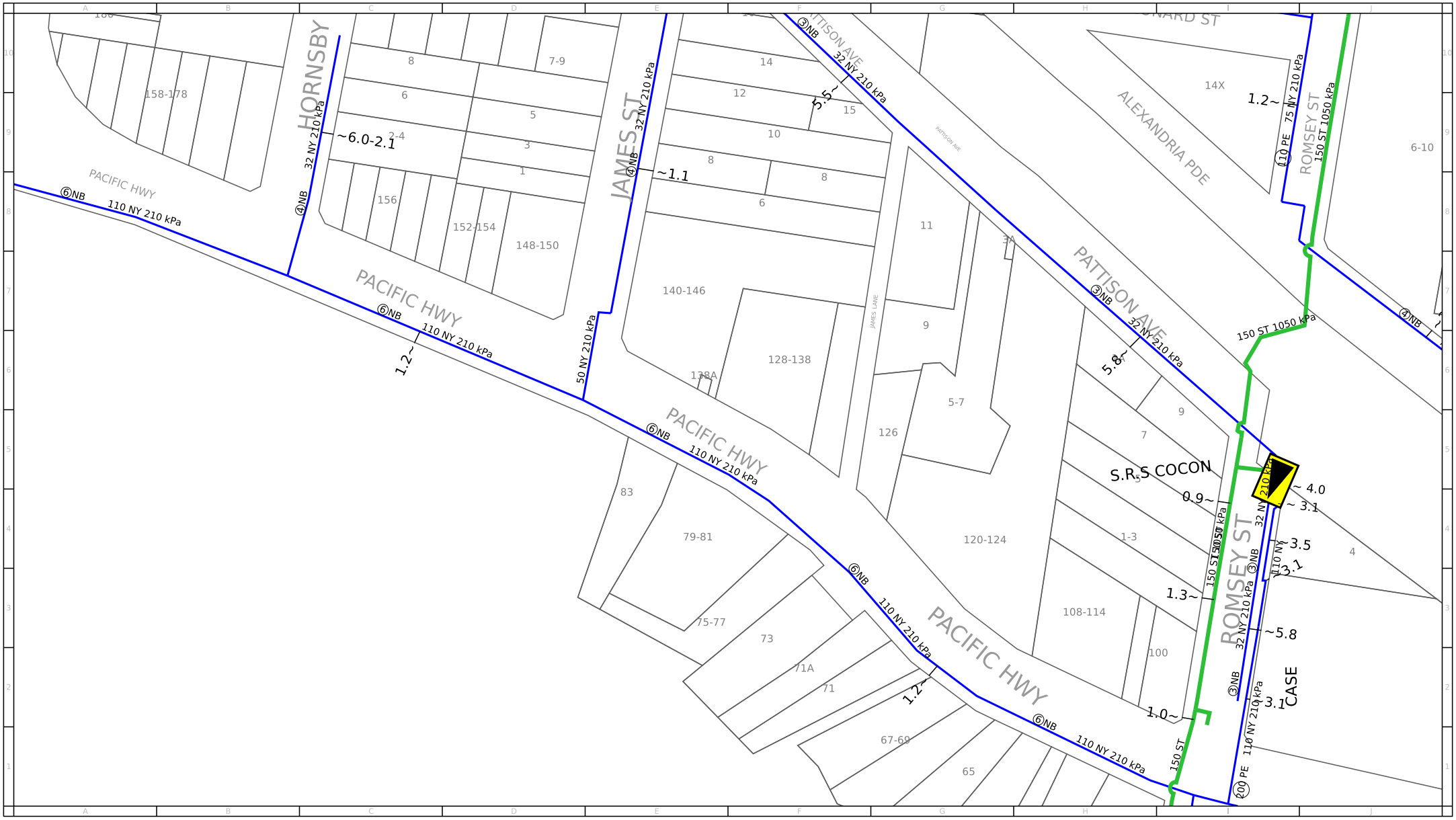
Scale: 1:2000

0m 10m 20m 30m 40m 50m 60m 70m 80m

WARNING: This is a representation of Jemena Gas Networks underground assets only and may not indicate all assets in the area. It must not be used for the purpose of exact asset location in order to undertake any type of excavation. This plan is diagramatic only, and distances scaled from this plan may not be accurate. Please read all conditions and information on the attached information sheet. This extract is subject to those conditions. The information contained on this plan is only valid for 28 days from the date of issue.

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: Main college - 91 Pacific Highway Hornsby NSW, 2077



Jemena
ABN 87 003 004 322

For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.

Issue Date: 05/04/2022
DBYD Seq No: 210000754
DBYD Job No: 31711968

Scale: 1:2000

0m 10m 20m 30m 40m 50m 60m 70m 80m

SafeWork NSW Records

Katrina Taylor

From: Licensing <licensing@safework.nsw.gov.au>
Sent: Thursday, 12 May 2022 1:08 PM
To: Katrina Taylor
Subject: SafeWork NSW: 00690195 –Site Search application – Result found [ref:_00D281hl6J._5004a80qg4:ref]
Attachments: Hornsby, 91 Pacific Hwy - scanned file.pdf

Security Classification: Sensitive Personal
Please do not amend the subject line of this email

Dear Katrina

Re: Site Search for Schedule 11 Hazardous Chemicals on premises Application – Result found

I refer to your application for a Site Search for Schedule 11 Hazardous Chemicals on premises for the following site: 91 & 9 (LOT 100 DP1262386 & LOT 100 DP232343) PACIFIC HWY & CLARKE RD HORNSBY/WAHROONGA NSW 2077/2076.

Please find attached copies of the documents that SafeWork NSW holds on record number 35/035560 relating to the storage of Hazardous Chemicals at the above-mentioned premises.

If you have any further information or if you have any questions, please use one of the following options, quoting the SafeWork NSW enquiry reference number: 00690195

- Email: licensing@safework.nsw.gov.au
- Phone: 13 10 50

Kind regards

Gabriela Draper
Licensing Representative
SafeWork NSW | Better Regulation Division
Department of Customer Service
p- 13 10 50
e- licensing@safework.nsw.gov.au | www.customerservice.nsw.gov.au
Level 3, 32 Mann Street, Gosford, NSW 2250

well and where we can improve. If you do not wish to participate in our surveys, please email us at: licensingQA@customerservice.nsw.gov.au and we will ensure that you are not contacted.

ref:_00D281hl6J._5004a80qg4:ref

LICENCE NO. 35/035560

2002/046550

WorkCover New South Wales

KEYWORD: _____

ACTIVITY DESCRIPTOR: _____

SUBJECT DESCRIPTION: _____

TITLE: _____

WCA - Unclassified

File 2002/046550

WorkCover Authority of NSW

Custodian Dangerous Goods Licensing Section
Created 27/09/2002

HEALTH & SAFETY MANAGEMENT - LICENSING - Applications - Application for New Dangerous Goods Licence - 35/035560 91 PACIFIC HWY HORNSBY NSW 2077

DANGEROUS GOODS KEEPING LICENCE

2002/046550

NSW GOVERNMENT

FILE NUMBER: 20021046550

MINUTE SHEET

No.	Officer	Date	Action Required	Initial Upon Completion
1	G Draper	19/3/20		

NSW GOVERNMENT

FILE NUMBER:

MINUTE SHEET

No.	Officer	Date	Action Required	Initial Upon Completion

File Minute Sheet	Status: Active
Recordkeeping Guideline	Version: August 2017
Prepared by: Records Coordinator, Digital Resources 4321 5105	Publication no: D04/009075

SITE SUBURB: Hornsby FILE NUMBER: 35/035 560

☐ NOT ON PC ☐ CHECK CAN/ABN NO.

DANGEROUS GOODS LICENSING-PERFORMANCE MONITORING

KEEP THIS SHEET AS TOP PAGE

DATE APPLICATION RECEIVED:.....

DATE PEROCESSED BY LICENSING: 29/11/02 BY:.....
Where further assessment is required

DATE TO CSU/ROD:..... BY:.....

DATE ALLOCATED:..... TO:.....

DATE APPROVED:..... BY:.....

DATE RETURNED TO LICENSING:.....

DATE APPROVED BY LICENSING: 29/4/02 BY:.....

DATE DATA ENTRY COMPLETED:..... BY:.....

DATE LICENCE ISSUED:..... BY:.....
(initials)

COMMENTS: ***(where applicable, please include details of* (initials** ***date client contacted for further information, or reasons for delay in processing application)***

..... scan .....

Please tear off and fill in the information below and return the slip to the applicant for application only.

Thank you, for submitting the application form to WorkCover Dangerous Licensing section.

Date Received:..... This is an acknowledgment upon receipt of your application form into the Dangerous Goods Licensing section. Your application is currently in progress for processing.

Thank you, for submitting the application form to WorkCover Dangerous Licensing section.

Date Received:..... The application has been return to you for completion. *(please see the attached checklist for additional information)*

ChemCARE Consulting Pty Ltd 77A Copeland Road BEECROFT 2119 AUSTRALIA
Phone:02 9484 0506 Fax:02 9980 6555 Mobile:0419 333 900 e-mail: rolandc@chemcare.com.au

Chief Inspector of Dangerous Goods
WorkCover Authority NSW
GPO Box 5364
Sydney 2001

35/ new
Barker College
91 Pacific Highway Hornsby 2077
Application for a site DG storage licence

Attention: Michael Moore, coordinator DG licensing Ref.

Dear Mr Moore

Please find herewith, application for a site DG Storage licence. In order to achieve compliance of depots, a significant range of improvements have been made.

Stamped drawings of Depots POCL1 and No.2 have been appended, however, no stamped drawing has been provided for Depot No.3, as it is an internal Class 3 cabinet of approved type. Depot No. 3 is unvented and is satisfactorily located such that it is at least 3 m from any fixed source of ignition and does not prejudice any escape route.

Please phone should there be any query, in the absence of which, it is understood you will issue a licence within 20 days of receipt of this application.

Best regards,

Attached: Licence application
Stamped drawings for Depots POCL1 & No.2
Consultants checklist
Photo of Depot POCL1 prior to affixing placarding

Roland Churches.
Director
19 September, 2002

CC Sue NEWNHAM / BARKER

CONSULTANT'S CHECKLIST

DG Licence No. of site (if known) OR Company Name / Site address BARKER COLLEGE - 91 PACIFIC HWY HORNSBY P/Code 2077

35/ NEW

All plans of DG depots stamped by consultants and submitted in support of DG licence applications MUST include descriptive details, shown on the plan or in additional attached notes, which will allow future auditing of the on-going conformance of the depot.

If plans and accompanying details are inadequate for this purpose, they will be returned for further action.

Depot Number to which this Checklist applies:- *(You may list up to four depots per sheet)*..... | POCL1 | 2 | | |

Does the attached plan clearly identify the following details (as far as relevant) for the designated depot?
Write "Yes", "No", "N/A" (not applicable) or descriptive note for each part:

1	Is the Depot No. or Name shown prominently?	Y	Y		
2	Is the Class of dangerous goods shown?	Y	Y		
	Is the Packing Group included?	Y	Y		
4	Has its Maximum storage capacity (L, kg, m³, etc.) been indicated?	Y	Y		
5	Will open packages of Class 3 liquids be handled? (Influences separation distance compliance)	N/A	N		
3	Does it show a description of major design features (for example: "steel frame with metal cladding" or "masonry walls with sheetmetal roof" or "flammable liquids cabinet complying with AS1940-1993" or "underground tank" etc.)?.....	Y	Y		
	As well as fire resistance levels (FRL) (triple rating eg 240/240/240) of walls and doors?..	N/A	N/A		
	Are Ventilation details (vent sizes, locations, fan capacity, duct flame arrestors) shown?....	Y	Y		
	Are Spillage containment design details and capacity shown?	Y	Y		
	Is the Spill locus conformity (26.5° angle) for tank bunding, all sides, shown on plan?.....	Y	N/A		
	Has segregation from incompatible goods been addressed?..... (applies also for different goods of the same Class within Class 5.1 and Class8 depots).	Y	Y		
6	Are the minimum Separation distances shown to: other DG depots?.....	Y	Y		
	ignition sources?.....	Y	Y		
	on-site facilities?.....	Y	Y		
	off-site protected works?.....	Y	Y		
	boundaries and fences?.....	Y	Y		

Include distances to Protected Works/Public Places located up to twice the compliance distances away, across any boundary.
A plan drawn to scale is preferred, otherwise all relevant actual measurements must be shown at appropriate locations on the plan.

Are Fire protection fixtures (sprinklers, hydrants, hosereels, foam facilities etc) shown?....	Y	Y		
Have other significant features, such as open drains in relation to gas storage, steeply sloping sites, proximity to water bodies or stormwater drains etc been included?.....	Y	Y		

AC-CLF November 1997

N/A = NOT APPLICABLE

ROLAND CHURCHER
19 SEPT 2002

Application for Licence to Keep Dangerous Goods

WorkCover NEW SOUTH WALES

Application for ☑ new licence ☐ amendment ☐ transfer ☐ renewal of expired licence

PART A – Applicant and site information

See page 2 of Guidance Notes

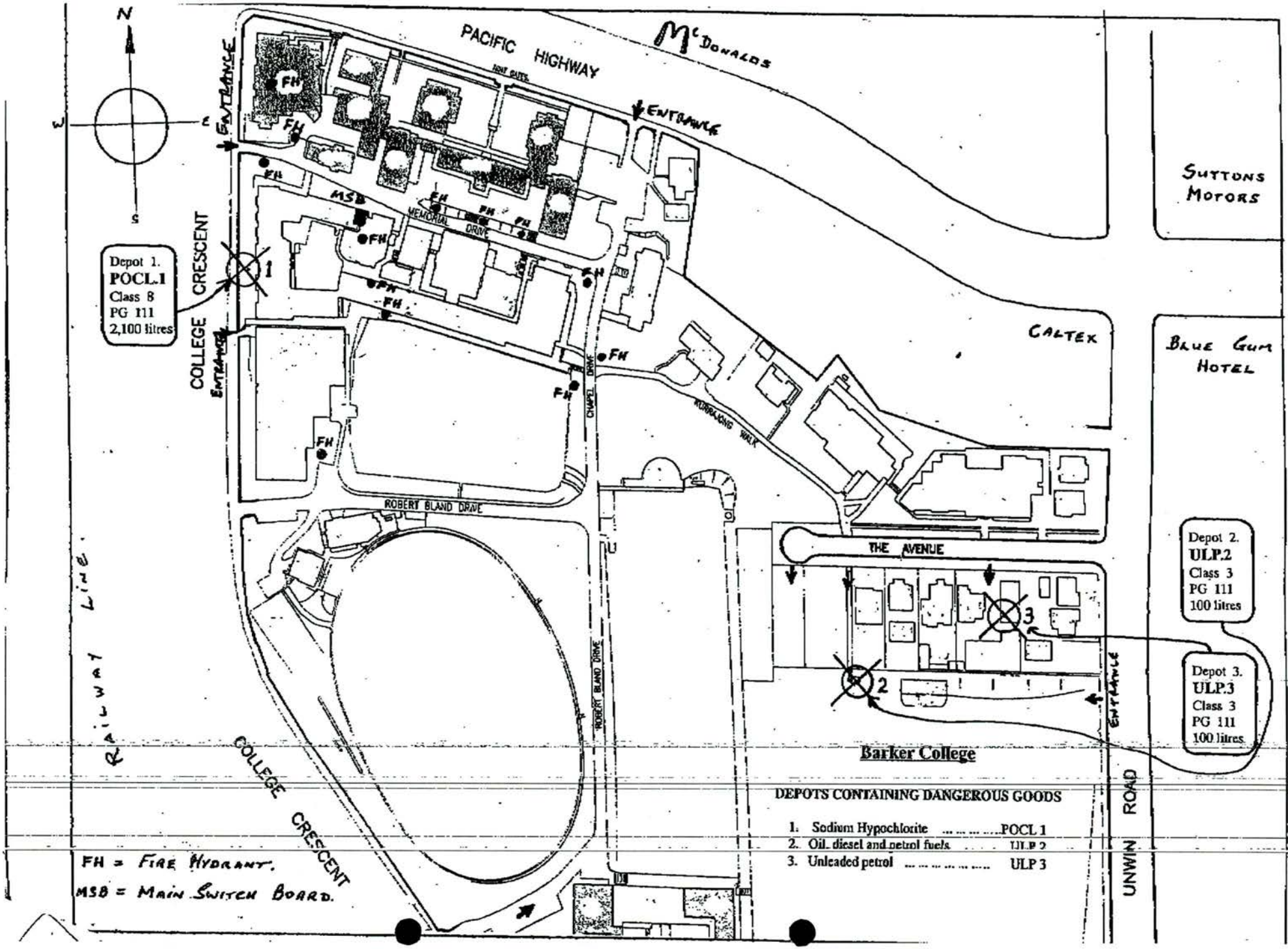
1. Name of applicant: BARKER COLLEGE — ACN: 620620356
2. Postal address of applicant: 91 PACIFIC HIGHWAY — Suburb/Town: HORNSBY — Postcode: 2077
3. Trading name or site occupier's name: N/A
4. Contact for licence enquiries — Phone: (02) 9487 1494 — Fax: (02) 9487 1494 — Name: MARK MITCHELL (GROUNDS MANAGER)
5. Previous licence number (if known): 351 N/A
6. Previous occupier (if known): N/A
7. Site to be licensed — No: 91 — Street: PACIFIC HIGHWAY
   Suburb/Town: HORNSBY — Postcode: 2077
8. Main business of site: SCHOOL
9. Site staffing: Hours per day: 24 — Days per week: 7
10. Site emergency contact — Phone: (02) 9847 8399 — Name: ~~AFTER~~ BARKER SWITCH (BUSINESS HOURS ~~AFTER~~ AFTER HOURS (02) 9477 3316
11. Major supplier of dangerous goods: SHELL / AMPOL + SPECTRUM Distrib.
12. If a new site or for amendments to depots – see page 4 of Guidance Notes
    Plan stamped by: Name of Accredited Consultant: ROLAND CHURCHES / [illegible] — Date stamped: 19/9/02

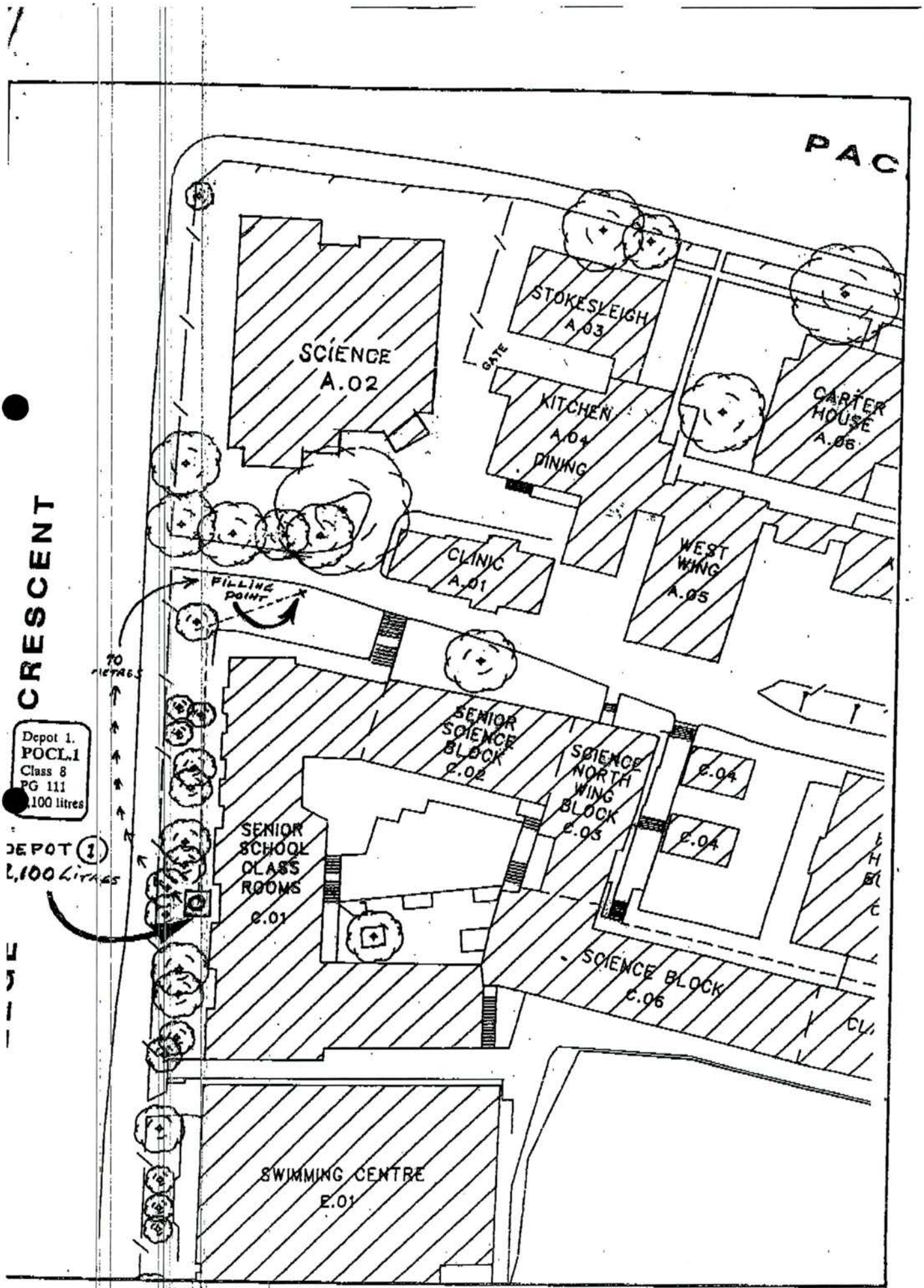
I certify that the details in this application (including any accompanying documentation) are correct and that the licensable quantities of dangerous goods kept on the premises will not exceed the quantities specified in this application.

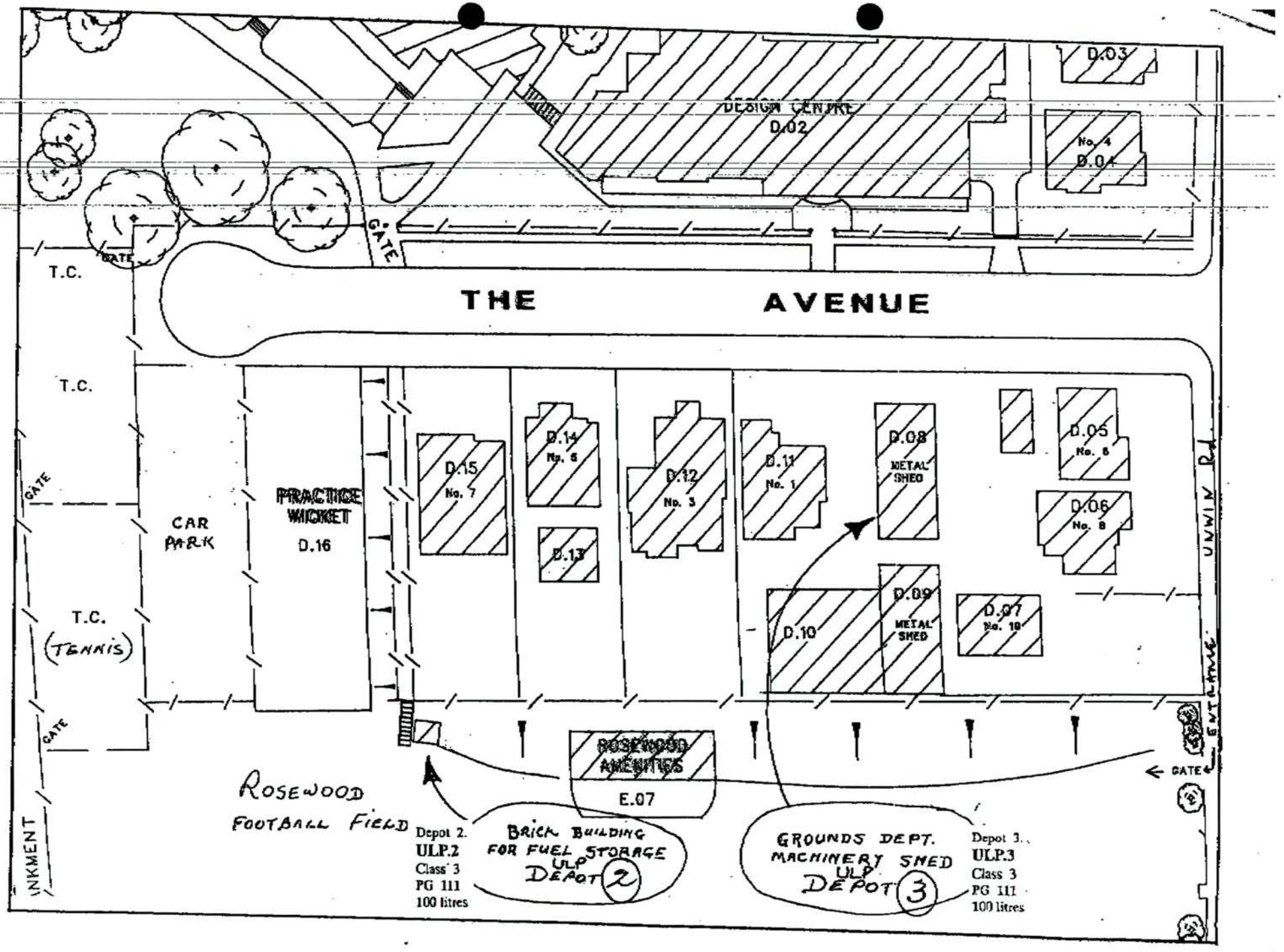
13. Signature of applicant: [signature] — Printed name: Dr. R.E. KEFFORD — Date: 10.9.02

Please send your application, marked *CONFIDENTIAL*, to: **Dangerous Goods Licensing, WorkCover NSW, Level 3, GPO Box 5364, SYDNEY NSW 2001**

35/035560







What is a depot? See page 5 of the Guidance Notes.

PART C – Dangerous Goods Storage *Complete one section per depot.*

If you have more depots than the space provided, photocopy sufficient sheets first.

Depot Number	Type of depot (see page 5)	Depot Class	Maximum storage capacity
POOL 1	Above ground tank in roofed store	DG 8	2,100 Litres

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³
1791	Hypochlorite solutions	8	III	Sodium hypochlorite Swimming Pool	2000	L

Depot Number	Type of depot (see page 5)	Depot Class	Maximum storage capacity
ULP 2	FLAMMABLE LIQUID CABINET	DG 3	250 Litres

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³
1203	PETROL	3	II	UNLEADED PETROL	40	L
N/A	DIESOLINE	N/A	N/A	DIESOLINE	20	L

Depot Number	Type of depot (see page 5)	Depot Class	Maximum storage capacity
ULP 3	FLAMMABLE LIQUID CABINET	DG 3	250 Litres

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³
1203	PETROL	3	II	UNLEADED PETROL	60	L
N/A	DIESOLINE	N/A	N/A	DIESOLINE	20	L

Depot Number	Type of depot (see page 5)	Depot Class	Maximum storage capacity

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³

Part D – Checklist for Toxic and Corrosive Goods

FOR 6.1 for depots for Class 6.1 or Class 8 dangerous goods.

Please fill in a separate form for each depot (that is, each tank, drum store etc) containing Class 6.1 or Class 8 goods.

Depot number POCL 1 Class ☐ 6.1 ☑ 8

Please state whether the storage area meets the following requirements by ticking the matching response. For correct storage, all applicable responses should be YES.

1 The Storage area clearly identified with appropriate diamond sign ☑ YES ☐ NO

2 The diamond sign is at least 250 mm x 250 mm. ☑ YES ☐ NO

3 The diamond sign is clearly visible from all approaches to the storage area. ☑ YES ☐ NO

4 Spillage containment is provided for liquid dangerous goods:
a) In packages – 25% of the total ☐ YES ☐ NO
b) In tanks (including IBCs) – at least 100% of the largest or only tank ☑ YES ☐ NO

Note: The bund wall for tanks must be located as described in the DG Regulation or appropriate Australian Standard, or see WorkCover leaflet DG072 for guidance.

5. The edge of the bund wall for the storage area (for liquids) or the nearest package (of solids) is ***AT LEAST 5 metres away from:***
a) Any dangerous goods of other classes ☑ YES ☐ NO
b) Any material that burns easily, including flammable liquids, waste paper, rags, hay, sawdust, dry grass, shrubs and overhanging tree branches ☑ YES ☐ NO
c) Anything that could react with the dangerous goods in the storage area ☑ YES ☐ NO
(For example, some acids could react dangerously with Class 6.1 goods, and incompatible corrosives and oxidizing substances could react dangerously with Class 8 goods. For information, see the MSDS, product labels or WorkCover leaflet DG064.)
d) Foodstuffs or packages for food (this requirement only applies for Class 6.1 goods) ☐ YES ☐ NO
☑ **No Class 6.1 goods in this depot**

6. At least one fire extinguisher of Type 2A60B(E) or better is provided in or near the storage area ☑ YES ☐ NO

7. The fire extinguisher is inspected at least every six months ☑ YES ☐ NO

8. All packages containing 500mL or 500g or more are marked with the correct diamond sign and the Proper Shipping Name ☑ YES ☐ NO

I certify that the information on this checklist is correct.

Signature of applicant: _____ Date 10/9/02

Position: Headmaster Printed name: Lorraine Kenrick

Please send your application, marked *CONFIDENTIAL*, to:
Dangerous Goods Licensing, WorkCover NSW, Level 3, GPO Box 5364 SYDNEY NSW 2001

Stamped for Barker College, 91 Pacific Hwy, Hornsby 2077, Depot No.POCL1 for 2100 L of Class 8. PG III in bulk

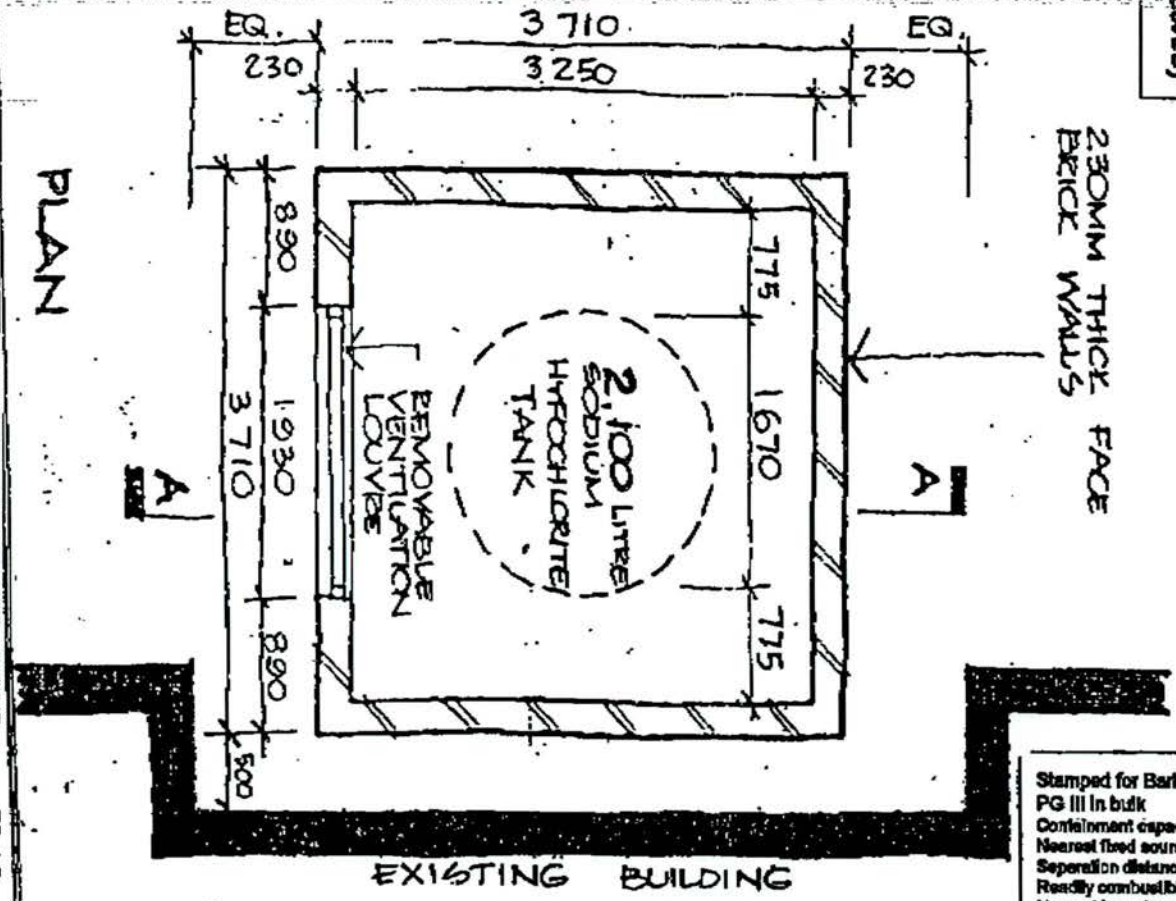
This plan conforms with the Dangerous Goods Act 1975 & AS 3780-1994.

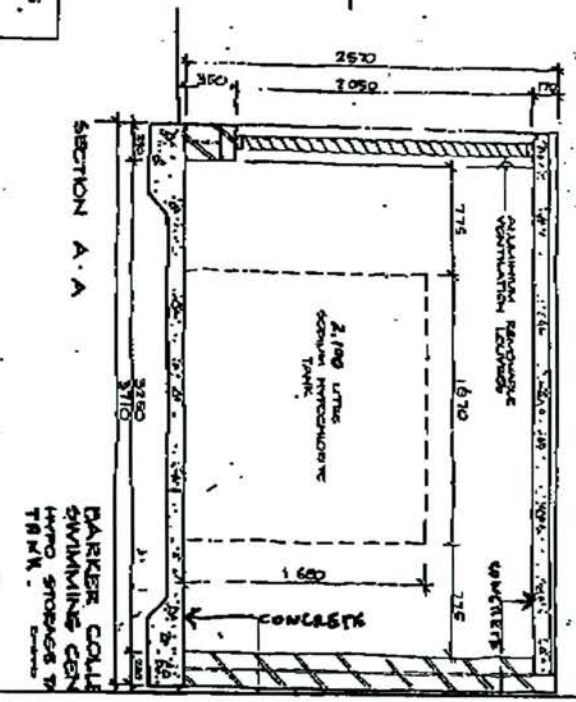
Signed by R Churches for ChemCARE Consulting Pty Ltd
19 September, 2002 based on information provided by the depot operator, the occupier.

DEPOT 1. POCL 1

Depot 1. POCL1 Class 8 PG III 2,100 litres

Note: Fill point is on process road 10 metres north. A functioning alarm system is in place. (MIGHT LOWER)





Stamped for Barker College, 91 Pacific Hwy, Hornsby 2077, Depot No.POCL1 for 2100 L of Class 8. PG III in bulk

Containment capacity	= 0.7X2.0 X2.5=3.5 cu.m
Nearest fired source of ignition	= Not relevant
Separation distances for depot -	
Readily combustible material	=> 5 m
Nearest boundary	=> 5 m
Nearest on-site facility -	=> 1 m but separated by liquid-tight wall.
Nearest protected work	=> 8 m
Nearest other DG depot	= Remote
Nearest storm water drain inlet	=> 10m

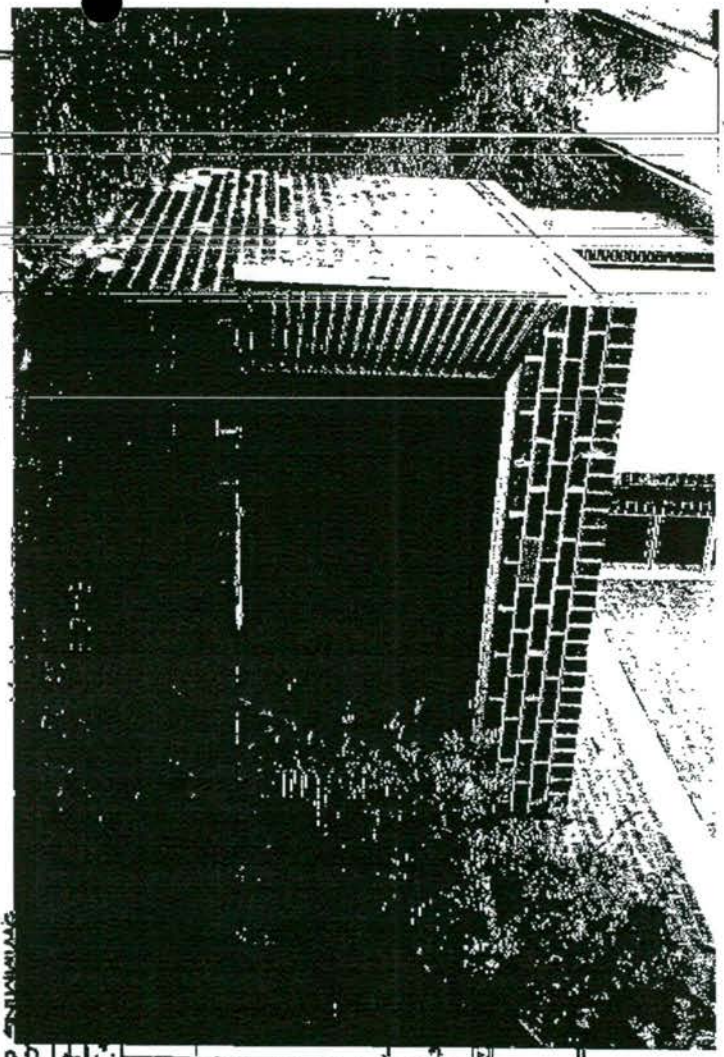
Dry powder extinguisher of capacity at least 2A 60(B)E deployed. Depot number, 250 mm Class 8 diamond and 50 mm text "Danger No Smoking" shown at each approach to depot.

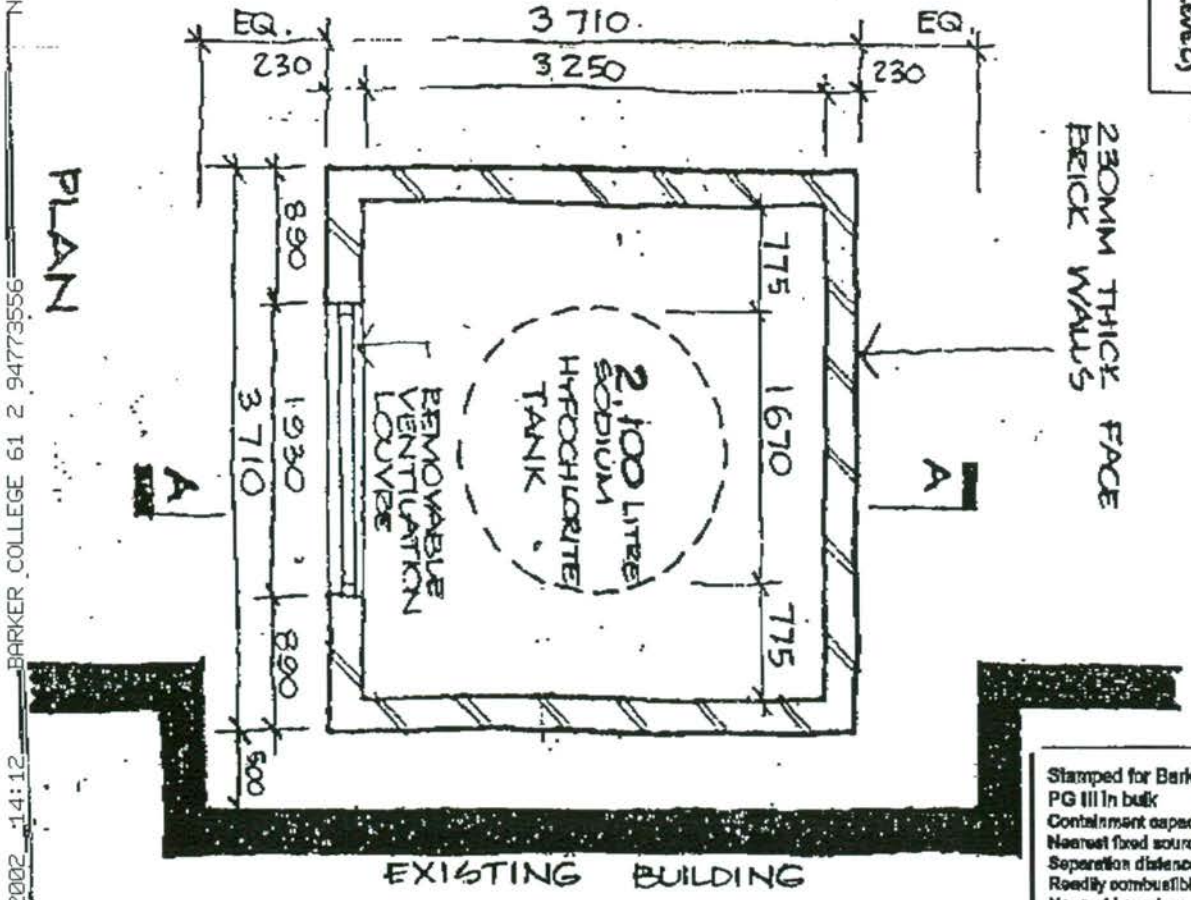
Stamped for Barker College, 91 Pacific Hwy, Hornsby 2077, Depot No.POCL1 for 2100 L of Class 8, PG III In bulk

This plan conforms with the Dangerous Goods Act 1975 & AS 3780-1994.

Signed by R Churches for ChemCARE Consulting Pty Ltd
19 September, 2002 based on information provided by the depot operator, the occupier.

Note: Fill point is on access road 70 metres north. A functioning alarm system is in place. (HIGH LEVEL)

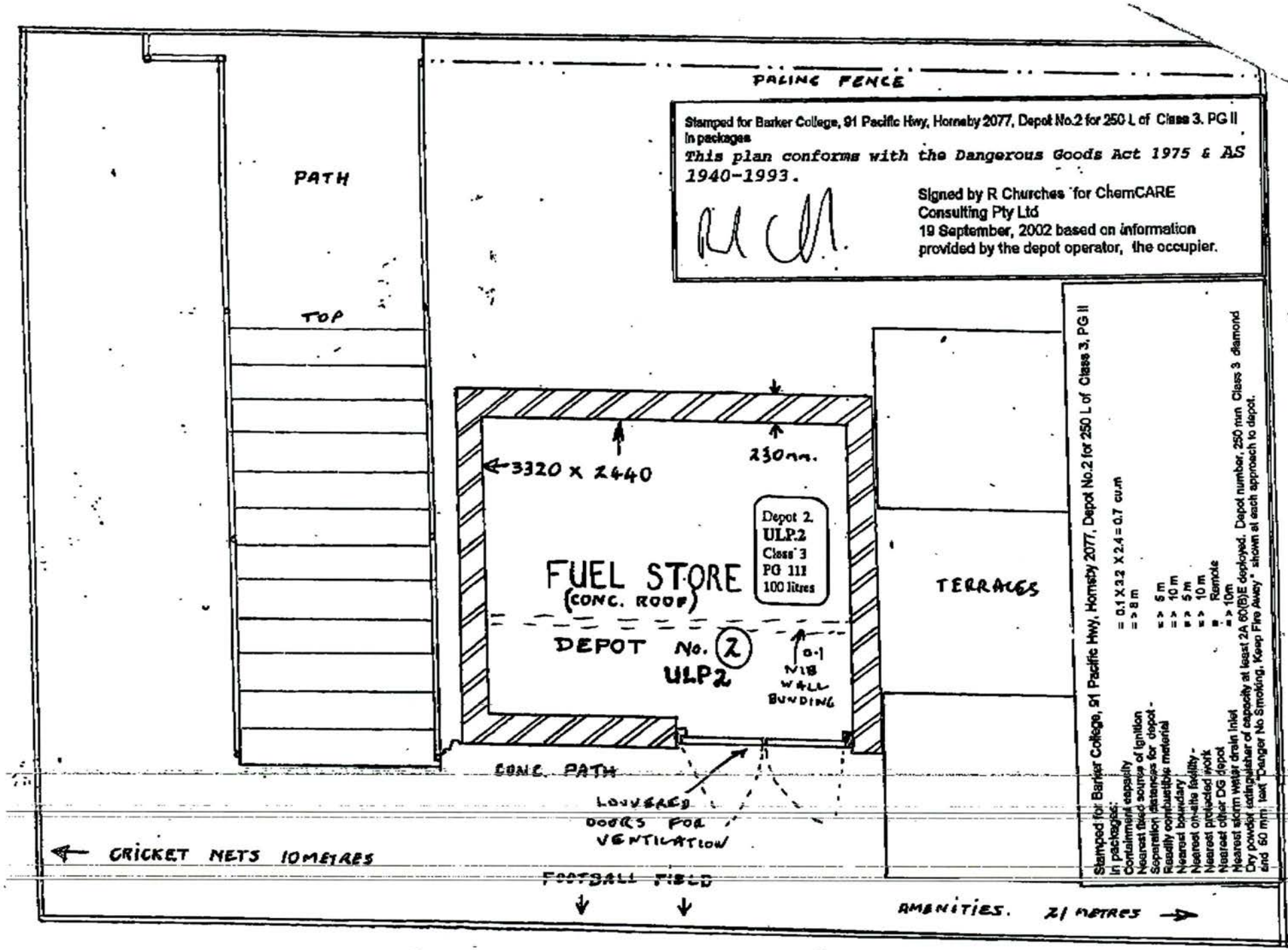


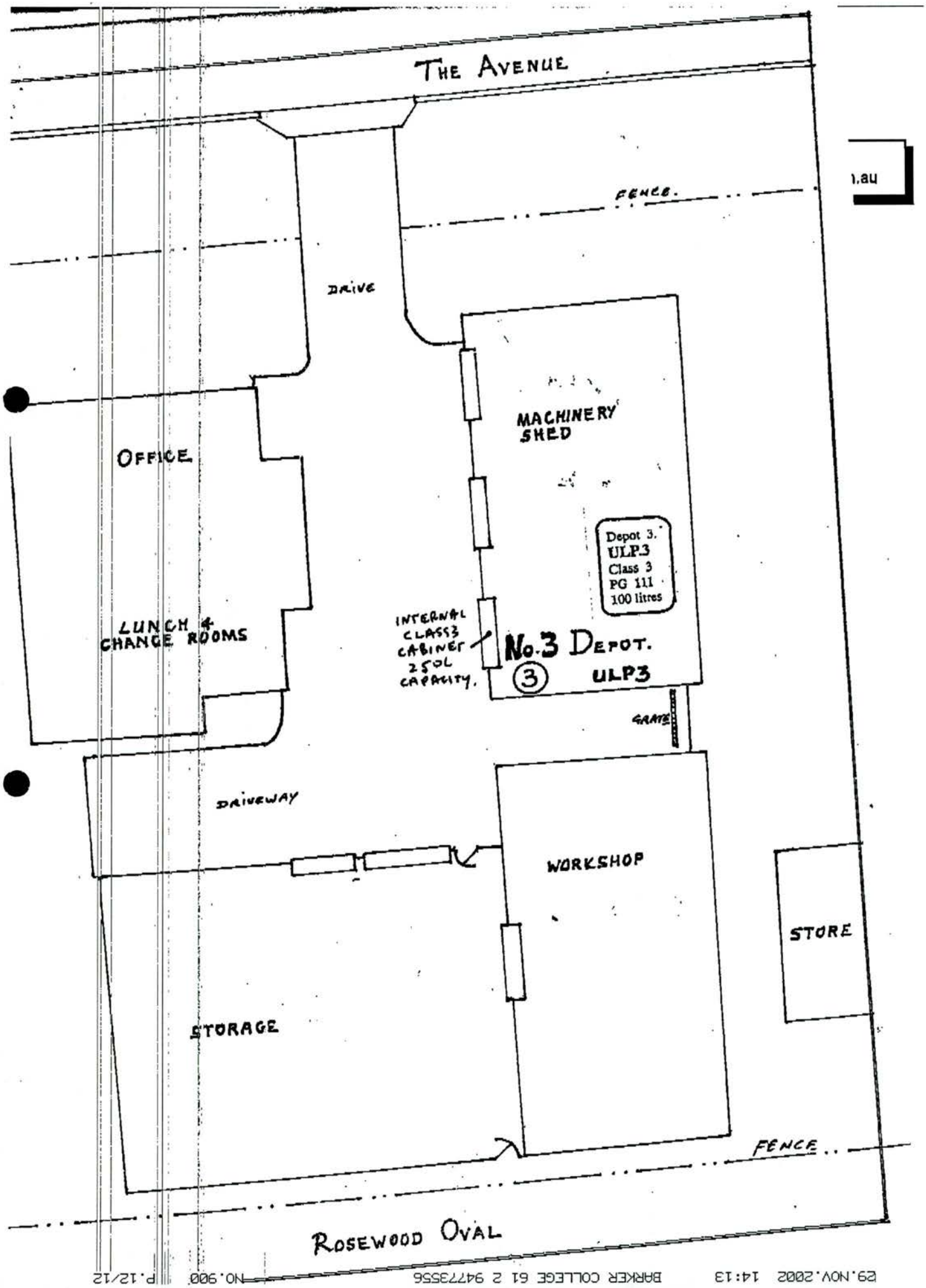


Stamped for Barker College, 91 Pacific Hwy, Hornsby 2077, Depot No.POCL1 for 2100 L of Class 8, PG III In bulk

Containment capacity	= 0.7 X 2.0 X 2.5 = 3.5 cu.m
Nearest fixed source of ignition	= Not relevant
Separation distances for depot -	
Readily combustible material	= > 5 m
Nearest boundary	= > 5 m
Nearest on-site facility -	= > 1 m but separated by liquid-tight wall.
Nearest protected work	= > 8 m
Nearest other DG depot	= Remote
Nearest storm water drain inlet	= > 10m

Dry powder extinguisher of capacity at least 2A 60(B)E deployed. Depot number, 250 mm Class 8 diamond and 50 mm text "Danger No Smoking" shown at each approach to depot.





35/035560

WORKCOVER NEW SOUTH WALES
DETAILS OF LICENCE FOR KEEPING DANGEROUS GOODS
8 January 2003

Licence Number 35/035560 **Expiry Date** 27/09/2003 **Number of Depots** 3

Licensee Details

Licensee BARKER COLLEGE
Trading Name
Postal Address 91 PACIFIC HWY HORNSBY NSW 2077
Licensee contact MARK MITCHELL Ph. 02 9487 1494 Fax. 02 9487 149

Site Details

Premises Licensed to Keep Dangerous Goods

BARKER COLLEGE
91 PACIFIC HWY HORNSBY NSW 2077

Nature of Site EDUCATION
Major Supplier of Dangerous Goods VARIOUS
Emergency contact for this site BARKER SWITCH Ph. 0418 971 816

Site staffing 24 HRS 7 DAYS

Details of Depots

Depot No	Depot Type	Goods Stored in depot	Qty
POCL 1	**ROOFED STORE**	**Class 8**	**2100 L**
	UN 1791 HYPOCHLORITE SOLUTION		2000 L
ULP 2	**FLAMMABLE LIQUIDS CABINET**	**Class 3**	**250 L**
	UN 00C1 DIESEL		20 L
	UN 1203 PETROL		40 L
ULP 3	**FLAMMABLE LIQUIDS CABINET**	**Class 3**	**250 L**
	UN 00C1 DIESEL		20 L
	UN 1203 PETROL		60 L

ChemCARE Consulting Pty Ltd 77A Copeland Road BEECROFT 2119 AUSTRALIA
Phone:02 9484 0506 Fax:02 9980 6555 Mobile:0419 333 900 e-mail: rolandc@chemcare.com.au

Chief Inspector of Dangerous Goods
WorkCover Authority NSW
GPO Box 5364
Sydney 2001

35/ new
Barker College
91 Pacific Highway Hornsby 2077
Application for a site DG storage licence

Attention: Michael Moore, coordinator DG licensing Ref.

Dear Mr Moore

Please find herewith, application for a site DG Storage licence. In order to achieve compliance of depots, a significant range of improvements have been made.

Stamped drawings of Depots POCL1 and No.2 have been appended, however, no stamped drawing has been provided for Depot No.3, as it is an internal Class 3 cabinet of approved type. Depot No. 3 is unvented and is satisfactorily located such that it is at least 3 m from any fixed source of ignition and does not prejudice any escape route.

Please phone should there be any query, in the absence of which, it is understood you will issue a licence within 20 days of receipt of this application.

Best regards,

Roland Churches.
Director
19 September, 2002

Attached:
Licence application
Stamped drawings for Depots POCL1 & No.2
Consultants checklist
Photo of Depot POCL1 prior to affixing placarding

CC Sue NEWNHAM / BARKER

d/e & issue new DG licence

CONSULTANT'S CHECKLIST

DG Licence No. of site (if known) *OR* **Company Name / Site address** BARKER COLLEGE - 91 PACIFIC HWY HORNSBY P/Code 2077

35 / NEW

All plans of DG depots stamped by consultants and submitted in support of DG licence applications MUST include descriptive details, shown on the plan or in additional attached notes, which will allow future auditing of the on-going conformance of the depot.

If plans and accompanying details are inadequate for this purpose, they will be returned for further action.

Depot Number to which this Checklist applies:- (*You may list up to four depots per sheet*)..... | POCL 1 | 2 | | |

Does the attached plan clearly identify the following details (as far as relevant) for the designated depot?
Write **"Yes"** , **"No"** , **"N/A"** (not applicable) or descriptive note for each part:

1	Is the Depot No. or Name shown prominently?	Y	Y		
2	Is the Class of dangerous goods shown?	Y	Y		
3	Is the Packing Group included?	Y	Y		
4	Has its Maximum storage capacity (L, kg, m³, etc.) been indicated?	Y	Y		
5	Will **open packages** of Class 3 liquids be handled? (Influences separation distance compliance)	N/A	N		
6	Does it show a **description** of **major design features** (for example: "steel frame with metal cladding" or "masonry walls with sheetmetal roof" or "flammable liquids cabinet complying with AS1940-1993" or "underground tank" etc.)?.....	Y	Y		
	As well as **fire resistance levels** (FRL) (triple rating eg 240/240/240) of walls and doors?..	N/A	N/A		
7	Are **Ventilation** details (vent sizes, locations, fan capacity, duct flame arrestors) shown?....	Y	Y		
8	Are **Spillage containment** design details and capacity shown?	Y	Y		
	Is the **Spill locus conformity** (26.5º angle) for tank bunding, all sides, shown on plan?.....	Y	N/A		
9	Has **Segregation** from incompatible goods been addressed?..... (applies also for different goods of the same Class within Class 5.1 and Class8 depots).	Y	Y		
10	Are the minimum **Separation distances** shown to: other DG depots?.....	Y	Y		
	ignition sources?.....	Y	Y		
	on-site facilities?.....	Y	Y		
	off-site protected works?.....	Y	Y		
	boundaries and fences?.....	Y	Y		
	Include distances to Protected Works/Public Places located up to twice the compliance distances away, across any boundary. *A plan drawn to scale is preferred, otherwise all relevant actual measurements must be shown at appropriate locations on the plan.*				
11	Are **Fire protection** fixtures (sprinklers, hydrants, hosereels, foam facilities etc) shown?....	Y	Y		
12	Have other **significant features**, such as open drains in relation to gas storage, steeply sloping sites, proximity to water bodies or stormwater drains etc been included?.....	Y	Y		

DGAC-CLF November 1997

N/A = NOT APPLICABLE

ROLAND CHURCHER
19 SEPT 2002

Application for Licence to Keep Dangerous Goods

WorkCover NEW SOUTH WALES

Application for ☑ new licence ☐ amendment ☐ transfer ☐ renewal of expired licence

PART A – Applicant and site information See page 2 of Guidance Notes.

1 Name of applicant: BARKER COLLEGE — ACN: 620620356

2 Postal address of applicant: 91 PACIFIC HIGHWAY — Suburb/Town: HORNSBY — Postcode: 2077

3 Trading name or site occupier's name: N/A.

4 Contact for licence inquiries

Phone	Fax	Name
(02) 9487 1494	(02) 9487 1494	MARK MITCHELL (GROUNDS MANAGER)

5 Previous licence number (if known): 35/ N/A 035560.

6 Previous occupier (if known): N/A

7 Site to be licensed

No	Street
91	PACIFIC HIGHWAY

Suburb / Town: HORNSBY — Postcode: 2077

8 Main business of site: SCHOOL

9 Site staffing: Hours per day: 24 — Days per week: 7

10 Site emergency contact

Phone	Name
(02) 9477 8399	~~ATAM~~ "BARKER SWITCH" (BUSINESS HOURS)
0418 971 816	ARROW SECURITY (AFTER HOURS)

11 Major supplier of dangerous goods: SHELL / AMPOL + SPECTRUM Distrib.

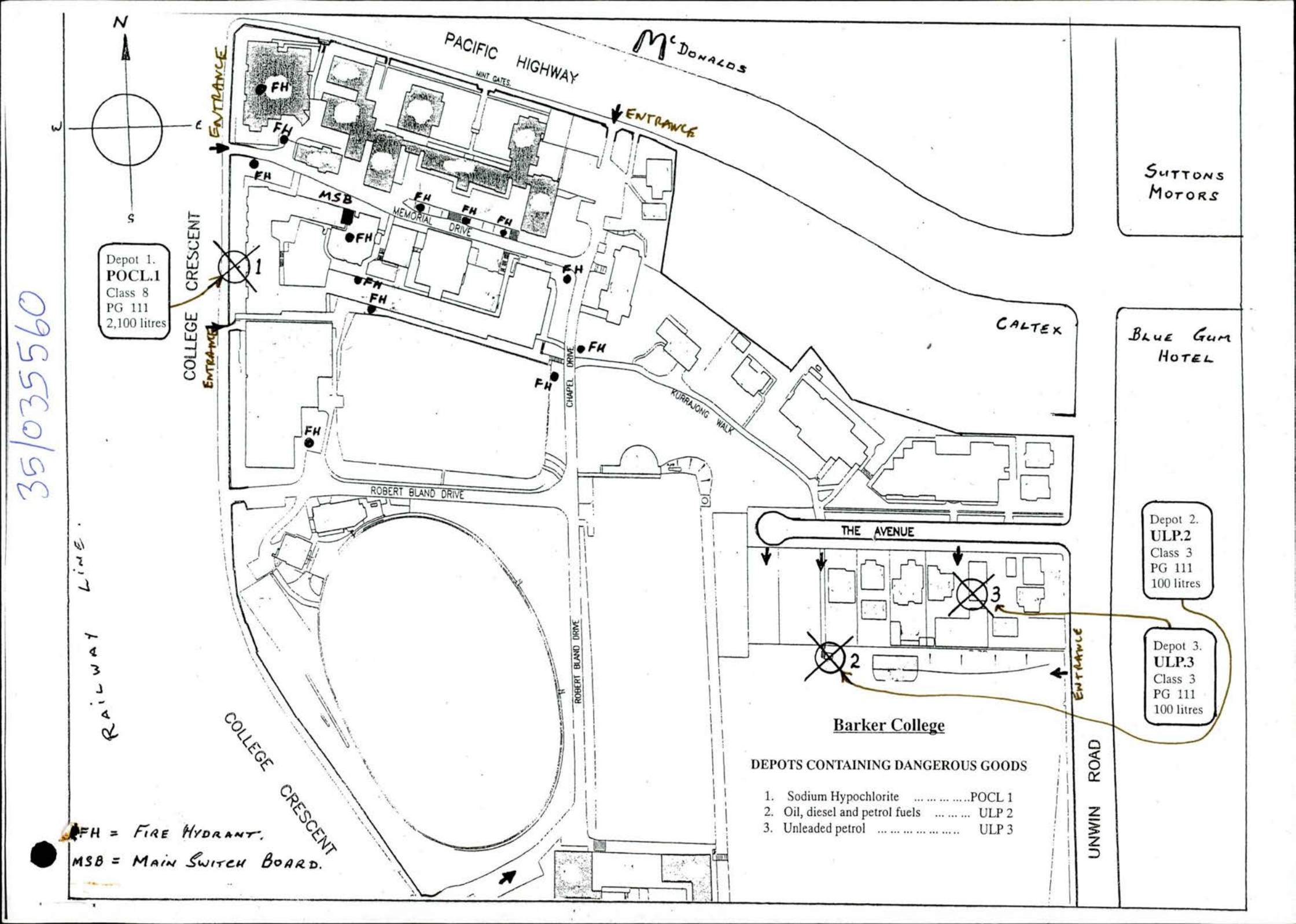
12 If a new site or for amendments to depots – see page 4 of Guidance Notes.

Plan stamped by: Name of Accredited Consultant: ROLAND CHURCHES / ChemCARE — Date stamped: 19/9/02

I certify that the details in this application (including any accompanying computer disk) are correct and cover all licensable quantities of dangerous goods kept on the premises.

13 Signature of applicant — Printed name: Dr. R.E. KEFFORD — Date: 10.9.02

Please send your application, marked *CONFIDENTIAL*, to: **Dangerous Goods Licensing, WorkCover NSW, Level 3, GPO Box 5364, SYDNEY NSW 2001**



Barker College

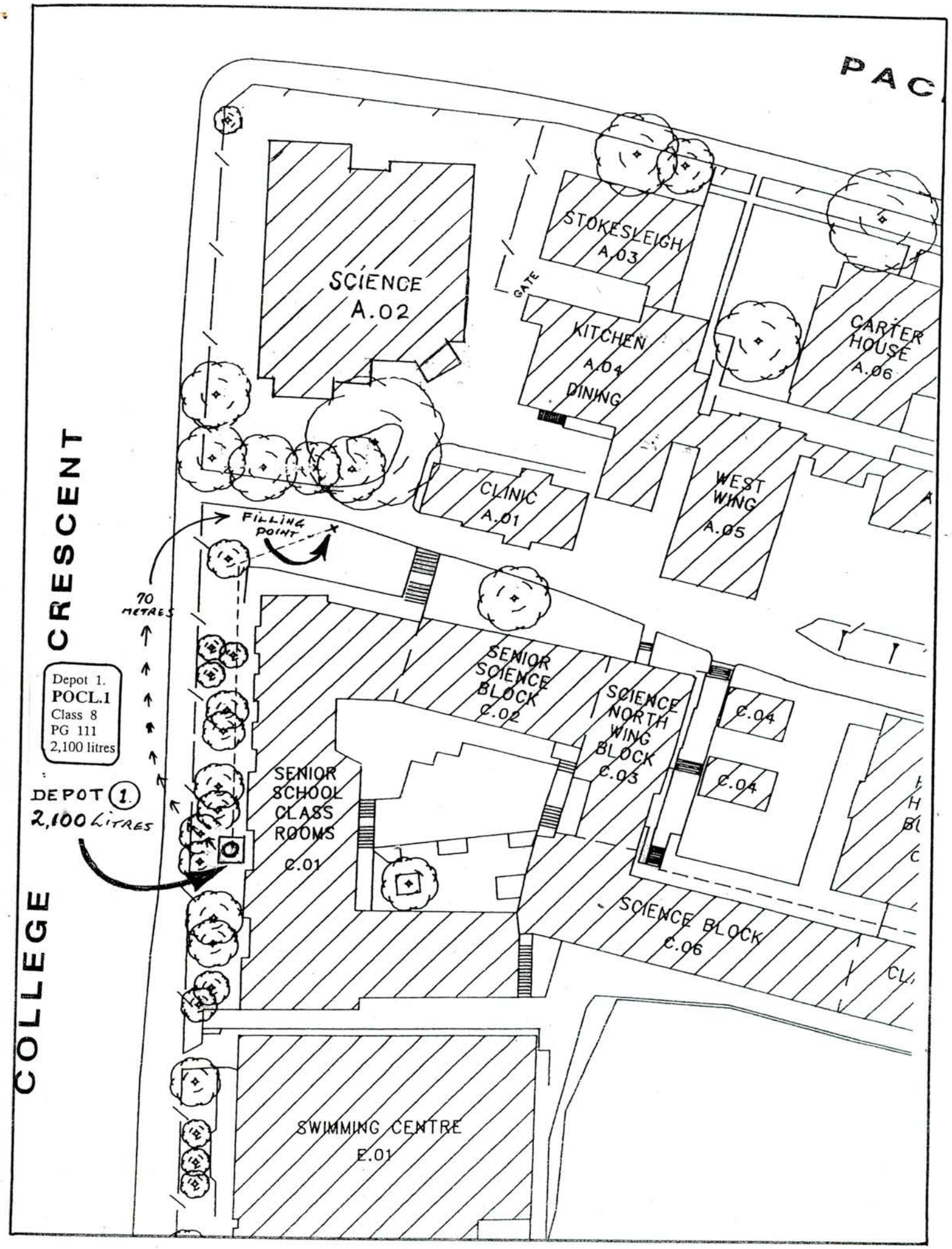
DEPOTS CONTAINING DANGEROUS GOODS

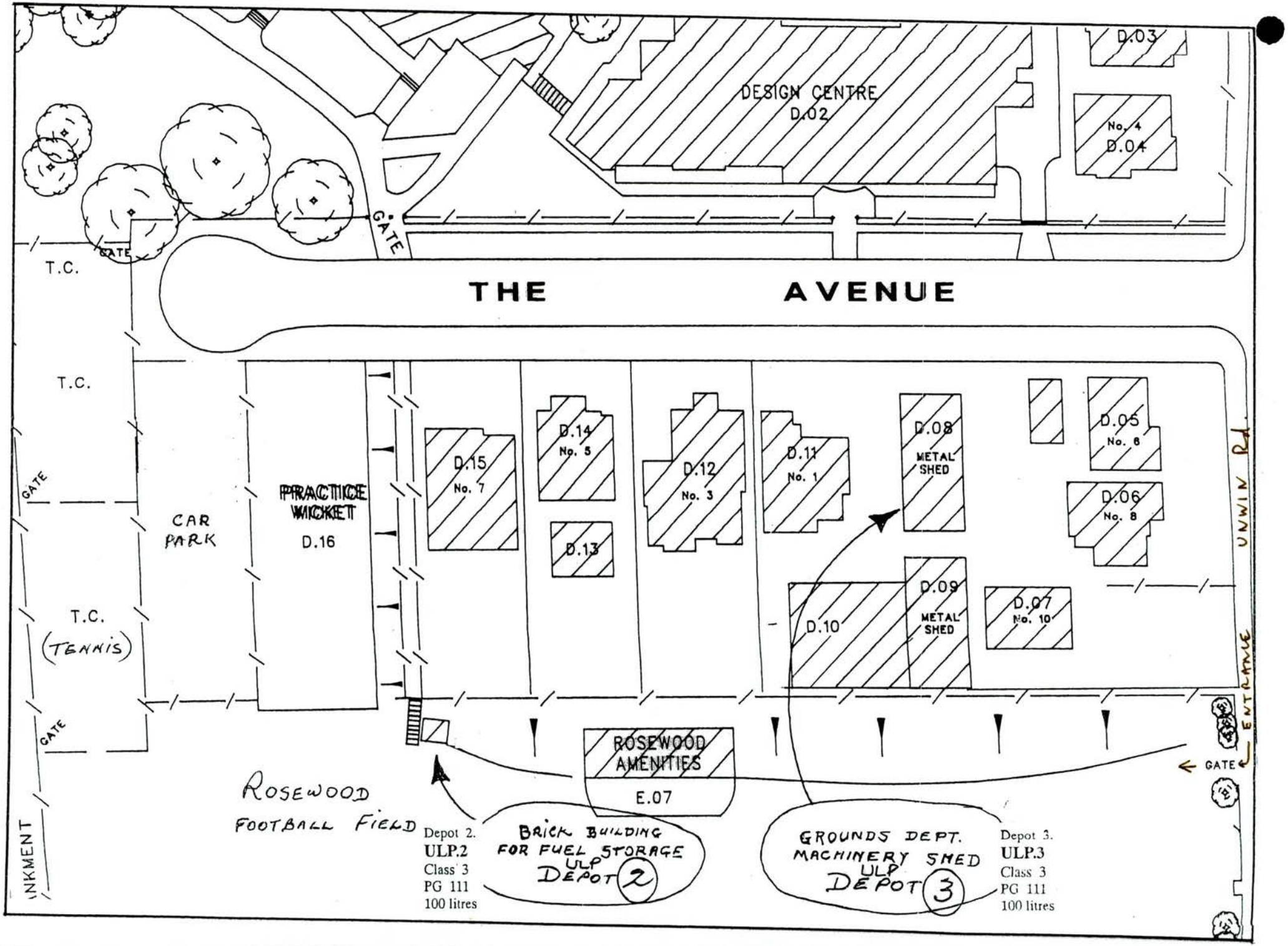
1. Sodium Hypochlorite ..... POCL 1
2. Oil, diesel and petrol fuels ..... ULP 2
3. Unleaded petrol ..... ULP 3

35/035560


24 2 02


BARKER
COLLEGE
DEPOT POCL1
Kodak
Royal
PAPER
Kodak
PAPER


PAC
SCIENCE
A.02
STOKESLEIGH
A.03
GATE
KITCHEN
A.04
DINING
CARTER
HOUSE
A.06
CLINIC
A.01
WEST
WING
A.05
FILLING
POINT
70
METRES
CRESCENT
Depot 1.
POCL.1
Class 8
PG 111
2,100 litres
DEPOT (1)
2,100 LITRES
SENIOR
SCIENCE
BLOCK
C.02
SCIENCE
NORTH
WING
BLOCK
C.03
C.04
C.04
SENIOR
SCHOOL
CLASS
ROOMS
C.01
SCIENCE BLOCK
C.06
COLLEGE
SWIMMING CENTRE
E.01


DESIGN CENTRE
D.02
D.03
No. 4
D.04
GATE
GATE
T.C.
THE AVENUE
T.C.
GATE
CAR PARK
PRACTICE WICKET
D.16
D.15
No. 7
D.14
No. 5
D.13
D.12
No. 3
D.11
No. 1
D.08
METAL SHED
D.05
No. 6
D.06
No. 8
D.09
METAL SHED
D.07
No. 10
D.10
UNWIN Rd.
ENTRANCE
GATE
T.C.
(TENNIS)
GATE
ROSEWOOD AMENITIES
E.07
ROSEWOOD
FOOTBALL FIELD
BRICK BUILDING FOR FUEL STORAGE
ULP
DEPOT 2
GROUNDS DEPT. MACHINERY SHED
ULP
DEPOT 3
Depot 2.
ULP.2
Class 3
PG 111
100 litres
Depot 3.
ULP.3
Class 3
PG 111
100 litres

What is a depot? See page 5 of the Guidance Notes.

PART C – Dangerous Goods Storage *Complete one section per depot.*

If you have more depots than the space provided, photocopy sufficient sheets first.

Depot Number	Type of depot (see page 5)	Depot Class	Maximum storage capacity
POCL 1	Above ground tank in roofed store	DG 8	2,100 Litres

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³
1791	Hypochlorite solutions	8	III	Sodium hypochlorite Swimming Pool	2000	L

Depot Number	Type of depot (see page 5)	Depot Class	Maximum storage capacity
VLP 2	FLAMMABLE LIQUID CABINET	DG 3	250 Litres

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³
1203	PETROL	3	II	UNLEADED PETROL	40	L
N/A	DIESOLINE	N/A	N/A	DIESOLINE	20	L

Depot Number	Type of depot (see page 5)	Depot Class	Maximum storage capacity
VLP 3	FLAMMABLE LIQUID CABINET	DG 3	250 Litres

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³
1203	PETROL	3	II	UNLEADED PETROL	60	L
N/A	DIESOLINE	N/A	N/A	DIESOLINE	20	L

Depot Number	Type of depot (see page 5)	Depot Class	Maximum storage capacity

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or common name	Typical quantity	Unit, e.g. L, kg, m³

Part D – Checklist for Toxic and Corrosive Goods

ONLY For depots for Class 6.1 or Class 8 dangerous goods

Please fill in a separate form for each depot (that is, each tank, drum store etc) containing Class 6.1 or Class 8 goods.

Depot number POCL 1 Class ☐ 6.1 ☑ 8

Please state whether the storage area meets the following requirements by ticking the matching response. For correct storage, all applicable responses should be YES.

1 The Storage area clearly identified with appropriate diamond sign ☑ YES ☐ NO

2 The diamond sign is at least 250 mm x 250 mm. ☑ YES ☐ NO

3 The diamond sign is clearly visible from all approaches to the storage area. ☑ YES ☐ NO

4 Spillage containment is provided for liquid dangerous goods:
   a) In packages – 25% of the total ☐ YES ☐ NO
   b) In tanks (including IBCs) – at least 100% of the largest or only tank ☑ YES ☐ NO

Note: The bund wall for tanks must be located as described in the DG Regulation or appropriate Australian Standard, or see WorkCover leaflet DG072 for guidance.

5. The edge of the bund wall for the storage area (for liquids) or the nearest package (of solids) is ***AT LEAST 5 metres away from:***
   a) Any dangerous goods of other classes ☑ YES ☐ NO
   b) Any material that burns easily, including flammable liquids, waste paper, rags, hay, sawdust, dry grass, shrubs and overhanging tree branches ☑ YES ☐ NO
   c) Anything that could react with the dangerous goods in the storage area ☑ YES ☐ NO
   (For example, some acids could react dangerously with Class 6.1 goods, and incompatible corrosives and oxidizing substances could react dangerously with Class 8 goods. For information, see the MSDS, product labels or WorkCover leaflet DG064.)
   d) Foodstuffs or packages for food (this requirement only applies for Class 6.1 goods) ☐ YES ☐ NO ☑ **No Class 6.1 goods in this depot**

6. At least one fire extinguisher of Type 2A60B(E) or better is provided in or near the storage area ☑ YES ☐ NO

7. The fire extinguisher is inspected at least every six months ☑ YES ☐ NO

8. All packages containing 500mL or 500g or more are marked with the correct diamond sign and the Proper Shipping Name ☑ YES ☐ NO

I certify that the information on this checklist is correct.

Signature of applicant: _____ Date 10/9/02

Position: Warehouse Printed name: Lorraine Kenrick

Please send your application, marked *CONFIDENTIAL*, to:
Dangerous Goods Licensing, WorkCover NSW, Level 3, GPO Box 5364 SYDNEY NSW 2001

Stamped for Barker College, 91 Pacific Hwy, Hornsby 2077, Depot No.POCL1 for 2100 L of Class 8. PG III in bulk

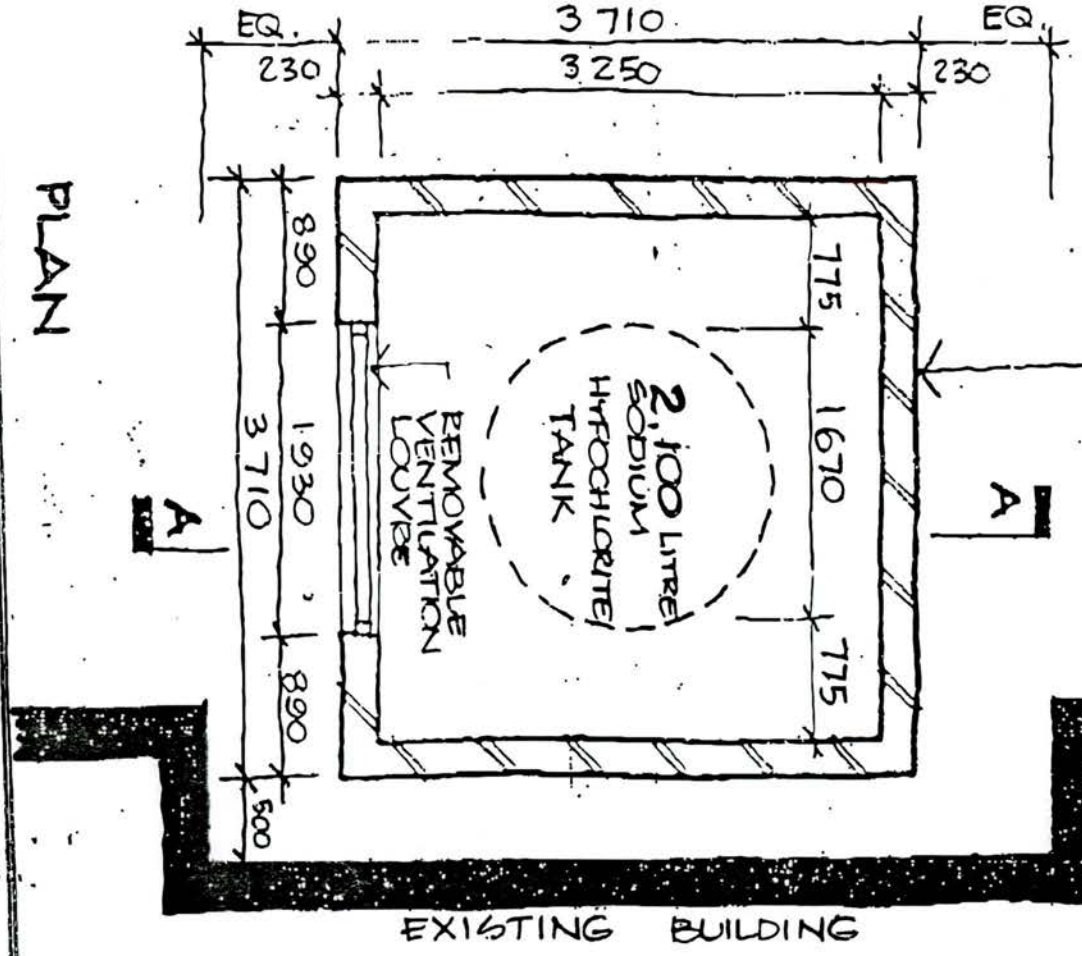
This plan conforms with the Dangerous Goods Act 1975 & AS 3780-1994.

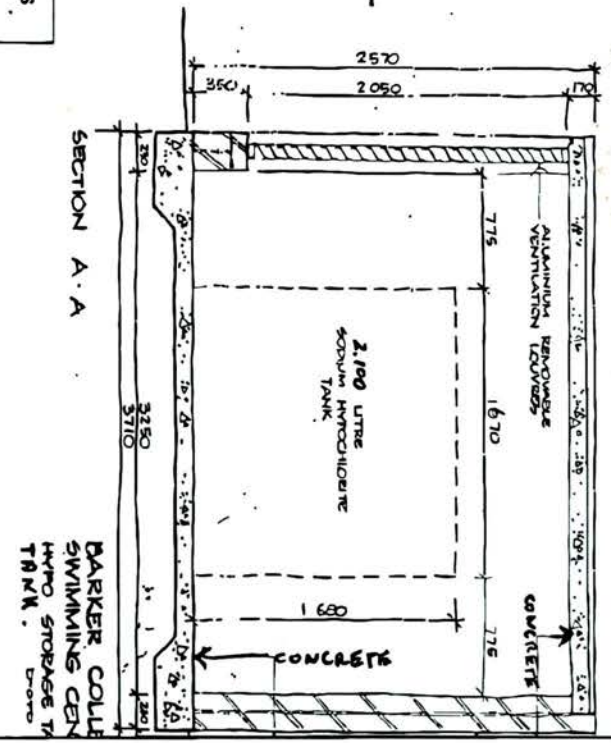
Signed by R Churches for ChemCARE Consulting Pty Ltd
19 September, 2002 based on information provided by the depot operator, the occupier.

DEPOT 1. POCL1

Depot 1.
POCL1
Class 8
PG III
2,100 litres

Note: Fill point is on access road 70 metres north.
A functioning alarm system is in place. (HIGH LEVEL)

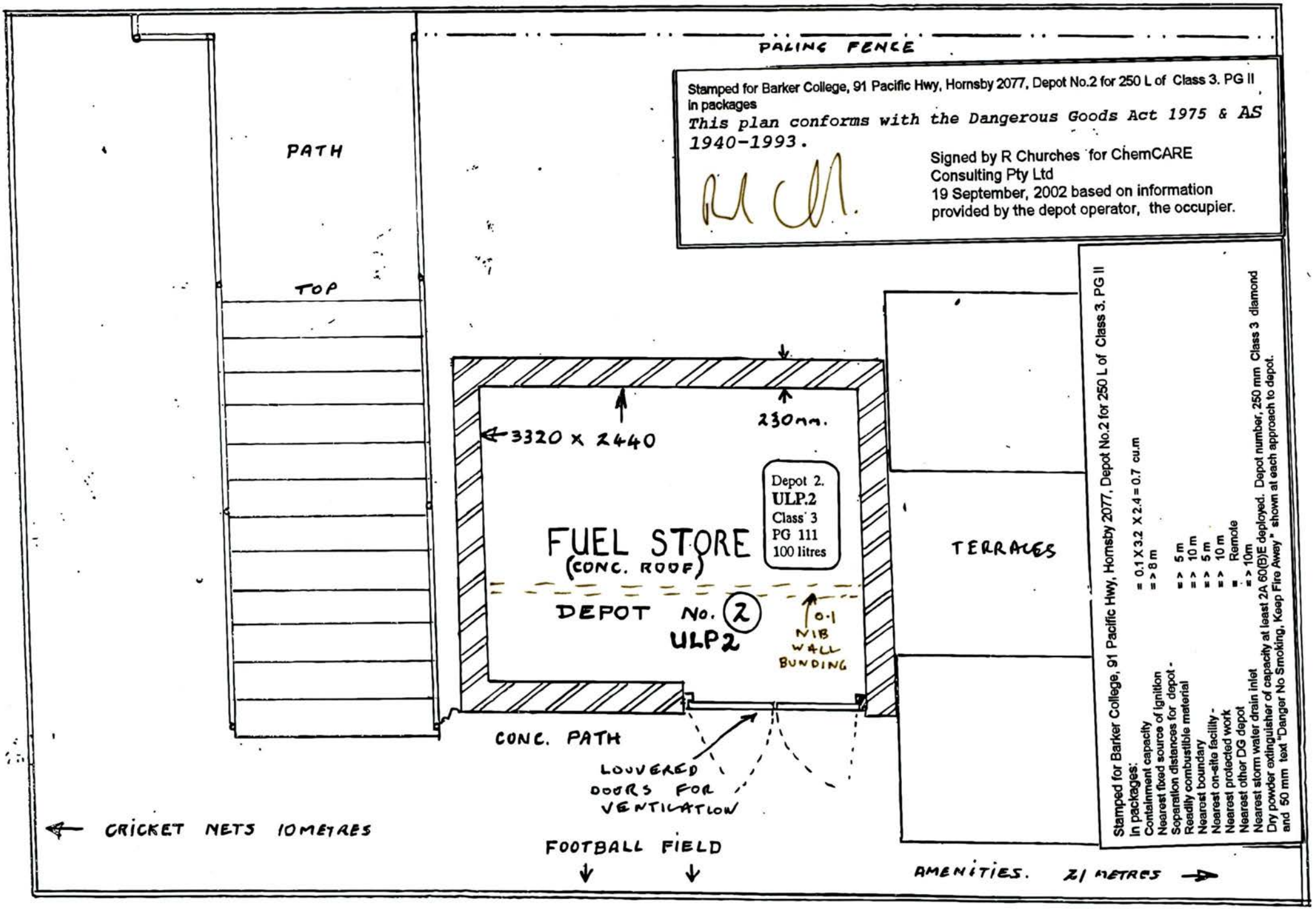


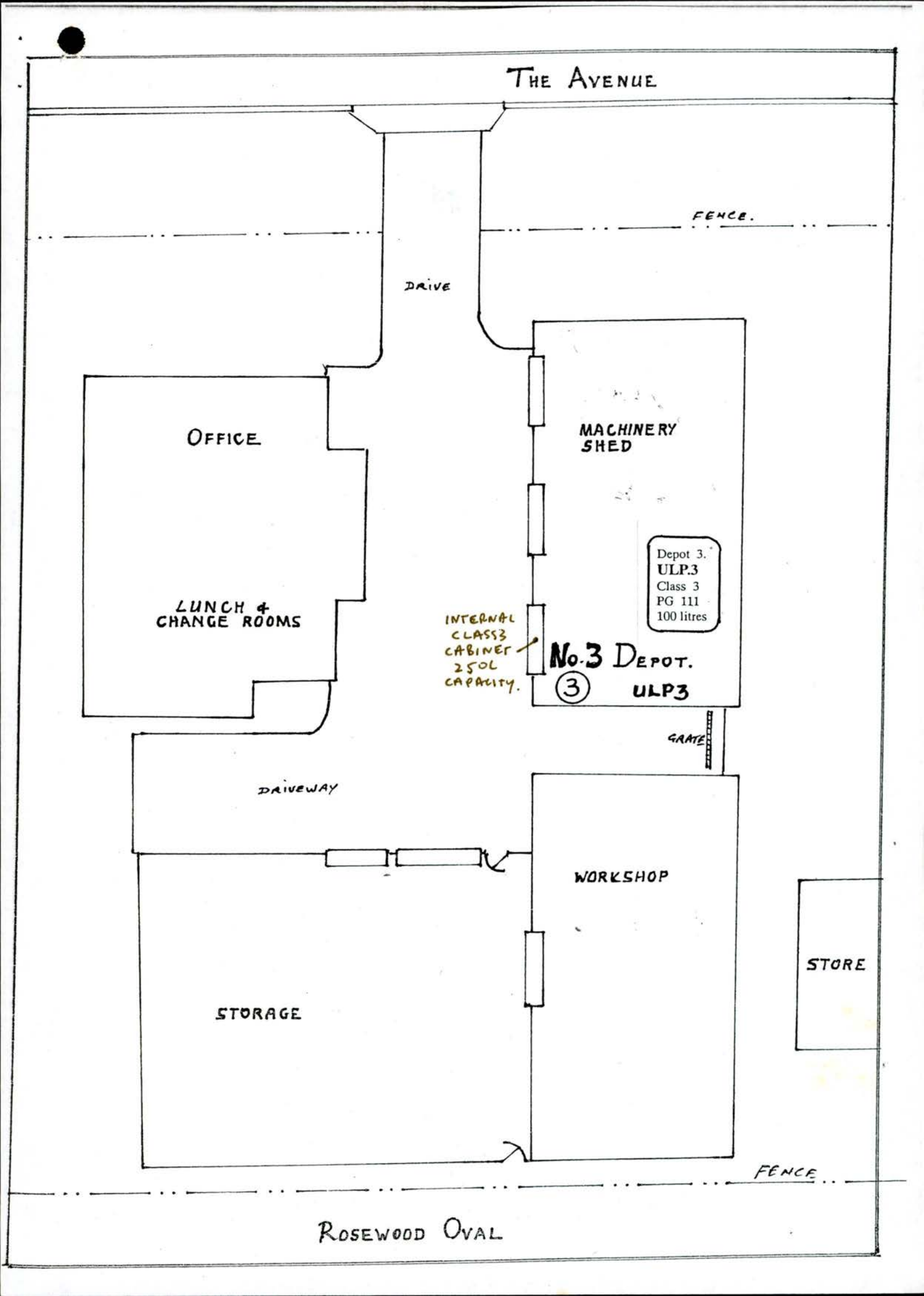


Stamped for Barker College, 91 Pacific Hwy, Hornsby 2077, Depot No.POCL1 for 2100 L of Class 8. PG III in bulk

Containment capacity	= 0.7 X 2.0 X 2.5 = 3.5 cu.m
Nearest fixed source of ignition	= Not relevant
Separation distances for depot -	
Readily combustible material	= > 5 m
Nearest boundary	= > 5 m
Nearest on-site facility -	= > 1 m but separated by liquid-tight wall.
Nearest protected work	= > 8 m
Nearest other DG depot	= Remote
Nearest storm water drain inlet	= > 10m

Dry powder extinguisher of capacity at least 2A 60(B)E deployed. Depot number, 250 mm Class 8 diamond and 50 mm text "Danger No Smoking " shown at each approach to depot.


PALING FENCE
PATH
TOP
3320 x 2440
230mm.
Depot 2.
ULP.2
Class 3
PG 111
100 litres
FUEL STORE
(CONC. ROOF)
DEPOT No. 2
ULP2
0.1 NIB WALL BUNDING
TERRACES
CONC. PATH
LOUVERED DOORS FOR VENTILATION
CRICKET NETS 10METRES
FOOTBALL FIELD
AMENITIES. 21 METRES
Stamped for Barker College, 91 Pacific Hwy, Hornsby 2077, Depot No.2 for 250 L of Class 3. PG II in packages
This plan conforms with the Dangerous Goods Act 1975 & AS 1940-1993.
Signed by R Churches for ChemCARE Consulting Pty Ltd
19 September, 2002 based on information provided by the depot operator, the occupier.
Stamped for Barker College, 91 Pacific Hwy, Hornsby 2077, Depot No.2 for 250 L of Class 3. PG II
In packages:
Containment capacity = 0.1 X 3.2 X 2.4 = 0.7 cu.m
Nearest fixed source of ignition = > 8 m
Separation distances for depot -
Readily combustible material = > 5 m
Nearest boundary = > 10 m
Nearest on-site facility - = > 5 m
Nearest protected work = > 10 m
Nearest other DG depot = Remote
Nearest storm water drain inlet = > 10m
Dry powder extinguisher of capacity at least 2A 60(B)E deployed. Depot number, 250 mm Class 3 diamond and 50 mm text "Danger No Smoking, Keep Fire Away" shown at each approach to depot.


THE AVENUE
FENCE.
DRIVE
OFFICE
LUNCH & CHANGE ROOMS
MACHINERY SHED
Depot 3.
ULP.3
Class 3
PG 111
100 litres
INTERNAL CLASS3 CABINET 250L CAPACITY.
No.3 DEPOT.
3
ULP3
GATE
DRIVEWAY
WORKSHOP
STORE
STORAGE
FENCE
ROSEWOOD OVAL

Access Office Systems
Tel: 02 9519 0720 Prod. No. 9712-WC2

Appendix C: Laboratory Results Summary Tables

ABBREVIATIONS AND EXPLANATIONS

Abbreviations used in the Tables:

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

Table Specific Explanations:

HIL Tables:

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

EIL/ESL Table:

Site specific ABC values for specific metals have been adopted.

Waste Classification and TCLP Table:

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

QA/QC Table:

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

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

All data in mg/kg unless stated otherwise			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES (OCPs)							OP PESTICIDES (OPPs)	TOTAL PCBs	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	Carcinogenic PAHs	HCB	Endosulfan	Methoxychlor	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Chlorpyrifos		
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100
Site Assessment Criteria (SAC)			100	20	100	6000	300	40	400	7400	300	3	10	270	300	6	50	240	6	160	1	Detected/Not Detected
Sample Reference	**Sample Depth**	**Sample Description**																				
BH1	0.12-0.2	F: Silty Clayey Sand	**6**	<0.4	**9**	**28**	**20**	**0.1**	**4**	**24**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH1 - [LAB_DUP]	0.12-0.2	F: Silty Clayey Sand	**4**	<0.4	**7**	**46**	**22**	<0.1	**5**	**28**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH1 - [TRIPLICATE]	0.12-0.2	F: Silty Clayey Sand	**5**	<0.4	**7**	**36**	**19**	<0.1	**5**	**31**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH2	0-0.1	F: Silty Clayey Sand	<4	<0.4	**10**	**11**	**9**	<0.1	**14**	**24**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH2	0.3-0.6	F: Silty Clay	**4**	<0.4	**11**	**15**	**23**	<0.1	**6**	**30**	**1.2**	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH3	0-0.1	F: Silty Sandy Clay	**6**	<0.4	**17**	**140**	**44**	<0.1	**11**	**70**	**0.06**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH4	0.2-0.4	F: Silty Clay	**4**	<0.4	**16**	**9**	**16**	<0.1	**9**	**13**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH5	0.1-0.3	F: Silty Sand	<4	<0.4	**6**	**59**	**2**	<0.1	**78**	**23**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH5	0.3-0.8	Silty Clay	<4	<0.4	**3**	**13**	**4**	<0.1	<1	**2**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH6	0-0.1	F: Silty Sand	**4**	<0.4	**5**	**7**	**6**	<0.1	**2**	**20**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH6	0.1-0.3	F: Silty Sandy Clay	<4	<0.4	**7**	**7**	**12**	<0.1	**4**	**23**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH7	0-0.1	F: Silty Sand	<4	<0.4	**3**	**2**	**2**	<0.1	<1	**5**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH8	0.05-0.15	F: Silty Clay	**5**	<0.4	**12**	**14**	**20**	<0.1	**3**	**18**	**1.3**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH8 - [LAB_DUP]	0.05-0.15	F: Silty Clay	**5**	<0.4	**10**	**14**	**20**	<0.1	**3**	**20**	**0.97**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH9	0-0.1	F: Silty Clay	**5**	<0.4	**12**	**12**	**30**	<0.1	**4**	**32**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH10	0.13-0.2	F: Silty Clayey Sand	<4	<0.4	**15**	**160**	**30**	<0.1	**18**	**46**	**1.8**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH11	0.13-0.17	F: Silty Clayey Sand	<4	<0.4	**7**	**100**	**10**	**0.2**	**7**	**21**	**0.07**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH12	0.13-0.17	F: Silty Clayey Sand	<4	<0.4	**46**	**57**	**24**	<0.1	**28**	**33**	**1.7**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH13	0.12-0.13	F: Silty Clayey Sand	<4	<0.4	**13**	**75**	**20**	<0.1	**16**	**40**	**0.3**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH14	0.1-0.4	F: Silty Sand	<4	<0.4	**5**	**9**	**6**	<0.1	**4**	**27**	**2.9**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH14	0.4-1.0	F: Silty Clay	**5**	<0.4	**11**	**6**	**18**	<0.1	**2**	**13**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH14	1.8-2.4	Silty Clay	**5**	<0.4	**12**	**8**	**40**	<0.1	**2**	**48**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH15	0.1-0.5	F: Silty Sand	<4	<0.4	**5**	**7**	**6**	<0.1	**3**	**25**	**4.2**	**0.5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH15 - [LAB_DUP]	0.1-0.5	F: Silty Sand	<4	<0.4	**3**	**4**	**4**	<0.1	**2**	**17**	**3.4**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH15 - [TRIPLICATE]	0.1-0.5	F: Silty Sand	<4	<0.4	**4**	**6**	**6**	<0.1	**3**	**51**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH15	0.5-0.9	Silty Clay	**7**	<0.4	**12**	**4**	**11**	<0.1	**1**	**45**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH16	0.17-0.4	F: Silty Sandy Clay	<4	**1**	**8**	**28**	**21**	**0.1**	**5**	**31**	**1.6**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH16	0.4-1.0	F: Silty Clay	**7**	**0.5**	**19**	**54**	**140**	**0.4**	**14**	**180**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH17	0.2-0.3	F: Silty Sandy Clay	<4	<0.4	**8**	**18**	**26**	<0.1	**4**	**28**	**47**	**4.7**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH17	0.3-1.0	Silty Sandy Clay	<4	<0.4	**9**	<1	**5**	<0.1	<1	**1**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP1	-	Fill	**9**	<0.4	**12**	<1	**6**	<0.1	<1	**1**	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP2	-	Fill	<4	<0.4	**4**	**5**	**7**	<0.1	**2**	**17**	<0.05	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SDUP3	-	Fill	**5**	<0.4	**13**	**130**	**42**	<0.1	**9**	**66**	**2.2**	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Total Number of Samples			33	33	33	33	33	33	33	33	31	31	22	22	22	22	22	22	22	22	22	13
Maximum Value			9	1	46	160	140	0.4	78	180	47	4.7	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	Not Detected

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

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

					C_6-C_{10} (F1)	$>C_{10}$-C_{16} (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Services					25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land Use Category					HSL-A/B: LOW/HIGH DENSITY RESIDENTIAL							
Sample Reference	**Sample Depth**	**Sample Description**	**Depth Category**	**Soil Category**								
BH1	0.12-0.2	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH1 - [LAB_DUP]	0.12-0.2	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH2	0-0.1	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH2	0.3-0.6	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH3	0-0.1	F: Silty Sandy Clay	0m to <1m	Sand	<25	**56**	<0.2	<0.5	<1	<1	<1	0
BH4	0.2-0.4	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH5	0.1-0.3	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH5	0.3-0.8	Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH6	0-0.1	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH6	0.1-0.3	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH7	0-0.1	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH8	0.05-0.15	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH8 - [LAB_DUP]	0.05-0.15	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH9	0-0.1	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH10	0.13-0.2	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH11	0.13-0.17	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH12	0.13-0.17	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH13	0.12-0.13	F: Silty Clayey Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH14	0.1-0.4	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH14	0.4-1.0	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH14	1.8-2.4	Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH15	0.1-0.5	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.1
BH15 - [LAB_DUP]	0.1-0.5	F: Silty Sand	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH15	0.5-0.9	Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH16	0.17-0.4	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH16	0.4-1.0	F: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH17	0.2-0.3	F: Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH17	0.3-1.0	Silty Sandy Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
SDUP1	-	Fill	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP2	-	Fill	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
SDUP3	-	Fill	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	-
Total Number of Samples					31	31	31	31	31	31	31	28
Maximum Value					<PQL	56	<PQL	<PQL	<PQL	<PQL	<PQL	0.1

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
BH1	0.12-0.2	F: Silty Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH1 - [LAB_DUP]	0.12-0.2	F: Silty Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH2	0-0.1	F: Silty Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH2	0.3-0.6	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH3	0-0.1	F: Silty Sandy Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH4	0.2-0.4	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH5	0.1-0.3	F: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH5	0.3-0.8	Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH6	0-0.1	F: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH6	0.1-0.3	F: Silty Sandy Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH7	0-0.1	F: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH8	0.05-0.15	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH8 - [LAB_DUP]	0.05-0.15	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH9	0-0.1	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH10	0.13-0.2	F: Silty Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH11	0.13-0.17	F: Silty Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH12	0.13-0.17	F: Silty Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH13	0.12-0.13	F: Silty Clayey Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH14	0.1-0.4	F: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH14	0.4-1.0	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH14	1.8-2.4	Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH15	0.1-0.5	F: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH15 - [LAB_DUP]	0.1-0.5	F: Silty Sand	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH15	0.5-0.9	Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH16	0.17-0.4	F: Silty Sandy Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH16	0.4-1.0	F: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH17	0.2-0.3	F: Silty Sandy Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH17	0.3-1.0	Silty Sandy Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP1	-	Fill	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP2	-	Fill	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP3	-	Fill	0m to <1m	Sand	45	110	0.5	160	55	40	3

JKEnvironments

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

			C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
PQL - Envirolab Services			25	50	100	100
NEPM 2013 Land Use Category			**RESIDENTIAL, PARKLAND & PUBLIC OPEN SPACE**			
Sample Reference	**Sample Depth**	**Soil Texture**				
BH1	0.12-0.2	Coarse	<25	<50	<100	<100
BH1 - [LAB_DUP]	0.12-0.2	Coarse	<25	<50	<100	<100
BH2	0-0.1	Coarse	<25	<50	<100	<100
BH2	0.3-0.6	Fine	<25	<50	<100	<100
BH3	0-0.1	Fine	<25	**56**	**310**	<100
BH4	0.2-0.4	Fine	<25	<50	<100	<100
BH5	0.1-0.3	Coarse	<25	<50	<100	<100
BH5	0.3-0.8	Fine	<25	<50	<100	<100
BH6	0-0.1	Coarse	<25	<50	<100	<100
BH6	0.1-0.3	Fine	<25	<50	<100	<100
BH7	0-0.1	Coarse	<25	<50	<100	<100
BH8	0.05-0.15	Fine	<25	<50	<100	<100
BH8 - [LAB_DUP]	0.05-0.15	Fine	<25	<50	<100	<100
BH9	0-0.1	Fine	<25	<50	<100	<100
BH10	0.13-0.2	Coarse	<25	<50	**260**	**200**
BH11	0.13-0.17	Coarse	<25	<50	<100	<100
BH12	0.13-0.17	Coarse	<25	<50	**120**	<100
BH13	0.12-0.13	Coarse	<25	<50	<100	<100
BH14	0.1-0.4	Coarse	<25	<50	<100	<100
BH14	0.4-1.0	Fine	<25	<50	<100	<100
BH14	1.8-2.4	Fine	<25	<50	<100	<100
BH15	0.1-0.5	Coarse	<25	<50	<100	<100
BH15 - [LAB_DUP]	0.1-0.5	Coarse	<25	<50	<100	<100
BH15	0.5-0.9	Fine	<25	<50	<100	<100
BH16	0.17-0.4	Fine	<25	<50	**160**	<100
BH16	0.4-1.0	Fine	<25	<50	**100**	<100
BH17	0.2-0.3	Fine	<25	<50	**180**	**100**
BH17	0.3-1.0	Fine	<25	<50	<100	<100
SDUP1	-	Coarse	<25	<50	<100	<100
SDUP2	-	Coarse	<25	<50	<100	<100
SDUP3	-	Coarse	<25	<50	<100	<100
Total Number of Samples			31	31	31	31
Maximum Value			<PQL	56	310	200

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

MANAGEMENT LIMIT ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Soil Texture**	C_6-C_{10} (F1) plus BTEX	>C_{10}-C_{16} (F2) plus napthalene	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)
BH1	0.12-0.2	Coarse	700	1000	2500	10000
BH1 - [LAB_DUP]	0.12-0.2	Coarse	700	1000	2500	10000
BH2	0-0.1	Coarse	700	1000	2500	10000
BH2	0.3-0.6	Fine	800	1000	3500	10000
BH3	0-0.1	Fine	800	1000	3500	10000
BH4	0.2-0.4	Fine	800	1000	3500	10000
BH5	0.1-0.3	Coarse	700	1000	2500	10000
BH5	0.3-0.8	Fine	800	1000	3500	10000
BH6	0-0.1	Coarse	700	1000	2500	10000
BH6	0.1-0.3	Fine	800	1000	3500	10000
BH7	0-0.1	Coarse	700	1000	2500	10000
BH8	0.05-0.15	Fine	800	1000	3500	10000
BH8 - [LAB_DUP]	0.05-0.15	Fine	800	1000	3500	10000
BH9	0-0.1	Fine	800	1000	3500	10000
BH10	0.13-0.2	Coarse	700	1000	2500	10000
BH11	0.13-0.17	Coarse	700	1000	2500	10000
BH12	0.13-0.17	Coarse	700	1000	2500	10000
BH13	0.12-0.13	Coarse	700	1000	2500	10000
BH14	0.1-0.4	Coarse	700	1000	2500	10000
BH14	0.4-1.0	Fine	800	1000	3500	10000
BH14	1.8-2.4	Fine	800	1000	3500	10000
BH15	0.1-0.5	Coarse	700	1000	2500	10000
BH15 - [LAB_DUP]	0.1-0.5	Coarse	700	1000	2500	10000
BH15	0.5-0.9	Fine	800	1000	3500	10000
BH16	0.17-0.4	Fine	800	1000	3500	10000
BH16	0.4-1.0	Fine	800	1000	3500	10000
BH17	0.2-0.3	Fine	800	1000	3500	10000
BH17	0.3-1.0	Fine	800	1000	3500	10000
SDUP1	-	Coarse	700	1000	2500	10000
SDUP2	-	Coarse	700	1000	2500	10000
SDUP3	-	Coarse	700	1000	2500	10000

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

Analyte		C_6-C_{10}	>C_{10}-C_{16}	>C_{16}-C_{34}	>C_{34}-C_{40}	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact Criteria		4,400	3,300	4,500	6,300	100	14,000	4,500	12,000	1,400	
Site Use		RESIDENTIAL WITH ACCESSIBLE SOIL- DIRECT SOIL CONTACT									
Sample Reference	**Sample Depth**										
BH1	0.12-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH1 - [LAB_DUP]	0.12-0.2	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH2	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH2	0.3-0.6	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH3	0-0.1	<25	**56**	**310**	<100	<0.2	<0.5	<1	<1	<1	0
BH4	0.2-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH5	0.1-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH5	0.3-0.8	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH6	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH6	0.1-0.3	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH7	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH8	0.05-0.15	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH8 - [LAB_DUP]	0.05-0.15	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH9	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH10	0.13-0.2	<25	<50	**260**	**200**	<0.2	<0.5	<1	<1	<1	0
BH11	0.13-0.17	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH12	0.13-0.17	<25	<50	**120**	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH13	0.12-0.13	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH14	0.1-0.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH14	0.4-1.0	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH14	1.8-2.4	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH15	0.1-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**
BH15 - [LAB_DUP]	0.1-0.5	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH15	0.5-0.9	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH16	0.17-0.4	<25	<50	**160**	<100	<0.2	<0.5	<1	<1	<1	0
BH16	0.4-1.0	<25	<50	**100**	<100	<0.2	<0.5	<1	<1	<1	0
BH17	0.2-0.3	<25	<50	**180**	**100**	<0.2	<0.5	<1	<1	<1	0
BH17	0.3-1.0	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
SDUP2	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
SDUP3	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	-
Total Number of Samples		31	31	31	31	31	31	31	31	31	28
Maximum Value		<PQL	56	310	200	<PQL	<PQL	<PQL	<PQL	<PQL	0.1

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

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

FIELD DATA															LABORATORY DATA											
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx. Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample refeference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimation %(w/w)	FA and AF Estimation %(w/w)
SAC			**No**					**0.01**			**0.001**			**0.001**											**0.01**	**0.001**
20/04/2022	BH2	0-0.25	No	10	11,100	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	293990	BH1	0.12-0.2	154.07	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
21/04/2022	BH3	0-0.1	No	10	10,320	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	293990	BH2	0-0.1	856.27	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
21/04/2022	BH3	0.25-0.45	NA	10	10,050	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	293990	BH3	0-0.1	246.1	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
21/04/2022	BH6	0-0.1	No	10	10,050	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	293990	BH4	0.2-0.4	147.55	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
21/04/2022	BH6	0.1-0.3	NA	10	10,440	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	293990	BH5	0.1-0.3	115.1	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
21/04/2022	BH7	0-0.1	No	10	12,000	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	293990	BH6	0-0.1	761.57	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
21/04/2022	BH7	0.1-0.3	NA	10	10,380	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	293990	BH7	0-0.1	580.81	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
21/04/2022	BH8	0-0.05	No	10	10,720	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	293990	BH8	0.05-0.15	775.49	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
21/04/2022	BH8	0.05-0.15	NA	10	5,530	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	293990	BH9	0-0.1	590.54	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected	–	–	<0.01	<0.001
21/04/2022	BH9	0-0.1	No	10	10,250	No ACM observed	--	--	No ACM <7mm observed	--	--	No FA observed	--	--	293990	BH11	0.13-0.17	724.99	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
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	293990	BH14	0.1-0.4	277.95	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
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	293990	BH15	0.1-0.5	374.59	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
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	293990	BH17	0.2-0.3	136.08	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

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				URBAN RESIDENTIAL AND PUBLIC OPEN SPACE																		
							AGED HEAVY METALS-EILs						EILs		ESLs							
				pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services				-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Concentration (ABC)				-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**																			
BH1	0.12-0.2	F: Silty Clayey Sand	Coarse	NA	NA	NA	**6**	**9**	**28**	**20**	**4**	**24**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH1 - [LAB_DUP]	0.12-0.2	F: Silty Clayey Sand	Coarse	NA	NA	NA	**4**	**7**	**46**	**22**	**5**	**28**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH1 - [TRIPLICATE]	0.12-0.2	F: Silty Clayey Sand	Coarse	NA	NA	NA	**5**	**7**	**36**	**19**	**5**	**31**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH2	0-0.1	F: Silty Clayey Sand	Coarse	NA	NA	NA	<4	**10**	**11**	**9**	**14**	**24**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH2	0.3-0.6	F: Silty Clay	Fine	NA	NA	NA	**4**	**11**	**15**	**23**	**6**	**30**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.2**
BH3	0-0.1	F: Silty Sandy Clay	Fine	**8**	**35**	NA	**6**	**17**	**140**	**44**	**11**	**70**	<1	<0.1	<25	**56**	**310**	<100	<0.2	<0.5	<1	<1	**0.06**
BH4	0.2-0.4	F: Silty Clay	Fine	NA	NA	NA	**4**	**16**	**9**	**16**	**9**	**13**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH5	0.1-0.3	F: Silty Sand	Coarse	**8.3**	**24**	NA	<4	**6**	**59**	**2**	**78**	**23**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH5	0.3-0.8	Silty Clay	Fine	NA	NA	NA	<4	**3**	**13**	**4**	<1	**2**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH6	0-0.1	F: Silty Sand	Coarse	NA	NA	NA	**4**	**5**	**7**	**6**	**2**	**20**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH6	0.1-0.3	F: Silty Sandy Clay	Fine	NA	NA	NA	<4	**7**	**7**	**12**	**4**	**23**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH7	0-0.1	F: Silty Sand	Coarse	NA	NA	NA	<4	**3**	**2**	**2**	<1	**5**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH8	0.05-0.15	F: Silty Clay	Fine	NA	NA	NA	**5**	**12**	**14**	**20**	**3**	**18**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.2**
BH8 - [LAB_DUP]	0.05-0.15	F: Silty Clay	Fine	NA	NA	NA	**5**	**10**	**14**	**20**	**3**	**20**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.1**
BH9	0-0.1	F: Silty Clay	Fine	NA	NA	NA	**5**	**12**	**12**	**30**	**4**	**32**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH10	0.13-0.2	F: Silty Clayey Sand	Coarse	**9.1**	**42**	NA	<4	**15**	**160**	**30**	**18**	**46**	<1	<0.1	<25	<50	**260**	**200**	<0.2	<0.5	<1	<1	**0.2**
BH11	0.13-0.17	F: Silty Clayey Sand	Coarse	**10.8**	**35**	NA	<4	**7**	**100**	**10**	**7**	**21**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.07**
BH12	0.13-0.17	F: Silty Clayey Sand	Coarse	NA	NA	NA	<4	**46**	**57**	**24**	**28**	**33**	<1	<0.1	<25	<50	**120**	<100	<0.2	<0.5	<1	<1	**0.2**
BH13	0.12-0.13	F: Silty Clayey Sand	Coarse	NA	NA	NA	<4	**13**	**75**	**20**	**16**	**40**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.06**
BH14	0.1-0.4	F: Silty Sand	Coarse	NA	NA	NA	<4	**5**	**9**	**6**	**4**	**27**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.2**
BH14	0.4-1.0	F: Silty Clay	Fine	NA	NA	NA	**5**	**11**	**6**	**18**	**2**	**13**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH14	1.8-2.4	Silty Clay	Fine	NA	NA	NA	**5**	**12**	**8**	**40**	**2**	**48**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH15	0.1-0.5	F: Silty Sand	Coarse	NA	NA	NA	<4	**5**	**7**	**6**	**3**	**25**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.3**
BH15 - [LAB_DUP]	0.1-0.5	F: Silty Sand	Coarse	NA	NA	NA	<4	**3**	**4**	**4**	**2**	**17**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.2**
BH15 - [TRIPLICATE]	0.1-0.5	F: Silty Sand	Coarse	NA	NA	NA	<4	**4**	**6**	**6**	**3**	**51**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH15	0.5-0.9	Silty Clay	Fine	NA	NA	NA	**7**	**12**	**4**	**11**	**1**	**45**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH16	0.17-0.4	F: Silty Sandy Clay	Fine	NA	NA	NA	<4	**8**	**28**	**21**	**5**	**31**	<1	<0.1	<25	<50	**160**	<100	<0.2	<0.5	<1	<1	**0.1**
BH16	0.4-1.0	F: Silty Clay	Fine	NA	NA	NA	**7**	**19**	**54**	**140**	**14**	**180**	<1	NA	<25	<50	**100**	<100	<0.2	<0.5	<1	<1	<0.05
BH17	0.2-0.3	F: Silty Sandy Clay	Fine	NA	NA	NA	<4	**8**	**18**	**26**	**4**	**28**	<1	<0.1	<25	<50	**180**	**100**	<0.2	<0.5	<1	<1	**3.4**
BH17	0.3-1.0	Silty Sandy Clay	Fine	NA	NA	NA	<4	**9**	<1	**5**	<1	**1**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
SDUP1	-	Fill	Coarse	NA	NA	NA	**9**	**12**	<1	**6**	<1	**1**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
SDUP2	-	Fill	Coarse	NA	NA	NA	<4	**4**	**5**	**7**	**2**	**17**	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
SDUP3	-	Fill	Coarse	**8**	**35**	NA	**5**	**13**	**130**	**42**	**9**	**66**	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**0.19**
Total Number of Samples				5	5	0	33	33	33	33	33	33	31	22	31	31	31	31	31	31	31	31	31
Maximum Value				10.8	42	NA	9	46	160	140	78	180	<PQL	<PQL	<PQL	56	310	200	<PQL	<PQL	<PQL	<PQL	3.4

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

EIL AND ESL ASSESSMENT CRITERIA

Sample Reference	**Sample Depth**	**Sample Description**	**Soil Texture**	pH	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C_6-C_{10} (F1)	>C_{10}-C_{16} (F2)	>C_{16}-C_{34} (F3)	>C_{34}-C_{40} (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
BH1	0.12-0.2	F: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH1 - [LAB_DUP]	0.12-0.2	F: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH1 - [TRIPLICATE]	0.12-0.2	F: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	--	--	--	--	--	--	--	--	--	--	--
BH2	0-0.1	F: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH2	0.3-0.6	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	1300	5600	65	105	125	45	20
BH3	0-0.1	F: Silty Sandy Clay	Fine	8	35	NA	100	200	250	1300	420	1300	170	180	180	120	1300	5600	65	105	125	45	20
BH4	0.2-0.4	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH5	0.1-0.3	F: Silty Sand	Coarse	8.3	24	NA	100	200	250	1300	360	1100	170	180	180	120	300	2800	50	85	70	105	20
BH5	0.3-0.8	Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	1300	5600	65	105	125	45	20
BH6	0-0.1	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH6	0.1-0.3	F: Silty Sandy Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	1300	5600	65	105	125	45	20
BH7	0-0.1	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH8	0.05-0.15	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH8 - [LAB_DUP]	0.05-0.15	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH9	0-0.1	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH10	0.13-0.2	F: Silty Clayey Sand	Coarse	9.1	42	NA	100	200	260	1300	560	1400	170	180	180	120	300	2800	50	85	70	105	20
BH11	0.13-0.17	F: Silty Clayey Sand	Coarse	10.8	35	NA	100	200	250	1300	420	1300	170	180	180	120	300	2800	50	85	70	105	20
BH12	0.13-0.17	F: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH13	0.12-0.13	F: Silty Clayey Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH14	0.1-0.4	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH14	0.4-1.0	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	1300	5600	65	105	125	45	20
BH14	1.8-2.4	Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	1300	5600	65	105	125	45	20
BH15	0.1-0.5	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH15 - [LAB_DUP]	0.1-0.5	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
BH15 - [TRIPLICATE]	0.1-0.5	F: Silty Sand	Coarse	NA	NA	NA	100	200	90	1300	35	190	--	--	--	--	--	--	--	--	--	--	--
BH15	0.5-0.9	Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	1300	5600	65	105	125	45	20
BH16	0.17-0.4	F: Silty Sandy Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH16	0.4-1.0	F: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	1300	5600	65	105	125	45	20
BH17	0.2-0.3	F: Silty Sandy Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	1300	5600	65	105	125	45	20
BH17	0.3-1.0	Silty Sandy Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	1300	5600	65	105	125	45	20
SDUP1	-	Fill	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20
SDUP2	-	Fill	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	--	180	120	300	2800	50	85	70	105	20
SDUP3	-	Fill	Coarse	8	35	NA	100	200	250	1300	420	1300	170	180	180	120	300	2800	50	85	70	105	20

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

			HEAVY METALS								PAHs		OC/OP PESTICIDES				Total	TRH					BTEX COMPOUNDS				ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Total Endosulfans	Chloropyrifos	Total Moderately Harmful	Total Scheduled	PCBs	C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Total C_{10}-C_{36}	Benzene	Toluene	Ethyl benzene	Total Xylenes	
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	25	50	100	100	50	0.2	0.5	1	1	100
General Solid Waste CT1			100	20	100	NSL	100	4	40	NSL	200	0.8	60	4	250	50	50	650		NSL		10,000	10	288	600	1,000	-
General Solid Waste SCC1			500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	650		NSL		10,000	18	518	1,080	1,800	-
Restricted Solid Waste CT2			400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	2600		NSL		40,000	40	1,152	2,400	4,000	-
Restricted Solid Waste SCC2			2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600		NSL		40,000	72	2,073	4,320	7,200	-
Sample Reference	**Sample Depth**	**Sample Description**																									
BH1	0.12-0.2	F: Silty Clayey Sand	**6**	<0.4	**9**	**28**	**20**	**0.1**	**4**	**24**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH1 - [LAB_DUP]	0.12-0.2	F: Silty Clayey Sand	**4**	<0.4	**7**	**46**	**22**	<0.1	**5**	**28**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH1 - [TRIPLICATE]	0.12-0.2	F: Silty Clayey Sand	**5**	<0.4	**7**	**36**	**19**	<0.1	**5**	**31**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH2	0-0.1	F: Silty Clayey Sand	<4	<0.4	**10**	**11**	**9**	<0.1	**14**	**24**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH2	0.3-0.6	F: Silty Clay	**4**	<0.4	**11**	**15**	**23**	<0.1	**6**	**30**	**1.2**	**0.2**	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH3	0-0.1	F: Silty Sandy Clay	**6**	<0.4	**17**	**140**	**44**	<0.1	**11**	**70**	**0.06**	**0.06**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	**62**	**190**	**200**	**452**	<0.2	<0.5	<1	<1	Not Detected
BH4	0.2-0.4	F: Silty Clay	**4**	<0.4	**16**	**9**	**16**	<0.1	**9**	**13**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH5	0.1-0.3	F: Silty Sand	<4	<0.4	**6**	**59**	**2**	<0.1	**78**	**23**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH5	0.3-0.8	Silty Clay	<4	<0.4	**3**	**13**	**4**	<0.1	<1	**2**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH6	0-0.1	F: Silty Sand	**4**	<0.4	**5**	**7**	**6**	<0.1	**2**	**20**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH6	0.1-0.3	F: Silty Sandy Clay	<4	<0.4	**7**	**7**	**12**	<0.1	**4**	**23**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH7	0-0.1	F: Silty Sand	<4	<0.4	**3**	**2**	**2**	<0.1	<1	**5**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH8	0.05-0.15	F: Silty Clay	**5**	<0.4	**12**	**14**	**20**	<0.1	**3**	**18**	**1.3**	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH8 - [LAB_DUP]	0.05-0.15	F: Silty Clay	**5**	<0.4	**10**	**14**	**20**	<0.1	**3**	**20**	**0.97**	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH9	0-0.1	F: Silty Clay	**5**	<0.4	**12**	**12**	**30**	<0.1	**4**	**32**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH10	0.13-0.2	F: Silty Clayey Sand	<4	<0.4	**15**	**160**	**30**	<0.1	**18**	**46**	**1.8**	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	**100**	**230**	**330**	<0.2	<0.5	<1	<1	NA
BH11	0.13-0.17	F: Silty Clayey Sand	<4	<0.4	**7**	**100**	**10**	**0.2**	**7**	**21**	**0.07**	**0.07**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH12	0.13-0.17	F: Silty Clayey Sand	<4	<0.4	**46**	**57**	**24**	<0.1	**28**	**33**	**1.7**	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH13	0.12-0.13	F: Silty Clayey Sand	<4	<0.4	**13**	**75**	**20**	<0.1	**16**	**40**	**0.3**	**0.06**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH14	0.1-0.4	F: Silty Sand	<4	<0.4	**5**	**9**	**6**	<0.1	**4**	**27**	**2.9**	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH14	0.4-1.0	F: Silty Clay	**5**	<0.4	**11**	**6**	**18**	<0.1	**2**	**13**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH14	1.8-2.4	Silty Clay	**5**	<0.4	**12**	**8**	**40**	<0.1	**2**	**48**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH15	0.1-0.5	F: Silty Sand	<4	<0.4	**5**	**7**	**6**	<0.1	**3**	**25**	**4.2**	**0.3**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH15 - [LAB_DUP]	0.1-0.5	F: Silty Sand	<4	<0.4	**3**	**4**	**4**	<0.1	**2**	**17**	**3.4**	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH15 - [TRIPLICATE]	0.1-0.5	F: Silty Sand	<4	<0.4	**4**	**6**	**6**	<0.1	**3**	**51**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BH15	0.5-0.9	Silty Clay	**7**	<0.4	**12**	**4**	**11**	<0.1	**1**	**45**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH16	0.17-0.4	F: Silty Sandy Clay	<4	**1**	**8**	**28**	**21**	**0.1**	**5**	**31**	**1.6**	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	**120**	**120**	<0.2	<0.5	<1	<1	NA
BH16	0.4-1.0	F: Silty Clay	**7**	**0.5**	**19**	**54**	**140**	**0.4**	**14**	**180**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH17	0.2-0.3	F: Silty Sandy Clay	<4	<0.4	**8**	**18**	**26**	<0.1	**4**	**28**	**47**	**3.4**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	**110**	**120**	**230**	<0.2	<0.5	<1	<1	Not Detected
BH17	0.3-1.0	Silty Sandy Clay	<4	<0.4	**9**	<1	**5**	<0.1	<1	**1**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP1	-	Fill	**9**	<0.4	**12**	<1	**6**	<0.1	<1	**1**	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP2	-	Fill	<4	<0.4	**4**	**5**	**7**	<0.1	**2**	**17**	<0.05	<0.05	NA	NA	NA	NA	NA	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP3	-	Fill	**5**	<0.4	**13**	**130**	**42**	<0.1	**9**	**66**	**2.2**	**0.19**	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	**100**	**100**	<0.2	<0.5	<1	<1	NA
Total Number of Samples			33	33	33	33	33	33	33	33	31	31	22	22	22	22	22	31	31	31	31	31	31	31	31	31	13
Maximum Value			9	1	46	160	140	0.4	78	180	47	3.4	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	62	190	230	452	<PQL	<PQL	<PQL	<PQL	Not Detected

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

TABLE S8
SOIL LABORATORY TCLP RESULTS
All data in mg/L unless stated otherwise

			Lead	Nickel	B(a)P
PQL - Envirolab Services			0.03	0.02	0.001
TCLP1 - General Solid Waste			5	2	0.04
TCLP2 - Restricted Solid Waste			20	8	0.16
TCLP3 - Hazardous Waste			>20	>8	>0.16
Sample Reference	**Sample Depth**	**Sample Description**			
BH5	0.1-0.3	F: silty sand	NA	**0.2**	NA
BH16	0.4-1.0	F: silty clay	**0.1**	NA	NA
BH17	0.2-0.3	F: silty sandy clay	NA	<0.2	<0.001
BH17	0.2-0.3	LAB DUP	NA	<0.2	<0.001
Total Number of samples			1	2	1
Maximum Value			0.10	0.2	<PQL

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

Preliminary (Stage 1) Site Investigation
91 Pacific Highway, Hornsby, NSW
E34849BT

TABLE Q1
SOIL QA/QC SUMMARY

			TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene
	PQL Envirolab SYD		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1*	*2*	*1*
	PQL Envirolab VIC		*25*	*50*	*100*	*100*	*0.2*	*0.5*	*1.0*	*2.0*	*1.0*
Intra	BH7	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
laboratory	SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH6	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
laboratory	SDUP2	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	BH3	0-0.1	<25	56	310	<100	<0.2	<0.5	<1	<2	<1
laboratory	SDUP3	-	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1
duplicate	MEAN		nc	40.5	180	nc	nc	nc	nc	nc	nc
	RPD %		nc	77%	144%	nc	nc	nc	nc	nc	nc
Field	TB	-	<25	NA	NA	NA	<0.2	<0.5	<1	<2	<1
Blank	20/04/22										
Field	FR-HA	µg/L	NA	NA	NA	NA	NA	NA	<1	<1	<1
Rinsate	22/04/22										
Trip	TS		-	-	-	-	81%	85%	86%	87%	98%
Spike	20/04/22										

			Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthra-cene	Benzo(g,h,i)perylene
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.05*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*
Intra	BH7	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH6	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
laboratory	SDUP2	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	BH3	0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	0.06	<0.1	<0.1	<0.1
laboratory	SDUP3	-	<0.1	<0.1	<0.1	<0.1	0.4	0.1	0.4	0.5	0.2	0.2	0.2	0.19	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	0.225	0.075	0.225	0.275	0.125	0.125	0.15	0.125	nc	nc	nc
	RPD %		nc	nc	nc	nc	156%	67%	156%	164%	120%	120%	67%	104%	nc	nc	nc
Field	TB	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	20/04/22																
Field	FR-HA	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	22/04/22																
Trip	TS		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	20/04/22																

			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	BH7	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	SDUP1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<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	BH6	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	SDUP2	-	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	BH3	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	SDUP3	-	<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	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	20/04/22																					
Field	FR-HA	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	22/04/22																					
Trip	TS		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	20/04/22																					

			Azinphos-methyl (Guthion)	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS
	PQL Envirolab SYD		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
	PQL Envirolab VIC		*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Intra	BH7	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
laboratory	SDUP1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
duplicate	MEAN		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Intra	BH6	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
laboratory	SDUP2	-	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
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Inter	BH3	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
laboratory	SDUP3	-	<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
	RPD %		nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Field	TB	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Blank	20/04/22														
Field	FR-HA	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	22/04/22														
Trip	TS		-	-	-	-	-	-	-	-	-	-	-	-	-
Spike	20/04/22														

			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	PQL Envirolab SYD		*4*	*0.4*	*1*	*1*	*1*	*0.1*	*1*	*1*
	PQL Envirolab VIC		*4.0*	*0.4*	*1.0*	*1.0*	*1.0*	*0.1*	*1.0*	*1.0*
Intra	BH7	0-0.1	<4	<0.4	3	2	2	<0.1	<1	5
laboratory	SDUP1	-	9	<0.4	12	<1	6	<0.1	<1	1
duplicate	MEAN		5.5	nc	7.5	1.25	4	nc	nc	3
	RPD %		127%	nc	120%	120%	100%	nc	nc	133%
Intra	BH6	0-0.1	4	<0.4	5	7	6	<0.1	2	20
laboratory	SDUP2	-	<4	<0.4	4	5	7	<0.1	2	17
duplicate	MEAN		3	nc	4.5	6	6.5	nc	2	18.5
	RPD %		67%	nc	22%	33%	15%	nc	0%	16%
Inter	BH3	0-0.1	6	<0.4	17	140	44	<0.1	11	70
laboratory	SDUP3	-	5	<0.4	13	130	42	<0.1	9	66
duplicate	MEAN		5.5	nc	15	135	43	nc	10	68
	RPD %		18%	nc	27%	7%	5%	nc	20%	6%
Field	TB	-	NA	NA	NA	NA	NA	NA	NA	NA
Blank	20/04/22									
Field	FR-HA	µg/L	NA	NA	NA	NA	NA	NA	NA	NA
Rinsate	22/04/22									
Trip	TS		-	-	-	-	-	-	-	-
Spike	20/04/22									

Result outside of QA/QC acceptance criteria (highlighted)

Appendix D: Borehole Logs

JKEnvironments

ENVIRONMENTAL LOG

Log No. 1 **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** HAND AUGER **R.L. Surface:** -

Date: 21/4/22 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION			■				0		-	CONCRETE: 120mm.t				
	■								-	FILL: Silty clayey sand, fine to medium grained, grey, trace of igneous gravel.	M			
									CI	Silty CLAY: medium to high plasticity, brown, trace of ironstone gravel and ash.	w≈PL			RESIDUAL
							0.5			END OF BOREHOLE AT 0.6m				
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Log No. 2 **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** PUSH TUBE **R.L. Surface:** -

Date: 20/4/22 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0		-	FILL: Silty clayey sand, fine to medium grained, brown, trace of root fibres.	M			SCREEN: 11.10kg 0-0.25m NO FCF
							0.5			FILL: Silty clay, medium to high plasticity, brown, trace of sand, ironstone and igneous gravel, ash and root fibres.	w<PL			
										FILL: Silty clay, medium to high plasticity, orange brown mottled grey, trace of ironstone and sandstone gravel and ash.	w<PL			
							1		CI	Silty CLAY: medium to high plasticity, red brown, trace of ash and root fibres.	w≈PL			RESIDUAL
							1.5			Silty CLAY: low to medium plasticity, red brown mottled grey, trace of ironstone.	w<PL			
							2			END OF BOREHOLE AT 2.0m				
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. 3 **1/1**

SDUP3

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** HAND AUGER **R.L. Surface:** -

Date: 21/4/22 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0		-	FILL: Silty sandy clay, low to medium plasticity, brown, fine to medium grained sand, trace of ironstone and igneous gravel, plastic, concrete and ceramic fragments, root fibres and organic matter.	w<PL			ORGANIC MATTER/ LEAF LITTER AT SURFACE
											w<PL			SCREEN: 10.32kg 0-0.1m NO FCF
							0.5			FILL: Silty clay, low to medium plasticity, brown, trace of sand, ironstone gravel and organic matter.				SCREEN: 10.05kg 0.25-0.45m NO FCF
										END OF BOREHOLE AT 0.45m				POSSIBLY NATURAL HAND AUGER REFUSAL ON GRAVEL
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Log No. 4 **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** PUSH TUBE **R.L. Surface:** -

Date: 20/4/22 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■				0		-	FILL: Gravelly sand, fine to medium grained, grey, fine to medium grained igneous gravel.	D			
	■		■							FILL: Silty clay, medium to high plasticity, brown mottled orange, trace of igneous and ironstone gravel and root fibres.	w≈PL			
	■		■				0.5		CI	Silty CLAY: medium to high plasticity, orange brown, trace of ironstone gravel, ash and root fibres.	w≈PL			RESIDUAL
							1							
										as above, but mottled grey.	w≈PL			
							1.5			END OF BOREHOLE AT 1.5m				
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. 5 **1/1**

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** PUSH TUBE **R.L. Surface:** -

Date: 20/4/22 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■				0		-	FILL: Gravelly sand, fine to medium grained, grey, fine to medium grained igneous gravel.	D			
	■		■						CI	FILL: Silty sand, fine to medium grained, brown, trace of igneous and ironstone gravel.	w<PL			RESIDUAL
							0.5			Silty CLAY: medium to high plasticity, grey, trace of ash and root fibres.				
	■		■						-	Extremely Weathered siltstone: silty CLAY, low to medium plasticity, grey, trace of root fibres.	XW			
							1			END OF BOREHOLE 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. 6 **1/1**

SDUP2

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** HAND AUGER / SHOVEL **R.L. Surface:** -

Date: 21/4/22 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0		-	FILL: Silty sand, fine to medium grained, grey, trace of root fibres.	M			GRASS COVER
										FILL: Silty sandy clay, low to medium plasticity, brown, fine to medium grained sand, trace of ironstone gravel and ash.	w≈PL			SCREEN: 10.05kg 0-0.1m NO FCF
									CL	Silty CLAY: low to medium plasticity, brown mottled orange, trace of ironstone gravel and root fibres.	w<PL			SCREEN: 10.44kg 0.1-0.3m NO FCF
							0.5			END OF BOREHOLE AT 0.4m				RESIDUAL HAND AUGER REFUSAL ON GRAVEL
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. 7 **1/1**

SDUP1

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** HAND AUGER **R.L. Surface:** -

Date: 21/4/22 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0		-	FILL: Silty sand, fine to medium grained, grey, trace of igneous gravel.	M			GRASS COVER
										FILL: Silty sandy clay, low to medium plasticity, brown, fine to medium grained sand trace of ironstone gravel.	w≈PL			SCREEN: 12.00kg 0-0.1m NO FCF
									CI	Silty CLAY: medium to high plasticity, brown mottled orange, trace of sand, ironstone gravel and root fibres.	w<PL			SCREEN: 10.38kg 0.1-0.3m NO FCF
							0.5			END OF BOREHOLE AT 0.45m				RESIDUAL
							1							HAND AUGER REFUSAL ON GRAVEL
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. 8 **1/1**

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** HAND AUGER **R.L. Surface:** -

Date: 21/4/22 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0		-	FILL: Silty clay, low to medium plasticity, brown, trace of sand and root fibres.	w<PL			GRASS COVER
										FILL: Silty clay, medium to high plasticity, brown mottled orange, trace of sandstone, ironstone and igneous gravel, concrete and tile fragments, ash and root fibres.	w<PL			SCREEN: 10.72kg 0-0.05m NO FCF
							0.5			END OF BOREHOLE AT 0.15m				SCREEN: 5.53kg 0.05-0.15m NO FCF
														POSSIBLE SERVICES
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. 9 **1/1**

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** HAND AUGER / SHOVEL **R.L. Surface:** -

Date: 21/4/22 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■		■		0		-	FILL: Silty clay, low to medium plasticity, brown, trace of sand, ironstone gravel and root fibres.	w<PL			GRASS COVER SCREEN: 10.25kg 0-0.1m NO FCF
										END OF BOREHOLE AT 0.25m				HAND AUGER REFUSAL ON GRAVEL
							0.5							
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Log No. 10 1/1

Environmental logs are not to be used for geotechnical purposes

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** HAND AUGER **R.L. Surface:** -

Date: 22/4/22 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■						0		-	CONCRETE: 130mm.t				
									-	FILL: Silty clayey sand, fine to medium grained, brown, trace of igneous and ironstone gravel.	M			HAND AUGER REFUSAL ON GRAVEL
										END OF BOREHOLE AT 0.2m				
							0.5							
							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. 11 **1/1**

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** HAND AUGER **R.L. Surface:** -

Date: 22/4/22 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION			■				0		-	CONCRETE: 130mm.t				
	■								-	FILL: Silty clayey sand, fine to medium grained, brown, trace of ironstone and igneous gravel.	M			HAND AUGER REFUSAL ON GRAVEL
										END OF BOREHOLE AT 0.17m				
							0.5							
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Log No. 12 1/1

Environmental logs are not to be used for geotechnical purposes

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** HAND AUGER **R.L. Surface:** -

Date: 22/4/22 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■						0		-	CONCRETE: 130mm.t				
									-	FILL: Silty clayey sand, fine to medium grained, brown, trace of igneous and ironstone gravel.	M			HAND AUGER REFUSAL ON GRAVEL
										END OF BOREHOLE AT 0.17m				
							0.5							
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

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ENVIRONMENTAL LOG

Log No. 13 1/1

Environmental logs are not to be used for geotechnical purposes

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** HAND AUGER **R.L. Surface:** -

Date: 22/4/22 **Datum:** -

Plant Type: - **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0		-	CONCRETE: 120mm.t				
									-	FILL: Silty clayey sand, fine to medium grained, brown, trace of ironstone and igneous gravel.	D			HAND AUGER REFUSAL ON GRAVEL
										END OF BOREHOLE AT 0.13m				
							0.5							
							1							
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Log No. 14 **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** PUSH TUBE **R.L. Surface:** -

Date: 20/4/22 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION	■		■				0		-	FILL: Gravelly sand, fine to medium grained, grey, fine to medium grained igneous gravel.				
										FILL: Silty sand, fine to medium grained, grey, trace of igneous and ironstone gravel.	D			
	■		■				0.5			FILL: Silty clay, low to medium plasticity, grey mottled yellow brown, trace of sandstone and ironstone gravel, ash and root fibre.	w≈PL			POSSIBLY NATURAL
							1							
							1.5							
	■		■						CI	Silty CLAY: medium to high plasticity, brown mottled orange brown, trace of sandstone and ironstone gravel, ash and root fibres.	w≈PL			RESIDUAL
							2							
										END OF BOREHOLE AT 2.4m				
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Log No. 15 **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** PUSH TUBE **R.L. Surface:** -

Date: 20/4/22 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION							0		-	FILL: gravelly sand, fine to medium grained, grey, fine to medium grained igneous gravel with asphaltic concrete fragments.	D			
										FILL: Silty sand, fine to medium grained, grey, trace of igneous and quartz gravel, glass and metal.				
							0.5		CI	Silty CLAY: medium to high plasticity, orange brown, trace of ironstone gravel, ash and root fibre.	w≈PL			RESIDUAL
							1		-	Extremely Weathered sandstone: silty CLAY, low to medium plasticity, grey mottled yellow, trace of ironstone gravel, ash and organic matter.	w<PL			
										END OF BOREHOLE AT 1.4m				
							1.5							
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Log No. 16 **1/1**

Environmental logs are not to be used for geotechnical purposes

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** PUSH TUBE **R.L. Surface:** -

Date: 20/4/22 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0		-	CONCRETE: 170mm.t				
									-	FILL: Silty sandy clay, low to medium plasticity, grey, fine to medium grained sand, trace of igneous, sandstone and ironstone gravel.	w≈PL			
							0.5			FILL: Silty clay, low to medium plasticity, brown, trace of igneous, sandstone and ironstone gravel and root fibres.	w≈PL			
							1		CI	Silty CLAY: medium to high plasticity, light brown, trace of sand and ironstone.	w≈PL			RESIDUAL
							1.5			END OF BOREHOLE AT 1.4m				
							2							
							2.5							
							3							
							3.5							

JKEnvironments

ENVIRONMENTAL LOG

Environmental logs are not to be used for geotechnical purposes

Log No. 17 **1/1**

Client: BARKER COLLEGE C/- EPM PROJECTS

Project: PROPOSED ALTERATIONS AND ADDITIONS TO COLLEGE CAMPUS

Location: BARKER COLLEGE, 91 PACIFIC HIGHWAY, HORNSBY, NSW

Job No.: E34849BT **Method:** PUSH TUBE **R.L. Surface:** -

Date: 20/4/22 **Datum:** -

Plant Type: EZIPROBE **Logged/Checked by:** A.D./T.H.

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	SAMPLES DB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE-TION							0		-	CONCRETE: 200mm.t				
									-	FILL: Silty sandy clay, low to medium plasticity, grey, fine to medium grained sand, trace of igneous, ironstone and sandstone gravel and ash.	w<PL			
									CI	Silty Sandy CLAY: medium to high plasticity, light brown, fine to medium grained sand, with ironstone banding.	w≈PL			RESIDUAL
							0.5							
							1		CI	Silty CLAY: medium to high plasticity, orange brown, trace of sand and ironstone.	w≈PL			
										END OF BOREHOLE AT 1.3m				
							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:

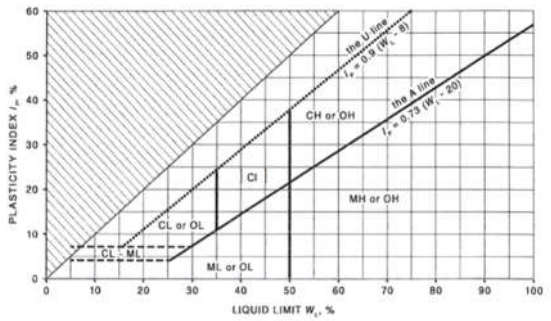
1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.

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 E: Laboratory Report(s) & COC Documents

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

CERTIFICATE OF ANALYSIS 293990

Client Details

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

Sample Details

Your Reference	**E34849BT, Hornsby**
Number of Samples	47 Soil, 1 Water
Date samples received	22/04/2022
Date completed instructions received	22/04/2022

Analysis Details

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

Samples were analysed as received from the client. Results relate specifically to the samples as received.

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

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

Report Details

Date results requested by	02/05/2022
Date of Issue	02/05/2022

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Asbestos Approved By

Analysed by Asbestos Approved Analyst: Panika Wongchanda, Nyovan Moonean

Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Dragana Tomas, Senior Chemist

Hannah Nguyen, Metals Supervisor

Lucy Zhu, Asbestos Supervisor

Thomas Beenie, Lab Technician

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		293990-1	293990-3	293990-4	293990-8	293990-11
Your Reference	UNITS	BH1	BH2	BH2	BH3	BH4
Depth		0.12-0.2	0-0.1	0.3-0.6	0-0.1	0.2-0.4
Date Sampled		21/04/2022	20/04/2022	20/04/2022	21/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	28/04/2022	28/04/2022	28/04/2022	28/04/2022	28/04/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	87	84	87	83	96

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		293990-14	293990-15	293990-17	293990-18	293990-20
Your Reference	UNITS	BH5	BH5	BH6	BH6	BH7
Depth		0.1-0.3	0.3-0.8	0-0.1	0.1-0.3	0-0.1
Date Sampled		20/04/2022	20/04/2022	21/04/2022	21/04/2022	21/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	28/04/2022	28/04/2022	28/04/2022	28/04/2022	28/04/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	96	81	91	101	94

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		293990-24	293990-25	293990-27	293990-28	293990-29
Your Reference	UNITS	BH8	BH9	BH10	BH11	BH12
Depth		0.05-0.15	0-0.1	0.13-0.2	0.13-0.17	0.13-0.17
Date Sampled		21/04/2022	21/04/2022	22/04/2022	22/04/2022	22/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	28/04/2022	28/04/2022	28/04/2022	28/04/2022	28/04/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	89	102	112	94	85

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		293990-30	293990-32	293990-33	293990-34	293990-35
Your Reference	UNITS	BH13	BH14	BH14	BH14	BH15
Depth		0.12-0.13	0.1-0.4	0.4-1.0	1.8-2.4	0.1-0.5
Date Sampled		22/04/2022	20/04/2022	20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	28/04/2022	28/04/2022	28/04/2022	28/04/2022	28/04/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	84	89	128	83	85

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		293990-36	293990-38	293990-39	293990-41	293990-42
Your Reference	UNITS	BH15	BH16	BH16	BH17	BH17
Depth		0.5-0.9	0.17-0.4	0.4-1.0	0.2-0.3	0.3-1.0
Date Sampled		20/04/2022	20/04/2022	20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	28/04/2022	28/04/2022	28/04/2022	28/04/2022	28/04/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	88	128	118	92	124

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		293990-44	293990-45	293990-46	293990-47
Your Reference	UNITS	SDUP1	SDUP2	TB	TS
Depth		-	-	-	-
Date Sampled		21/04/2022	21/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	28/04/2022	28/04/2022	28/04/2022	28/04/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	[NA]
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	[NA]
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	[NA]
Benzene	mg/kg	<0.2	<0.2	<0.2	81%
Toluene	mg/kg	<0.5	<0.5	<0.5	85%
Ethylbenzene	mg/kg	<1	<1	<1	86%
m+p-xylene	mg/kg	<2	<2	<2	87%
o-Xylene	mg/kg	<1	<1	<1	98%
Naphthalene	mg/kg	<1	<1	<1	[NA]
Total +ve Xylenes	mg/kg	<1	<1	<1	[NT]
Surrogate aaa-Trifluorotoluene	%	95	87	114	107

svTRH (C10-C40) in Soil						
Our Reference		293990-1	293990-3	293990-4	293990-8	293990-11
Your Reference	UNITS	BH1	BH2	BH2	BH3	BH4
Depth		0.12-0.2	0-0.1	0.3-0.6	0-0.1	0.2-0.4
Date Sampled		21/04/2022	20/04/2022	20/04/2022	21/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	62	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	190	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	200	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	450	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	56	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	56	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	310	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	360	<50
Surrogate o-Terphenyl	%	102	102	101	106	96

svTRH (C10-C40) in Soil						
Our Reference		293990-14	293990-15	293990-17	293990-18	293990-20
Your Reference	UNITS	BH5	BH5	BH6	BH6	BH7
Depth		0.1-0.3	0.3-0.8	0-0.1	0.1-0.3	0-0.1
Date Sampled		20/04/2022	20/04/2022	21/04/2022	21/04/2022	21/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	91	98	101	100	109

svTRH (C10-C40) in Soil						
Our Reference		293990-24	293990-25	293990-27	293990-28	293990-29
Your Reference	UNITS	BH8	BH9	BH10	BH11	BH12
Depth		0.05-0.15	0-0.1	0.13-0.2	0.13-0.17	0.13-0.17
Date Sampled		21/04/2022	21/04/2022	22/04/2022	22/04/2022	22/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	230	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	340	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	260	<100	120
TRH >C_{34} -C_{40}	mg/kg	<100	<100	200	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	460	<50	120
Surrogate o-Terphenyl	%	100	95	95	94	94

svTRH (C10-C40) in Soil						
Our Reference		293990-30	293990-32	293990-33	293990-34	293990-35
Your Reference	UNITS	BH13	BH14	BH14	BH14	BH15
Depth		0.12-0.13	0.1-0.4	0.4-1.0	1.8-2.4	0.1-0.5
Date Sampled		22/04/2022	20/04/2022	20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	91	92	93	93	90

svTRH (C10-C40) in Soil						
Our Reference		293990-36	293990-38	293990-39	293990-41	293990-42
Your Reference	UNITS	BH15	BH16	BH16	BH17	BH17
Depth		0.5-0.9	0.17-0.4	0.4-1.0	0.2-0.3	0.3-1.0
Date Sampled		20/04/2022	20/04/2022	20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	110	<100
TRH C_{29} - C_{36}	mg/kg	<100	120	<100	120	<100
Total +ve TRH (C10-C36)	mg/kg	<50	120	<50	230	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	160	100	180	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	160	100	290	<50
Surrogate o-Terphenyl	%	88	87	87	89	83

svTRH (C10-C40) in Soil			
Our Reference		293990-44	293990-45
Your Reference	UNITS	SDUP1	SDUP2
Depth		-	-
Date Sampled		21/04/2022	21/04/2022
Type of sample		Soil	Soil
Date extracted	-	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	84	84

PAHs in Soil						
Our Reference		293990-1	293990-3	293990-4	293990-8	293990-11
Your Reference	UNITS	BH1	BH2	BH2	BH3	BH4
Depth		0.12-0.2	0-0.1	0.3-0.6	0-0.1	0.2-0.4
Date Sampled		21/04/2022	20/04/2022	20/04/2022	21/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	0.3	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.2	0.06	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	1.2	0.06	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	97	98	97	103	96

PAHs in Soil						
Our Reference		293990-14	293990-15	293990-17	293990-18	293990-20
Your Reference	UNITS	BH5	BH5	BH6	BH6	BH7
Depth		0.1-0.3	0.3-0.8	0-0.1	0.1-0.3	0-0.1
Date Sampled		20/04/2022	20/04/2022	21/04/2022	21/04/2022	21/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	97	96	98	97	96

PAHs in Soil						
Our Reference		293990-24	293990-25	293990-27	293990-28	293990-29
Your Reference	UNITS	BH8	BH9	BH10	BH11	BH12
Depth		0.05-0.15	0-0.1	0.13-0.2	0.13-0.17	0.13-0.17
Date Sampled		21/04/2022	21/04/2022	22/04/2022	22/04/2022	22/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.1	<0.1	0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<0.1	0.3	<0.1	0.3
Pyrene	mg/kg	0.2	<0.1	0.3	<0.1	0.3
Benzo(a)anthracene	mg/kg	0.2	<0.1	0.2	<0.1	0.2
Chrysene	mg/kg	0.1	<0.1	0.2	<0.1	0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.3	<0.2	0.3	<0.2	0.3
Benzo(a)pyrene	mg/kg	0.2	<0.05	0.2	0.07	0.2
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1	0.1	<0.1	0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.1	<0.1	0.1	<0.1	0.1
Total +ve PAH's	mg/kg	1.3	<0.05	1.8	0.07	1.7
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	94	90	90	88	71

PAHs in Soil						
Our Reference		293990-30	293990-32	293990-33	293990-34	293990-35
Your Reference	UNITS	BH13	BH14	BH14	BH14	BH15
Depth		0.12-0.13	0.1-0.4	0.4-1.0	1.8-2.4	0.1-0.5
Date Sampled		22/04/2022	20/04/2022	20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.4	<0.1	<0.1	0.5
Anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	0.1
Fluoranthene	mg/kg	0.1	0.5	<0.1	<0.1	0.8
Pyrene	mg/kg	0.1	0.4	<0.1	<0.1	0.7
Benzo(a)anthracene	mg/kg	<0.1	0.3	<0.1	<0.1	0.4
Chrysene	mg/kg	<0.1	0.2	<0.1	<0.1	0.4
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.5	<0.2	<0.2	0.6
Benzo(a)pyrene	mg/kg	0.06	0.2	<0.05	<0.05	0.3
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.2	<0.1	<0.1	0.2
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	<0.1	<0.1	0.2
Total +ve PAH's	mg/kg	0.3	2.9	<0.05	<0.05	4.2
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	0.5
Surrogate p-Terphenyl-d14	%	76	74	72	74	73

PAHs in Soil						
Our Reference		293990-36	293990-38	293990-39	293990-41	293990-42
Your Reference	UNITS	BH15	BH16	BH16	BH17	BH17
Depth		0.5-0.9	0.17-0.4	0.4-1.0	0.2-0.3	0.3-1.0
Date Sampled		20/04/2022	20/04/2022	20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	30/04/2022	30/04/2022	30/04/2022	30/04/2022	30/04/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	0.3	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	0.4	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	0.6	<0.1
Phenanthrene	mg/kg	<0.1	0.2	<0.1	7.4	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	1.4	<0.1
Fluoranthene	mg/kg	<0.1	0.3	<0.1	9.5	<0.1
Pyrene	mg/kg	<0.1	0.3	<0.1	8.8	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.1	<0.1	2.7	<0.1
Chrysene	mg/kg	<0.1	0.1	<0.1	2.3	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.2	<0.2	4.6	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.1	<0.05	3.4	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.1	<0.1	2.3	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.1	<0.1	2.3	<0.1
Total +ve PAH's	mg/kg	<0.05	1.6	<0.05	47	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	4.7	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	4.7	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	4.7	<0.5
Surrogate p-Terphenyl-d14	%	98	98	100	100	96

PAHs in Soil			
Our Reference		293990-44	293990-45
Your Reference	UNITS	SDUP1	SDUP2
Depth		-	-
Date Sampled		21/04/2022	21/04/2022
Type of sample		Soil	Soil
Date extracted	-	26/04/2022	26/04/2022
Date analysed	-	30/04/2022	30/04/2022
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	98	98

Organochlorine Pesticides in soil						
Our Reference		293990-1	293990-3	293990-8	293990-11	293990-14
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.12-0.2	0-0.1	0-0.1	0.2-0.4	0.1-0.3
Date Sampled		21/04/2022	20/04/2022	21/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	92	97	89	89

Organochlorine Pesticides in soil						
Our Reference		293990-17	293990-20	293990-24	293990-25	293990-27
Your Reference	UNITS	BH6	BH7	BH8	BH9	BH10
Depth		0-0.1	0-0.1	0.05-0.15	0-0.1	0.13-0.2
Date Sampled		21/04/2022	21/04/2022	21/04/2022	21/04/2022	22/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	88	88	84	85

Organochlorine Pesticides in soil						
Our Reference		293990-28	293990-29	293990-30	293990-32	293990-35
Your Reference	UNITS	BH11	BH12	BH13	BH14	BH15
Depth		0.13-0.17	0.13-0.17	0.12-0.13	0.1-0.4	0.1-0.5
Date Sampled		22/04/2022	22/04/2022	22/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	82	69	69	70	68

Organochlorine Pesticides in soil				
Our Reference		293990-38	293990-41	293990-44
Your Reference	UNITS	BH16	BH17	SDUP1
Depth		0.17-0.4	0.2-0.3	-
Date Sampled		20/04/2022	20/04/2022	21/04/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	30/04/2022	30/04/2022	30/04/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	99	97

Organophosphorus Pesticides in Soil						
Our Reference		293990-1	293990-3	293990-8	293990-11	293990-14
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.12-0.2	0-0.1	0-0.1	0.2-0.4	0.1-0.3
Date Sampled		21/04/2022	20/04/2022	21/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	92	97	89	89

Organophosphorus Pesticides in Soil						
Our Reference		293990-17	293990-20	293990-24	293990-25	293990-27
Your Reference	UNITS	BH6	BH7	BH8	BH9	BH10
Depth		0-0.1	0-0.1	0.05-0.15	0-0.1	0.13-0.2
Date Sampled		21/04/2022	21/04/2022	21/04/2022	21/04/2022	22/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	88	88	84	85

Organophosphorus Pesticides in Soil						
Our Reference		293990-28	293990-29	293990-30	293990-32	293990-35
Your Reference	UNITS	BH11	BH12	BH13	BH14	BH15
Depth		0.13-0.17	0.13-0.17	0.12-0.13	0.1-0.4	0.1-0.5
Date Sampled		22/04/2022	22/04/2022	22/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	82	69	69	70	68

Organophosphorus Pesticides in Soil				
Our Reference		293990-38	293990-41	293990-44
Your Reference	UNITS	BH16	BH17	SDUP1
Depth		0.17-0.4	0.2-0.3	-
Date Sampled		20/04/2022	20/04/2022	21/04/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	30/04/2022	30/04/2022	30/04/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	99	97

PCBs in Soil						
Our Reference		293990-1	293990-3	293990-8	293990-11	293990-14
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.12-0.2	0-0.1	0-0.1	0.2-0.4	0.1-0.3
Date Sampled		21/04/2022	20/04/2022	21/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	92	97	89	89

PCBs in Soil						
Our Reference		293990-17	293990-20	293990-24	293990-25	293990-27
Your Reference	UNITS	BH6	BH7	BH8	BH9	BH10
Depth		0-0.1	0-0.1	0.05-0.15	0-0.1	0.13-0.2
Date Sampled		21/04/2022	21/04/2022	21/04/2022	21/04/2022	22/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	88	88	84	85

PCBs in Soil						
Our Reference		293990-28	293990-29	293990-30	293990-32	293990-35
Your Reference	UNITS	BH11	BH12	BH13	BH14	BH15
Depth		0.13-0.17	0.13-0.17	0.12-0.13	0.1-0.4	0.1-0.5
Date Sampled		22/04/2022	22/04/2022	22/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	29/04/2022	29/04/2022	29/04/2022	29/04/2022	29/04/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	82	69	69	70	68

PCBs in Soil				
Our Reference		293990-38	293990-41	293990-44
Your Reference	UNITS	BH16	BH17	SDUP1
Depth		0.17-0.4	0.2-0.3	-
Date Sampled		20/04/2022	20/04/2022	21/04/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	30/04/2022	30/04/2022	30/04/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	99	97

Acid Extractable metals in soil						
Our Reference		293990-1	293990-3	293990-4	293990-8	293990-11
Your Reference	UNITS	BH1	BH2	BH2	BH3	BH4
Depth		0.12-0.2	0-0.1	0.3-0.6	0-0.1	0.2-0.4
Date Sampled		21/04/2022	20/04/2022	20/04/2022	21/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2022	29/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	29/04/2022	27/04/2022	27/04/2022	27/04/2022
Arsenic	mg/kg	6	<4	4	6	4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	9	10	11	17	16
Copper	mg/kg	28	11	15	140	9
Lead	mg/kg	20	9	23	44	16
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	4	14	6	11	9
Zinc	mg/kg	24	24	30	70	13

Acid Extractable metals in soil						
Our Reference		293990-14	293990-15	293990-17	293990-18	293990-20
Your Reference	UNITS	BH5	BH5	BH6	BH6	BH7
Depth		0.1-0.3	0.3-0.8	0-0.1	0.1-0.3	0-0.1
Date Sampled		20/04/2022	20/04/2022	21/04/2022	21/04/2022	21/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
Arsenic	mg/kg	<4	<4	4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	3	5	7	3
Copper	mg/kg	59	13	7	7	2
Lead	mg/kg	2	4	6	12	2
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	78	<1	2	4	<1
Zinc	mg/kg	23	2	20	23	5

Acid Extractable metals in soil						
Our Reference		293990-24	293990-25	293990-27	293990-28	293990-29
Your Reference	UNITS	BH8	BH9	BH10	BH11	BH12
Depth		0.05-0.15	0-0.1	0.13-0.2	0.13-0.17	0.13-0.17
Date Sampled		21/04/2022	21/04/2022	22/04/2022	22/04/2022	22/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
Arsenic	mg/kg	5	5	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	12	15	7	46
Copper	mg/kg	14	12	160	100	57
Lead	mg/kg	20	30	30	10	24
Mercury	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Nickel	mg/kg	3	4	18	7	28
Zinc	mg/kg	18	32	46	21	33

Acid Extractable metals in soil						
Our Reference		293990-30	293990-32	293990-33	293990-34	293990-35
Your Reference	UNITS	BH13	BH14	BH14	BH14	BH15
Depth		0.12-0.13	0.1-0.4	0.4-1.0	1.8-2.4	0.1-0.5
Date Sampled		22/04/2022	20/04/2022	20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
Arsenic	mg/kg	<4	<4	5	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	13	5	11	12	5
Copper	mg/kg	75	9	6	8	7
Lead	mg/kg	20	6	18	40	6
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	16	4	2	2	3
Zinc	mg/kg	40	27	13	48	25

Acid Extractable metals in soil						
Our Reference		293990-36	293990-38	293990-39	293990-41	293990-42
Your Reference	UNITS	BH15	BH16	BH16	BH17	BH17
Depth		0.5-0.9	0.17-0.4	0.4-1.0	0.2-0.3	0.3-1.0
Date Sampled		20/04/2022	20/04/2022	20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2022	29/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	29/04/2022	27/04/2022	27/04/2022	27/04/2022
Arsenic	mg/kg	7	<4	7	<4	<4
Cadmium	mg/kg	<0.4	1	0.5	<0.4	<0.4
Chromium	mg/kg	12	8	19	8	9
Copper	mg/kg	4	28	54	18	<1
Lead	mg/kg	11	21	140	26	5
Mercury	mg/kg	<0.1	0.1	0.4	<0.1	<0.1
Nickel	mg/kg	1	5	14	4	<1
Zinc	mg/kg	45	31	180	28	1

Acid Extractable metals in soil					
Our Reference		293990-44	293990-45	293990-49	293990-50
Your Reference	UNITS	SDUP1	SDUP2	BH1 - [TRIPLICATE]	BH15 - [TRIPLICATE]
Depth		-	-	0.12-0.2	0.1-0.5
Date Sampled		21/04/2022	21/04/2022	21/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022
Arsenic	mg/kg	9	<4	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	4	7	4
Copper	mg/kg	<1	5	36	6
Lead	mg/kg	6	7	19	6
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	2	5	3
Zinc	mg/kg	1	17	31	51

Moisture						
Our Reference		293990-1	293990-3	293990-4	293990-8	293990-11
Your Reference	UNITS	BH1	BH2	BH2	BH3	BH4
Depth		0.12-0.2	0-0.1	0.3-0.6	0-0.1	0.2-0.4
Date Sampled		21/04/2022	20/04/2022	20/04/2022	21/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
Moisture	%	16	11	17	33	18

Moisture						
Our Reference		293990-14	293990-15	293990-17	293990-18	293990-20
Your Reference	UNITS	BH5	BH5	BH6	BH6	BH7
Depth		0.1-0.3	0.3-0.8	0-0.1	0.1-0.3	0-0.1
Date Sampled		20/04/2022	20/04/2022	21/04/2022	21/04/2022	21/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
Moisture	%	5.2	13	13	15	11

Moisture						
Our Reference		293990-24	293990-25	293990-27	293990-28	293990-29
Your Reference	UNITS	BH8	BH9	BH10	BH11	BH12
Depth		0.05-0.15	0-0.1	0.13-0.2	0.13-0.17	0.13-0.17
Date Sampled		21/04/2022	21/04/2022	22/04/2022	22/04/2022	22/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
Moisture	%	13	15	16	16	15

Moisture						
Our Reference		293990-30	293990-32	293990-33	293990-34	293990-35
Your Reference	UNITS	BH13	BH14	BH14	BH14	BH15
Depth		0.12-0.13	0.1-0.4	0.4-1.0	1.8-2.4	0.1-0.5
Date Sampled		22/04/2022	20/04/2022	20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
Moisture	%	6.8	15	18	18	14

Moisture						
Our Reference		293990-36	293990-38	293990-39	293990-41	293990-42
Your Reference	UNITS	BH15	BH16	BH16	BH17	BH17
Depth		0.5-0.9	0.17-0.4	0.4-1.0	0.2-0.3	0.3-1.0
Date Sampled		20/04/2022	20/04/2022	20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	26/04/2022	26/04/2022	26/04/2022	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022	27/04/2022	27/04/2022	27/04/2022
Moisture	%	15	12	20	9.7	12

Moisture			
Our Reference		293990-44	293990-45
Your Reference	UNITS	SDUP1	SDUP2
Depth		-	-
Date Sampled		21/04/2022	21/04/2022
Type of sample		Soil	Soil
Date prepared	-	26/04/2022	26/04/2022
Date analysed	-	27/04/2022	27/04/2022
Moisture	%	16	16

Asbestos ID - soils NEPM - ASB-001						
Our Reference		293990-1	293990-3	293990-8	293990-11	293990-14
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0.12-0.2	0-0.1	0-0.1	0.2-0.4	0.1-0.3
Date Sampled		21/04/2022	20/04/2022	21/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	02/05/2022	02/05/2022	02/05/2022	02/05/2022	02/05/2022
Sample mass tested	g	154.07	856.27	246.1	147.55	115.1
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & debris	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001						
Our Reference		293990-17	293990-20	293990-24	293990-25	293990-28
Your Reference	UNITS	BH6	BH7	BH8	BH9	BH11
Depth		0-0.1	0-0.1	0.05-0.15	0-0.1	0.13-0.17
Date Sampled		21/04/2022	21/04/2022	21/04/2022	21/04/2022	22/04/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	02/05/2022	02/05/2022	02/05/2022	02/05/2022	02/05/2022
Sample mass tested	g	761.57	580.81	775.49	590.54	724.99
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001				
Our Reference		293990-32	293990-35	293990-41
Your Reference	UNITS	BH14	BH15	BH17
Depth		0.1-0.4	0.1-0.5	0.2-0.3
Date Sampled		20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil
Date analysed	-	02/05/2022	02/05/2022	02/05/2022
Sample mass tested	g	277.95	374.59	136.08
Sample Description	-	Beige fine-grained soil & rocks	Beige fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–
FA and AF Estimation*	g	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001

Asbestos ID - soils					
Our Reference		293990-27	293990-29	293990-30	293990-38
Your Reference	UNITS	BH10	BH12	BH13	BH16
Depth		0.13-0.2	0.13-0.17	0.12-0.13	0.17-0.4
Date Sampled		22/04/2022	22/04/2022	22/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	28/04/2022	28/04/2022	28/04/2022	28/04/2022
Sample mass tested	g	Approx. 50g	Approx. 45g	Approx. 15g	Approx. 30g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

BTEX in Water		
Our Reference		293990-48
Your Reference	UNITS	FR-HA
Depth		-
Date Sampled		22/04/2022
Type of sample		Water
Date extracted	-	22/04/2022
Date analysed	-	22/04/2022
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Surrogate Dibromofluoromethane	%	108
Surrogate toluene-d8	%	99
Surrogate 4-BFB	%	98

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

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

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	293990-3
Date extracted	-			26/04/2022	1	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			28/04/2022	1	28/04/2022	28/04/2022		28/04/2022	28/04/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	105	102
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	105	102
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	99	101
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	89	96
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	99	94
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	119	109
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	91	84
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	103	1	87	88	1	94	91

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	293990-38
Date extracted	-			[NT]	24	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			[NT]	24	28/04/2022	28/04/2022		28/04/2022	28/04/2022
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	24	<25	<25	0	113	113
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	24	<25	<25	0	113	113
Benzene	mg/kg	0.2	Org-023	[NT]	24	<0.2	<0.2	0	121	127
Toluene	mg/kg	0.5	Org-023	[NT]	24	<0.5	<0.5	0	111	121
Ethylbenzene	mg/kg	1	Org-023	[NT]	24	<1	<1	0	102	97
m+p-xylene	mg/kg	2	Org-023	[NT]	24	<2	<2	0	116	111
o-Xylene	mg/kg	1	Org-023	[NT]	24	<1	<1	0	90	86
Naphthalene	mg/kg	1	Org-023	[NT]	24	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	24	89	128	36	120	122

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	35	26/04/2022	26/04/2022		[NT]	[NT]
Date analysed	-			[NT]	35	28/04/2022	28/04/2022		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	35	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	35	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	35	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	35	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	35	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	35	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	35	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	35	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	35	85	100	16	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	293990-3
Date extracted	-			26/04/2022	1	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			27/04/2022	1	27/04/2022	27/04/2022		27/04/2022	27/04/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	117	125
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	102	120
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	100	111
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	117	125
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	102	120
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	100	111
Surrogate o-Terphenyl	%		Org-020	89	1	102	104	2	120	107

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	293990-38
Date extracted	-			[NT]	24	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			[NT]	24	27/04/2022	27/04/2022		27/04/2022	27/04/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	24	<50	<50	0	121	126
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	24	<100	<100	0	93	99
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	24	<100	<100	0	100	#
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	24	<50	<50	0	121	126
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	24	<100	<100	0	93	99
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	24	<100	<100	0	100	#
Surrogate o-Terphenyl	%		Org-020	[NT]	24	100	99	1	95	108

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	35	26/04/2022	26/04/2022		[NT]	[NT]
Date analysed	-			[NT]	35	27/04/2022	27/04/2022		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	35	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	35	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	35	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	35	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	35	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	35	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	35	90	88	2	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	293990-3
Date extracted	-			26/04/2022	1	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			29/04/2022	1	29/04/2022	29/04/2022		29/04/2022	29/04/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	99
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	99
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	103
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	110
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	104
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	111	111
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	95
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	98	112
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	76	1	97	104	7	95	95

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	293990-38
Date extracted	-			[NT]	24	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			[NT]	24	29/04/2022	29/04/2022		29/04/2022	30/04/2022
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	78	111
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	77	107
Fluorene	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	82	113
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	86	128
Anthracene	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	24	0.2	0.1	67	84	74
Pyrene	mg/kg	0.1	Org-022/025	[NT]	24	0.2	0.2	0	89	96
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	24	0.2	0.1	67	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	24	0.1	0.1	0	75	122
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	24	0.3	0.3	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	24	0.2	0.1	67	94	127
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	24	0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	24	0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	24	94	92	2	77	99

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	35	26/04/2022	26/04/2022		[NT]	[NT]
Date analysed	-			[NT]	35	29/04/2022	29/04/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	35	0.5	0.4	22	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	35	0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	35	0.8	0.6	29	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	35	0.7	0.6	15	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	35	0.4	0.3	29	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	35	0.4	0.3	29	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	35	0.6	0.5	18	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	35	0.3	0.2	40	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	35	0.2	0.2	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	35	0.2	0.2	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	35	73	77	5	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	293990-3
Date extracted	-			26/04/2022	1	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			29/04/2022	1	29/04/2022	29/04/2022		29/04/2022	29/04/2022
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	96
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	96
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	95
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	103
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	86
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	103
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	108
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	100
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	98
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	94
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	72	1	89	95	7	92	91

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	293990-38
Date extracted	-			[NT]	24	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			[NT]	24	29/04/2022	29/04/2022		29/04/2022	30/04/2022
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	70	106
HCB	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	75	107
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	75	113
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	85	101
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	70	116
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	82	113
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	88	110
Endrin	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	80	111
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	78	88
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	70	108
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	24	88	85	3	73	100

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	35	26/04/2022	26/04/2022		[NT]	[NT]
Date analysed	-			[NT]	35	29/04/2022	29/04/2022		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	35	68	70	3	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	293990-3
Date extracted	-			26/04/2022	1	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			29/04/2022	1	29/04/2022	29/04/2022		29/04/2022	29/04/2022
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	123
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	93
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	91	93
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	122	132
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	108
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	84
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	98
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	72	1	89	95	7	92	91

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	293990-38
Date extracted	-			[NT]	24	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			[NT]	24	29/04/2022	29/04/2022		29/04/2022	30/04/2022
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	93	120
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	75	104
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	81	107
Malathion	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	103	120
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	88	120
Parathion	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	78	86
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	86	107
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	24	88	85	3	73	100

QUALITY CONTROL: Organophosphorus Pesticides in Soil				Duplicate					Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	35	26/04/2022	26/04/2022		[NT]	[NT]
Date analysed	-			[NT]	35	29/04/2022	29/04/2022		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	35	68	70	3	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	293990-3
Date extracted	-			26/04/2022	1	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			29/04/2022	1	29/04/2022	29/04/2022		29/04/2022	29/04/2022
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	104	100
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	72	1	89	95	7	92	91

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	293990-38
Date extracted	-			[NT]	24	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			[NT]	24	29/04/2022	29/04/2022		29/04/2022	30/04/2022
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	24	<0.1	<0.1	0	87	120
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	24	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	24	88	85	3	73	100

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	35	26/04/2022	26/04/2022		[NT]	[NT]
Date analysed	-			[NT]	35	29/04/2022	29/04/2022		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	35	68	70	3	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	293990-3
Date prepared	-			26/04/2022	1	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			27/04/2022	1	27/04/2022	27/04/2022		27/04/2022	27/04/2022
Arsenic	mg/kg	4	Metals-020	<4	1	6	4	40	108	85
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	94	82
Chromium	mg/kg	1	Metals-020	<1	1	9	7	25	100	90
Copper	mg/kg	1	Metals-020	<1	1	28	46	49	113	98
Lead	mg/kg	1	Metals-020	<1	1	20	22	10	95	87
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.1	<0.1	0	106	72
Nickel	mg/kg	1	Metals-020	<1	1	4	5	22	98	86
Zinc	mg/kg	1	Metals-020	<1	1	24	28	15	94	74

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	293990-38
Date prepared	-			[NT]	24	26/04/2022	26/04/2022		26/04/2022	26/04/2022
Date analysed	-			[NT]	24	27/04/2022	27/04/2022		27/04/2022	27/04/2022
Arsenic	mg/kg	4	Metals-020	[NT]	24	5	5	0	107	76
Cadmium	mg/kg	0.4	Metals-020	[NT]	24	<0.4	<0.4	0	94	80
Chromium	mg/kg	1	Metals-020	[NT]	24	12	10	18	100	76
Copper	mg/kg	1	Metals-020	[NT]	24	14	14	0	111	#
Lead	mg/kg	1	Metals-020	[NT]	24	20	20	0	96	91
Mercury	mg/kg	0.1	Metals-021	[NT]	24	<0.1	<0.1	0	99	74
Nickel	mg/kg	1	Metals-020	[NT]	24	3	3	0	98	75
Zinc	mg/kg	1	Metals-020	[NT]	24	18	20	11	92	106

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	35	26/04/2022	26/04/2022		[NT]	[NT]
Date analysed	-			[NT]	35	27/04/2022	27/04/2022		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	35	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	35	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	35	5	3	50	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	35	7	4	55	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	35	6	4	40	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	35	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	35	3	2	40	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	35	25	17	38	[NT]	[NT]

QUALITY CONTROL: BTEX in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			22/04/2022	[NT]	[NT]	[NT]	[NT]	22/04/2022	[NT]
Date analysed	-			22/04/2022	[NT]	[NT]	[NT]	[NT]	22/04/2022	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	106	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate Dibromofluoromethane	%		Org-023	104	[NT]	[NT]	[NT]	[NT]	128	[NT]
Surrogate toluene-d8	%		Org-023	99	[NT]	[NT]	[NT]	[NT]	125	[NT]
Surrogate 4-BFB	%		Org-023	97	[NT]	[NT]	[NT]	[NT]	122	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

TRH Soil C10-C40 NEPM - # Percent recovery for the matrix spike is not possible to report as the high concentration of analytes in sample 293990-38ms have caused interference.

Acid Extractable Metals in Soil:
- The laboratory RPD acceptance criteria has been exceeded for 293990-1 for Cu. Therefore a triplicate result has been issued as laboratory sample number 293990-49.
- The laboratory RPD acceptance criteria has been exceeded for 293990-35 for Cu. Therefore a triplicate result has been issued as laboratory sample number 293990-50.
- # Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos according to ASB-001 asbestos subsampling procedure. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab/MPL recommends supplying 40-60g or 500ml of sample in its own container.
Note: Samples 293990-27, 29, 30 were sub-sampled from jars provided by the client.

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

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

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Vittal Boggaram

Sample Login Details

Your reference	E34849BT, Hornsby
Envirolab Reference	293990
Date Sample Received	22/04/2022
Date Instructions Received	22/04/2022
Date Results Expected to be Reported	02/05/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	47 Soil, 1 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	15
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

#38 has limited sample can only do asbestos ID

Please direct any queries to:

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

Analysis Underway, details on the following page:

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	Asbestos ID - soils	BTEX in Water	On Hold
BH1-0.12-0.2	✓	✓	✓	✓	✓	✓	✓	✓			
BH1-0.2-0.4											✓
BH2-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			
BH2-0.3-0.6	✓	✓	✓				✓				
BH2-0.6-0.7											✓
BH2-1.0-1.5											✓
BH2-1.5-2.0											✓
BH3-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			
BH3-0.3-0.45											✓
BH4-0-0.2											✓
BH4-0.2-0.4	✓	✓	✓	✓	✓	✓	✓	✓			
BH4-0.4-0.6											✓
BH5-0-0.1											✓
BH5-0.1-0.3	✓	✓	✓	✓	✓	✓	✓	✓			
BH5-0.3-0.8	✓	✓	✓				✓				
BH5-0.8-1.0											✓
BH6-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			
BH6-0.1-0.3	✓	✓	✓				✓				
BH6-0.3-0.4											✓
BH7-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			
BH7-0.1-0.3											✓
BH7-0.3-0.45											✓
BH8-0-0.05											✓
BH8-0.05-0.15	✓	✓	✓	✓	✓	✓	✓	✓			
BH9-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓			
BH9-0.1-0.25											✓
BH10-0.13-0.2	✓	✓	✓	✓	✓	✓	✓		✓		
BH11-0.13-0.17	✓	✓	✓	✓	✓	✓	✓	✓			
BH12-0.13-0.17	✓	✓	✓	✓	✓	✓	✓		✓		
BH13-0.12-0.13	✓	✓	✓	✓	✓	✓	✓		✓		
BH14-0-0.1											✓
BH14-0.1-0.4	✓	✓	✓	✓	✓	✓	✓	✓			

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB-001	Asbestos ID - soils	BTEX in Water	On Hold
BH14-0.4-1.0	✓	✓	✓				✓				
BH14-1.8-2.4	✓	✓	✓				✓				
BH15-0.1-0.5	✓	✓	✓	✓	✓	✓	✓	✓			
BH15-0.5-0.9	✓	✓	✓				✓				
BH15-0.9-1.3											✓
BH16-0.17-0.4	✓	✓	✓	✓	✓	✓	✓		✓		
BH16-0.4-1.0	✓	✓	✓				✓				
BH16-1.0-1.4											✓
BH17-0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓			
BH17-0.3-1.0	✓	✓	✓				✓				
BH17-1.0-1.3											✓
SDUP1	✓	✓	✓	✓	✓	✓	✓				
SDUP2	✓	✓	✓				✓				
TB	✓										
TS	✓										
FR-HA										✓	

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

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E34849BT Date Results Required: STANDARD Page: 1 of 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: vboggaram@jkenvironments.com.au

Location:	Hornsby						Sample Preserved in Esky on Ice											
Sampler:	AD/EW						Tests Required											
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3	Combo 6	Asbestos (500mL)	Asbestos Detection	BTEX						
21/04/2022	1	BH1	0.12-0.20	G, A	0	F: Silty Clayey Sand			X	X								
21/04/2022	2	BH1	0.2-0.4	G, A	0	Silty Clay												
20/02/2022	3	BH2	0-0.1	G, A	0	F: Silty Clayey Sand			X	X								
20/02/2022	4	BH2	0.3-0.6	G, A	0.1	F: Silty Clay		X										
20/02/2022	5	BH2	0.6-0.7	G, A	0	F: Silty Clay												
20/02/2022	6	BH2	1.0-1.5	G, A	0	Silty Clay												
20/02/2022	7	BH2	1.5-2.0	G, A	0	Silty Clay												
21/02/2022	8	BH3	0-0.1	G, A	0	F: Silty Sandy Clay			X	X								
21/02/2022	9	BH3	0.3-0.45	G, A	0.1	Silty Clay												
20/02/2022	10	BH4	0-0.2	G, A	0.1	F: Gravelly sand												
20/02/2022	11	BH4	0.2-0.4	G, A	0	F: Silty Clay			X	X								
20/02/2022	12	BH4	0.4-0.6	G, A	0	Silty Clay												
20/04/2022	13	BH5	0-0.1	G	0.1	F: Gravelly sand												
20/04/2022	14	BH5	0.1-0.3	G, A	0	F: Silty Sand			X	X								
20/04/2022	15	BH5	0.3-0.8	G, A	0.1	Silty Clay		X										
20/04/2022	16	BH5	0.8-1.0	G, A	0	XW Siltstone												
21/04/2022	17	BH6	0-0.1	G, A	0.1	F: Silty Sand			X	X								
21/04/2022	18	BH6	0.1-0.3	G, A	0	F: Silty Sandy Clay		X										
21/04/2022	19	BH6	0.3-0.4	G, A	0	Silty Clay												
21/04/2022	20	BH7	0-0.1	G	0	F: Silty Sand			X	X								
21/04/2022	21	BH7	0.1-0.3	G, A	0	F: Silty Sandy Clay												
21/04/2022	22	BH7	0.3-0.45	G, A	0	Silty Clay												
21/04/2022	23	BH8	0-0.05	G, A	0	F: Silty Clay												
21/04/2022	24	BH8	0.05-0.15	G, A	0.1	F: Silty Clay			X	X								
21/04/2022	25	BH9	0-0.1	G, A	0	F: Silty Clay			X	X								

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

293990

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

Job No: 293990
Date Received: 22/4/22
Time Received: 1630
Received By: CM
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished By:	Date: 22-04-22	Time: 14:30	Received By:	Date:
VB		1630	P McManus	22/4/22

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E34849BT Date Results Required: STANDARD Page: 2 of 2	JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: vboggaram@jkenvironments.com.au

Location:	Hornsby	Sample Preserved in Esky on Ice
Sampler:	AD/EW	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3	Combo 6	Asbestos (500mL)	Asbestos Detection	BTEX						
21/04/2022	26	BH9	0.1-0.25	G	0	F: Silty Clay												
22/04/2022	27	BH10	0.13-0.20	G	0	F: Silty Clayey Sand			X		X							
22/04/2022	28	BH11	0.13-0.17	G, A	0	F: Silty Clayey Sand			X	X								
22/04/2022	29	BH12	0.13-0.17	G	0.1	F: Silty Clayey Sand			X		X							
22/04/2022	30	BH13	0.12-0.13	G	0	F: Silty Clayey Sand			X		X							
20/04/2022	31	BH14	0-0.1	G	0.1	F: Gravelly sand												
20/04/2022	32	BH14	0.1-0.4	G, A	0	F: Silty Sand			X	X								
20/04/2022	33	BH14	0.4-1.0	G, A	0	F: Silty Clay		X										
20/04/2022	34	BH14	1.8-2.4	G, A	0.1	Silty Clay		X										
20/04/2022	35	BH15	0.1-0.5	G, A	0.1	F: Silty Sand			X	X								
20/04/2022	36	BH15	0.5-0.9	G, A	0	Silty Clay		X										
20/04/2022	37	BH15	0.9-1.3	G, A	0.1	XW Sandstone												
20/04/2022	38	BH16	0.17-0.4	G, A	0	F: Silty Sandy Clay			X	X								
20/04/2022	39	BH16	0.4-1.0	G, A	0	F: Silty Clay		X										
20/04/2022	40	BH16	1.0-1.4	G, A	0	Silty Clay												
20/04/2022	41	BH17	0.2-0.3	G, A	0	F: Silty Sandy Clay			X	X								
20/04/2022	42	BH17	0.3-1.0	G, A	0	Silty Sandy Clay		X										
20/04/2022	43	BH17	1.0-1.3	G, A	0	Silty Clay												
21/04/2022	44	SDUP1	–	G, A	–	Soil Duplicate			X									
21/04/2022	45	SDUP2	–	G, A	–	Soil Duplicate		X										
21/04/2022	–	SDUP3	–	G, A	–	Soil Duplicate			X	Please send to VIC								
20/04/2022	46	TB	–	G	–	Trip Blank						X						
20/04/2022	47	TS	–	V	–	Trip Spike						X						
22/04/2022	48	FR-HA	–	V x2	–	Field Rinsate						X						

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag	293990 CM

Relinquished By:	Date: 22-4-22	Time: 14:30	Received By:	Date:
VB			CM, ECJ MD	22/4/22

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

CERTIFICATE OF ANALYSIS 293990-A

Client Details

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

Sample Details

Your Reference	**E34849BT, Hornsby**
Number of Samples	additional analysis
Date samples received	22/04/2022
Date completed instructions received	04/05/2022

Analysis Details

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

Samples were analysed as received from the client. Results relate specifically to the samples as received.

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

Report Details

Date results requested by	11/05/2022
Date of Issue	11/05/2022

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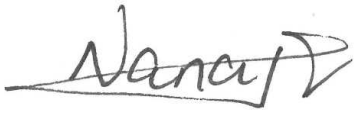
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Diego Bigolin, Inorganics Supervisor
Giovanni Agosti, Group Technical Manager
Hannah Nguyen, Metals Supervisor
Josh Williams, Organics and LC Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

Misc Inorg - Soil					
Our Reference		293990-A-8	293990-A-14	293990-A-27	293990-A-28
Your Reference	UNITS	BH3	BH5	BH10	BH11
Depth		0-0.1	0.1-0.3	0.13-0.2	0.13-0.17
Date Sampled		21/04/2022	20/04/2022	22/04/2022	22/04/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	05/05/2022	05/05/2022	05/05/2022	05/05/2022
pH 1:5 soil:water	pH Units	8.0	8.3	9.1	10.8

CEC					
Our Reference		293990-A-8	293990-A-14	293990-A-27	293990-A-28
Your Reference	UNITS	BH3	BH5	BH10	BH11
Depth		0-0.1	0.1-0.3	0.13-0.2	0.13-0.17
Date Sampled		21/04/2022	20/04/2022	22/04/2022	22/04/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	09/05/2022	09/05/2022	09/05/2022	09/05/2022
Date analysed	-	09/05/2022	09/05/2022	09/05/2022	09/05/2022
Exchangeable Ca	meq/100g	31	16	39	34
Exchangeable K	meq/100g	0.5	0.6	0.5	0.4
Exchangeable Mg	meq/100g	3.6	6.5	1.6	0.4
Exchangeable Na	meq/100g	0.1	0.7	0.8	0.2
Cation Exchange Capacity	meq/100g	35	24	42	35

TCLP Preparation - Acid				
Our Reference		293990-A-14	293990-A-39	293990-A-41
Your Reference	UNITS	BH5	BH16	BH17
Depth		0.1-0.3	0.4-1.0	0.2-0.3
Date Sampled		20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil
pH of soil for fluid# determ.	pH units	8.7	8.9	8.7
pH of soil TCLP (after HCl)	pH units	1.6	1.6	1.6
Extraction fluid used		1	1	1
pH of final Leachate	pH units	5.0	5.3	5.4

PAHs in TCLP (USEPA 1311)		
Our Reference		293990-A-41
Your Reference	UNITS	BH17
Depth		0.2-0.3
Date Sampled		20/04/2022
Type of sample		Soil
Date extracted	-	05/05/2022
Date analysed	-	05/05/2022
Naphthalene in TCLP	mg/L	<0.001
Acenaphthylene in TCLP	mg/L	<0.001
Acenaphthene in TCLP	mg/L	<0.001
Fluorene in TCLP	mg/L	<0.001
Phenanthrene in TCLP	mg/L	<0.001
Anthracene in TCLP	mg/L	<0.001
Fluoranthene in TCLP	mg/L	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001
Chrysene in TCLP	mg/L	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001
Total +ve PAH's	mg/L	<0.001
Surrogate p-Terphenyl-d14	%	82

Metals from Leaching Fluid pH 2.9 or 5				
Our Reference		293990-A-14	293990-A-39	293990-A-41
Your Reference	UNITS	BH5	BH16	BH17
Depth		0.1-0.3	0.4-1.0	0.2-0.3
Date Sampled		20/04/2022	20/04/2022	20/04/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	05/05/2022	05/05/2022	05/05/2022
Date analysed	-	05/05/2022	05/05/2022	05/05/2022
Lead	mg/L	[NA]	0.1	[NA]
Nickel	mg/L	0.2	[NA]	<0.02

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
Metals-020	Determination of various metals by ICP-AES following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-OES analytical finish.
Org-022/025	Leachates are extracted with Dichloromethane and analysed by GC-MS/GC-MSMS.

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			05/05/2022	[NT]	[NT]	[NT]	[NT]	05/05/2022	[NT]
Date analysed	-			05/05/2022	[NT]	[NT]	[NT]	[NT]	05/05/2022	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			[NT]	[NT]	[NT]	[NT]	[NT]	09/05/2022	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	09/05/2022	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			05/05/2022	[NT]	[NT]	[NT]	[NT]	05/05/2022	[NT]
Date analysed	-			05/05/2022	[NT]	[NT]	[NT]	[NT]	05/05/2022	[NT]
Naphthalene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	101	[NT]
Acenaphthylene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	83	[NT]
Fluorene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	84	[NT]
Phenanthrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	102	[NT]
Anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	88	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	75	[NT]
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	80	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	70	[NT]	[NT]	[NT]	[NT]	86	[NT]

QUALITY CONTROL: Metals from Leaching Fluid pH 2.9 or 5						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			05/05/2022	41	05/05/2022	05/05/2022		05/05/2022	[NT]
Date analysed	-			05/05/2022	41	05/05/2022	05/05/2022		05/05/2022	[NT]
Lead	mg/L	0.03	Metals-020	<0.03	[NT]	[NT]	[NT]	[NT]	89	[NT]
Nickel	mg/L	0.02	Metals-020	<0.02	41	<0.02	<0.02	0	90	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

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

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Katrina Taylor

Sample Login Details

Your reference	E34849BT, Hornsby
Envirolab Reference	293990-A
Date Sample Received	22/04/2022
Date Instructions Received	04/05/2022
Date Results Expected to be Reported	11/05/2022

Sample Condition

Samples received in appropriate condition for analysis	Holding time exceedance
No. of Samples Provided	additional analysis
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	15
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Holding time exceedance: pH

Please contact the laboratory within 24 hours if you wish to cancel the aforementioned testing. Otherwise testing will proceed as per the COC and hence invoiced accordingly.

Please direct any queries to:

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

Analysis Underway, details on the following page:

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ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
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Sample ID	Misc Inorg - Soil	CEC	TCLP Preparation - Acid	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(b)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	Lead	Nickel	On Hold
BH1-0.12-0.2																						✓
BH1-0.2-0.4																						✓
BH2-0-0.1																						✓
BH2-0.3-0.6																						✓
BH2-0.6-0.7																						✓
BH2-1.0-1.5																						✓
BH2-1.5-2.0																						✓
BH3-0-0.1	✓	✓																				
BH3-0.3-0.45																						✓
BH4-0-0.2																						✓
BH4-0.2-0.4																						✓
BH4-0.4-0.6																						✓
BH5-0-0.1																						✓
BH5-0.1-0.3	✓	✓	✓																		✓	
BH5-0.3-0.8																						✓
BH5-0.8-1.0																						✓
BH6-0-0.1																						✓
BH6-0.1-0.3																						✓
BH6-0.3-0.4																						✓
BH7-0-0.1																						✓

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customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	Misc Inorg - Soil	CEC	TCLP Preparation - Acid	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	Lead	Nickel	On Hold
BH7-0.1-0.3																						✓
BH7-0.3-0.45																						✓
BH8-0-0.05																						✓
BH8-0.05-0.15																						✓
BH9-0-0.1																						✓
BH9-0.1-0.25																						✓
BH10-0.13-0.2	✓	✓																				
BH11-0.13-0.17	✓	✓																				
BH12-0.13-0.17																						✓
BH13-0.12-0.13																						✓
BH14-0-0.1																						✓
BH14-0.1-0.4																						✓
BH14-0.4-1.0																						✓
BH14-1.8-2.4																						✓
BH15-0.1-0.5																						✓
BH15-0.5-0.9																						✓
BH15-0.9-1.3																						✓
BH16-0.17-0.4																						✓
BH16-0.4-1.0			✓																	✓		
BH16-1.0-1.4																						✓

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Sample ID	Misc Inorg - Soil	CEC	TCLP Preparation - Acid	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	Lead	Nickel	On Hold
BH17-0.2-0.3			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
BH17-0.3-1.0																						✓
BH17-1.0-1.3																						✓
SDUP1																						✓
SDUP2																						✓
TB																						✓
TS																						✓
FR-HA																						✓
BH1 - [TRIPLICATE]-0.12-0.2																						✓
BH15 - [TRIPLICATE]-0.1-0.5																						✓

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

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Ming To

Subject: FW: Results for Registration 293990 E34849BT, Hornsby
Attachments: 293990-[R00].pdf; 293990-COC.pdf; JK Environment Soil for Envirolab 293990.xlsx; 293990.Excel.xlsx

Ref: 293990-A
TAT: Standard
Due: 11/05/2022
MT

293990-A

From: Katrina Taylor <KTaylor@jkenvironments.com.au>
Sent: Wednesday, 4 May 2022 10:25 AM
To: Samplereceipt <Samplereceipt@envirolab.com.au>
Subject: FW: Results for Registration 293990 E34849BT, Hornsby

Morning,

Please analyse the following samples on standard turnaround:

pH & CEC
8 BH3 (0-0.1)
14 BH5 (0.1-0.3)
27 BH10 (0.13-0.2)
28 BH11 (0.13-0.17)

TCLP Nickel
14 BH5 (0.1-0.3)
41 BH17 (0.2-0.3)

TCLP Lead
39 BH16 (0.4-1.0)

TCLP PAHs
41 BH17 (0.2-0.3)

Thank you.

Regards
Katrina Taylor
Associate | Environmental Scientist
NSW Licensed Asbestos Assessor

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

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

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

CERTIFICATE OF ANALYSIS 31111

Client Details

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

Sample Details

Your Reference	**E34849BT**
Number of Samples	1 Soil
Date samples received	27/04/2022
Date completed instructions received	27/04/2022

Analysis Details

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

Samples were analysed as received from the client. Results relate specifically to the samples as received.

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

Report Details

Date results requested by	03/05/2022
Date of Issue	03/05/2022

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Results Approved By
Chris De Luca, Operations Manager

Authorised By

Pamela Adams, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		31111-1
Your Reference	UNITS	SDUP3
Date Sampled		21/04/2022
Type of sample		Soil
Date extracted	-	28/04/2022
Date analysed	-	28/04/2022
vTRH C_6 - C_9	mg/kg	<25
vTRH C_6 - C_{10}	mg/kg	<25
TRH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total BTEX	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	89

TRH Soil C10-C40 NEPM		
Our Reference		31111-1
Your Reference	UNITS	SDUP3
Date Sampled		21/04/2022
Type of sample		Soil
Date extracted	-	28/04/2022
Date analysed	-	30/04/2022
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	100
Total +ve TRH (C10-C36)	mg/kg	100
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	84

PAHs in Soil		
Our Reference		31111-1
Your Reference	UNITS	SDUP3
Date Sampled		21/04/2022
Type of sample		Soil
Date extracted	-	28/04/2022
Date analysed	-	30/04/2022
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.4
Anthracene	mg/kg	0.1
Fluoranthene	mg/kg	0.4
Pyrene	mg/kg	0.5
Benzo(a)anthracene	mg/kg	0.2
Chrysene	mg/kg	0.2
Benzo(b,j&k)fluoranthene	mg/kg	0.2
Benzo(a)pyrene	mg/kg	0.19
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	2.2
Benzo(a)pyrene TEQ calc (Zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (Half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc (PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d_{14}	%	104

OCP in Soil		
Our Reference		31111-1
Your Reference	UNITS	SDUP3
Date Sampled		21/04/2022
Type of sample		Soil
Date extracted	-	28/04/2022
Date analysed	-	30/04/2022
alpha-BHC	mg/kg	<0.1
Hexachlorobenzene	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve reported Aldrin + Dieldrin	mg/kg	<0.1
Total +ve reported DDT+DDD+DDE	mg/kg	<0.1
Surrogate 2-chlorophenol-d4	%	94

OP in Soil		
Our Reference		31111-1
Your Reference	UNITS	SDUP3
Date Sampled		21/04/2022
Type of sample		Soil
Date extracted	-	28/04/2022
Date analysed	-	30/04/2022
Azinphos-methyl	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyrifos	mg/kg	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorovos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate 2-chlorophenol-d4	%	94

PCBs in Soil		
Our Reference		31111-1
Your Reference	UNITS	SDUP3
Date Sampled		21/04/2022
Type of sample		Soil
Date extracted	-	28/04/2022
Date analysed	-	30/04/2022
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate 2-fluorobiphenyl	%	102

Acid Extractable metals in soil		
Our Reference		31111-1
Your Reference	UNITS	SDUP3
Date Sampled		21/04/2022
Type of sample		Soil
Date digested	-	29/04/2022
Date analysed	-	29/04/2022
Arsenic	mg/kg	5
Cadmium	mg/kg	<0.4
Chromium	mg/kg	13
Copper	mg/kg	130
Lead	mg/kg	42
Mercury	mg/kg	<0.1
Nickel	mg/kg	9
Zinc	mg/kg	66

Moisture		
Our Reference		31111-1
Your Reference	UNITS	SDUP3
Date Sampled		21/04/2022
Type of sample		Soil
Date prepared	-	28/04/2022
Date analysed	-	29/04/2022
Moisture	%	42

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

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

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			28/04/2022	[NT]	[NT]	[NT]	[NT]	28/04/2022	[NT]
Date analysed	-			28/04/2022	[NT]	[NT]	[NT]	[NT]	28/04/2022	[NT]
vTRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	102	[NT]
vTRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	102	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	84	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	95	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	111	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	104	[NT]	[NT]	[NT]	[NT]	107	[NT]

QUALITY CONTROL: TRH Soil C10-C40 NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			28/04/2022	[NT]	[NT]	[NT]	[NT]	28/04/2022	[NT]
Date analysed	-			28/04/2022	[NT]	[NT]	[NT]	[NT]	28/04/2022	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	105	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	85	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	107	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	105	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	85	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	107	[NT]
Surrogate o-Terphenyl	%		Org-020	89	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			28/04/2022	[NT]	[NT]	[NT]	[NT]	28/04/2022	[NT]
Date analysed	-			30/04/2022	[NT]	[NT]	[NT]	[NT]	30/04/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Acenaphthylene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Fluorene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Phenanthrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Pyrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Benzo(b,j&k)fluoranthene	mg/kg	0.2	Org-022	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022	<0.05	[NT]	[NT]	[NT]	[NT]	108	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d_{14}	%		Org-022	98	[NT]	[NT]	[NT]	[NT]	106	[NT]

QUALITY CONTROL: OCP in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			28/04/2022	[NT]	[NT]	[NT]	[NT]	28/04/2022	[NT]
Date analysed	-			30/04/2022	[NT]	[NT]	[NT]	[NT]	30/04/2022	[NT]
alpha-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Hexachlorobenzene	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
gamma-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
delta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
alpha-chlordane	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Dieldrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Endrin	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Methoxychlor	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022	92	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: OP in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			28/04/2022	[NT]	[NT]	[NT]	[NT]	28/04/2022	[NT]
Date analysed	-			30/04/2022	[NT]	[NT]	[NT]	[NT]	30/04/2022	[NT]
Azinphos-methyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Diazinon	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Dichlorovos	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Fenitrothion	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Malathion	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022	92	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			28/04/2022	[NT]	[NT]	[NT]	[NT]	28/04/2022	[NT]
Date analysed	-			30/04/2022	[NT]	[NT]	[NT]	[NT]	30/04/2022	[NT]
Aroclor 1016	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Aroclor 1260	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate 2-fluorobiphenyl	%		Org-022	100	[NT]	[NT]	[NT]	[NT]	104	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date digested	-			29/04/2022	[NT]	[NT]	[NT]	[NT]	29/04/2022	[NT]
Date analysed	-			29/04/2022	[NT]	[NT]	[NT]	[NT]	29/04/2022	[NT]
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	[NT]	[NT]	97	[NT]
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	[NT]	[NT]	98	[NT]
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	[NT]	[NT]	124	[NT]
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

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

SAMPLE RECEIPT ADVICE

Client Details

Client	JK Environments
Attention	Vittal Boggaram

Sample Login Details

Your reference	E34849BT
Envirolab Reference	31111
Date Sample Received	27/04/2022
Date Instructions Received	27/04/2022
Date Results Expected to be Reported	03/05/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	8.0
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	vTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	OCP in Soil	OP in Soil	PCBsin Soil	Acid Extractable metalsin soil
SDUP3	✓	✓	✓	✓	✓	✓	✓

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

Additional Info

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

SAMPLE AND CHAIN OF CUSTODY FORM

TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	JKE Job Number: E34849BT Date Results Required: STANDARD Page: 2 of 2	**FROM:** JKEnvironments REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: vboggaram@jkenvironments.com.au

Location: Hornsby | Sampler: AD/EW | Sample Preserved in Esky on Ice | Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3	Combo 6	Asbestos (500ml)	Asbestos Detection	BTEX						
21/04/2022	26	BH9	0.1-0.25	G	0	F: Silty Clay												
22/04/2022	27	BH10	0.13-0.20	G	0	F: Silty Clayey Sand			X		X							
22/04/2022	28	BH11	0.13-0.17	G, A	0	F: Silty Clayey Sand			X	X								
22/04/2022	29	BH12	0.13-0.17	G	0.1	F: Silty Clayey Sand			X		X							
22/04/2022	30	BH13	0.12-0.13	G	0	F: Silty Clayey Sand			X		X							
20/04/2022	31	BH14	0-0.1	G	0.1	F: Gravelly sand												
20/04/2022	32	BH14	0.1-0.4	G, A	0	F: Silty Sand			X	X								
20/04/2022	33	BH14	0.4-1.0	G, A	0	F: Silty Clay		X										
20/04/2022	34	BH14	1.8-2.4	G, A	0.1	Silty Clay		X										
20/04/2022	35	BH15	0.1-0.5	G, A	0.1	F: Silty Sand			X	X								
20/04/2022	36	BH15	0.5-0.9	G, A	0	Silty Clay		X										
20/04/2022	37	BH15	0.9-1.3	G, A	0.1	XW Sandstone												
20/04/2022	38	BH16	0.17-0.4	G, A	0	F: Silty Sandy Clay			X	X								
20/04/2022	39	BH16	0.4-1.0	G, A	0	F: Silty Clay		X										
20/04/2022	40	BH16	1.0-1.4	G, A	0	Silty Clay												
20/04/2022	41	BH17	0.2-0.3	G, A	0	F: Silty Sandy Clay			X	X								
20/04/2022	42	BH17	0.3-1.0	G, A	0	Silty Sandy Clay		X										
20/04/2022	43	BH17	1.0-1.3	G, A	0	Silty Clay												
21/04/2022	44	SDUP1	–	G, A	–	Soil Duplicate			X									
21/04/2022	45	SDUP2	–	G, A	–	Soil Duplicate		X										
(1) 21/04/2022	–	SDUP3	–	G, A	–	Soil Duplicate			X	Please send to VIC								
20/04/2022	46	TB	–	G	–	Trip Blank						X						
20/04/2022	47	TS	–	V	–	Trip Spike						X						
22/04/2022	48	FR-HA	–	V x2	–	Field Rinsate						X						

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

293490 CM

Relinquished By:	Date:	Time:	Received By:	Date:
AB	22-4-22	14:30	CM, EW, AP	22/4/22

Relinquished by ELS 1604
CMWayne
26/4/22 1200
CM

ENVIROLAB
Envirolab Services
25 Research Drive
Croydon South VIC 3136
Ph: (03) 9763 2500

Job No: 31111
Date Received: 27/4/22
Time Received: 12:20pm
Received By: AP
Temp: Cool/Ambient 5.0C
Cooling: Ice/Icepack
Security: Intact/Broken/None

Appendix F: Report Explanatory Notes

QA/QC Definitions

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)[14] methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)[15]. The NEPM (2013) is consistent with these documents.

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

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

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit*" (Keith, 1991).

B. Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

C. Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

D. Representativeness

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

E. Completeness

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

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;
- All blank data reported;

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

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

- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

F. Comparability

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

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

G. Blanks

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

H. Matrix Spikes

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

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

I. Surrogate Spikes

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

J. Duplicates

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

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

Appendix G: Data (QA/QC) Evaluation

Data (QA/QC) Evaluation

A. INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in Section 5.1 of this report. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

1. Field and Laboratory Considerations

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

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

2. Field QA/QC Samples and Analysis

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

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	SDUP1 (primary sample BH7 0-0.1m)	Approximately 8% of primary samples	Heavy metals, TRH/BTEX, and PAHs
Intra-laboratory duplicate (soil)	SDUP2 (primary sample BH6 0-0.1m)	As above	As above
Inter-laboratory duplicate (soil)	SDUP3 (primary sample BH3 0-0.1m)	Approximately 4% of primary samples	Heavy metals, TRH/BTEX, and PAHs
Trip spike (soil)	TS (20 April 2022)	One for the investigation to demonstrate adequacy of preservation, storage and transport methods	BTEX
Trip blank (soil)	TB (20 April 2022)	One for the investigation to demonstrate adequacy of storage and transport methods	TRH/BTEX
Rinsate (soil HA)	FR-HA (22 April 2022)	One for the investigation to demonstrate adequacy of decontamination methods	BTEX

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

3. Data Assessment Criteria

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

Field Duplicates

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

Field/Trip Blanks and Rinsates

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

Trip Spikes

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

Laboratory QA/QC

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

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

RPDs

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

Laboratory Control Samples (LCS) and Matrix Spikes

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

Surrogate Spikes

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

Method Blanks

- All results less than PQL.

B. DATA EVALUATION

1. Sample Collection, Storage, Transport and Analysis

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

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

JKE note that the temperature on receipt of soil samples was reported to be up to 15°C. JKE understand that the temperature is measured at the laboratory using an infrared temperature probe by scanning the outside of the sample container (i.e. one sample jar/container at the time of registering the samples). This procedure is not considered to be robust as there is a potential for the outside of the jar to warm to ambient temperature, or at least to increase from that of the internal contents, relatively quickly. On this basis, JKE is of the opinion that the temperatures reported on the Sample Receipts are unlikely to be reliable or representative of the overall batch. This is further supported by the trip spike recovery results (discussed further below) which reported adequate recovery in the range of 81% to 98%.

Whilst it could be argued that 19% loss of volatiles may have led to these contaminants being under-reported (i.e. the lower end of the trip spike recovery was 81%), it is noted that all BTEX results and volatile TRHs (F1 and F2) were below the PQLs and even a nominal 19% increase of TRH/BTEX concentrations in these samples would not result in exceedance of the SAC.

Review of the project data also indicated that:

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

2. Laboratory PQLs

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

3. Field QA/QC Sample Results

Field Duplicates

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

- Elevated RPDs were reported for arsenic, chromium, copper, lead and zinc in SDUP1/BH7 (0-0.1m);
- Elevated RPDs were reported for arsenic and copper in SDUP2/BH6 (0-0.1m); and
- Elevated RPDs were reported for TRH F3, TRH F4, and several PAH compounds in SDUP3/BH3 (0-0.1m).

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

Field/Trip Blanks

During the investigation, one soil trip blank was placed in the esky during sampling and transported back to the laboratory. The results were all less than the PQLs, therefore cross contamination between samples that may have significance for data validity did not occur.

Rinsates

All results were below the PQL. This indicated that cross-contamination artefacts associated with sampling equipment were not present and the potential for cross-contamination to have occurred was low.

Trip Spikes

The results ranged from 81% to 98% and indicated that field preservation methods were appropriate.

4. Laboratory QA/QC

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

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- Percent recovery for the matrix spike was not possible to report due to the high concentration of TRH C10-C40 in one sample causing interference;
- The laboratory RPD acceptance criteria was exceeded for copper in two samples. Therefore triplicate results were issued; and
- Percent recovery was not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However, an acceptable recovery was obtained for the LCS.

C. DATA QUALITY SUMMARY

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

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

Appendix H: Guidelines and Reference Documents

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

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

Contaminated Land Management Act 1997 (NSW)

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

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

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

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

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

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

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

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

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

Protection of the Environment Operations Act 1997 (NSW)

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

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