Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Detailed Site (Contamination) Investigation

Proposed Carpark
See Street, Meadowbank

Prepared for
TAFE NSW

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Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

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Table of Contents

Page

Report on Detailed Site (Contamination) Investigation
Proposed Carpark
See Street, Meadowbank

1. Introduction

This report presents the results of a Detailed Site (Contamination) Investigation (DSI) undertaken for a proposed multi-storey carpark as part of the TAFE NSW Meadowbank Campus future development, located at See Street, Meadowbank. The investigation was undertaken in accordance with the Douglas Partners Pty Ltd (DP) proposal SYD200270.P.001.Rev0 dated 13 March 2020.

It is understood that TAFE NSW has made a decision to proceed with a change to the TAFE Meadowbank Phase 2 SSDA scope which involves a proposed alternate car parking option to remove basement car parking spaces from the Multi-Trades Hub and construct a multi-storey carpark on the current Block J carpark. This DSI will be used to support the revised SSDA.

The proposed development area (the site) is shown on Drawing 1, Appendix A.

Greencap undertook a desktop preliminary site investigation (PSI) in 2018 on the entire Meadowbank campus, which includes the current site. The report recommended a detailed site investigation including groundwater assessment, prior to any future development.

The primary objective of the DSI was to assess the suitability of the site for the proposed development and to further identify contamination (or potential contamination) issues that require remediation or management as part of the proposed development. The DSI also presents a preliminary waste classification assessment to assist in budgeting for the disposal of surplus soils created as a result of the proposed development.

The DSI is undertaken with reference to the following primary documents:

- NSW EPA (2011) *Guidelines for Consultants Reporting on Contaminated Sites*, and
- NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013*.

The fieldwork for the DSI was conducted in conjunction with a geotechnical investigation reported under DP Report 86469.13.R.001.

2. Scope of Work

The scope of work for this DSI comprised:

- A review of the PSI report prepared by Greencap (2018) for the site and summary of the findings as they relate to the site;

- Site walkover to nominate accessible sampling locations and observe current features and activities;
- A review of Dial-Before-You-Dig Plans and undertake service location to identify underground services;
- Drilling of eight boreholes (BH1 to BH8) with a truck mounted drill rig;
- Extending the depth of three of the boreholes, and installing standpipes to permit measurement of groundwater levels and sampling of groundwater (if present);
- Collection of soil samples at regular depth intervals or upon signs of contamination;
- Screening of samples collected with a photo - ionisation detector (PID) to assess the likely presence or absence of volatile organic compounds;
- Analysis of selected soil samples at a NATA accredited laboratory for various combinations of the following:
  - Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc);
  - Total recoverable hydrocarbons (TRH); o Benzene, toluene, ethylbenzene and total xylenes (BTEX);
  - Polycyclic aromatic hydrocarbons (PAH);
  - Phenols;
  - Organochlorine pesticides (OCP);
  - Organophosphorus pesticides (OPP);
  - Polychlorinated biphenyls (PCB); and
  - Asbestos (40 g sample for initial screen).
- Development of the groundwater wells and measurement of water levels;
- Analysis of one intra-laboratory soil replicate for metals, TRH, BTEX, one trip blank sample for BTEX and one trip spike sample for BTEX; and
- The preparation of this DSI report.

It is noted that the collection and testing of groundwater samples formed part of the original scope of works. Since all wells were found to be dry on several occasions post installation, no samples were available for collection.

3. Site Information

3.1 Site Identification and Description

The site is part of Lot 11 Deposited Plan 1232584. The site is located within the boundaries of the Meadowbank TAFE and is a roughly rectangular shaped area with plan dimensions of some 60 m by 40 m as shown on Drawings 1 in Appendix A. The site occupies an area of approximately 2,400 m^2. The site is bounded to the south east by See Street, the north east and south west by open space area and existing TAFE buildings, and north-west by an internal driveway.

The local government authority is Ryde Council.

At the time of the investigation, the site was an asphalt surfaced on-grade carpark with numerous large eucalypts around the perimeter and between designated carparking areas. The site surface levels fall from See Street at approximately reduced level RL 27 m relative to the Australian Height Datum (AHD) to the west with the north western boundary at approximately RL 24 m AHD. Retaining walls exist between the two central carparking rows, splitting the higher elevation of the south-eastern half of the carpark from the lower elevation of the north-western half.

3.2 Geology, Topography and Hydrogeology

Reference to the Sydney 1:100 000 Geological Sheet indicates that the site is underlain by Hawkesbury Sandstone of Triassic Age. The Hawkesbury Sandstone comprises medium to coarse grained quartz sandstone, very minor shale and laminite lenses. The See Street boundary is close to a geological boundary with Ashfield Shale which comprises black to dark-grey shale and laminite.

Reference to the Sydney Soil Landscape 1:100 000 Map Sheet the site is within an area of Lucas Heights soil. This soil type is characterised by moderately hard setting Yellow Podzolic Soils and Yellow Soloths, and Yellow Earths on outer edges of crests.

The NSW Acid Sulphate Soil (ASS) Risk Map indicates that the site is not within an area of known acid sulfate soil occurrence.

A search of the NSW Department of Primary Industries Office of Water database was undertaken for water bearing bores within a 500 m radius of the site. Three registered groundwater bores were identified within the 500 m radius of the site. These bores were registered for monitoring purposes. Shallow standing water level was reported in the range 2.3-2.5 m below ground level (bgl).

DP conducted a contamination investigation of the proposed Multi-Trades Hub in 2019, with the findings presented in *Report on Limited Detailed Site (Contamination) Investigation, Proposed Multi-Trades Hub, TAFE NSW Meadowbank Campus, See Street, Meadowbank NSW*, Report 86469.04.R.001.Rev0 dated 9 May 2019 (DP, 2019). The proposed Multi-Trades Hub site also fronts See Street, is at a similar elevation to the site, and is located approximately 100 m further north-east of the site.

Two groundwater monitoring wells were installed as part of DP (2019). Water levels were measured in the wells at depths approximately 5 m bgl.

Based on regional topography, groundwater flow directions are expected to flow to the south, towards Parramatta River, while surface water is likely to discharge to the unnamed creek on the western campus boundary and flow via Charity Creek ultimately to the Parramatta River.

4. Review of Previous PSI Report

As part of the DSI, the Greencap 2018 *Report on Preliminary Site Investigation, Meadowbank Campus - See Street, Meadowbank NSW,* Report J154876 dated 10 October 2018 (Greencap, 2018) was reviewed and is summarised below.

Greencap (2018) comprised of a desktop review of the entire TAFE campus which includes the current site to assess the potential for contamination at the site. A site walkover, review of historical aerial photographs, regulatory notice search, SafeWork NSW Records search, historical title deeds search, and review of the council Section 10.7(2) planning certificate was undertaken.

The walkover undertaken by Greencap identified the following pertinent features of the campus:

- The site consists of 32 buildings, including multi story buildings, sheds, demountable buildings and warehouses. The footprint of the buildings cover approximately 40% of the site, an additional 20% is covered in hardstand including footpaths, car parking and small internal roads. The remainder of the site is covered in grass, garden beds and a small amount of dense vegetation;
- The buildings generally consist of seminar rooms, educational spaces, industrial skills workshops, administration offices, utilities and amenities;
- Anecdotal information provided during the site walkover indicated that the site was previously used for military use in the past;
- On the western boundary, adjacent the train line, a small ravine was identified covered in dense vegetation. A small amount of waste was identified in the vegetation area. A small creek at the base of the ravine was identified running north to south, the feeder for the creek was not identified indicating it was a stormwater channel;
- Chemical stores were identified in multiple spaces across the site;
- Waste bins and skip bins were identified in various locations across the site, all bins were well maintained;
- There was no visual evidence of underground storage tanks (e.g., fill points, dip points, breather lines) or above ground storage tanks observed;
- There was no visual evidence of potential asbestos containing materials (ACM) observed on the surface of the site or within the structures;
- There was no visual evidence of phytotoxic impact (i.e., plant stress or dieback) observed on the site;
- There was no olfactory evidence of contamination detected on the site; and
- There was no visual evidence of surface staining observed on the site.

Within the general area of the campus, the following potential sources of contamination were identified:

- A power sub-station is located on the north-eastern boundary of the site;
- Meadowbank train station and train line is located on the western boundary;
- Multiple mechanics / smash repairs 15 m north of the site; and
- Sydney water treatment facility 25 m north of site.

Within 500 m of the site four petrol stations were identified:

- BP Petrol Station, 220 m north-west of site;
- Caltex West Ryde Petrol Station, 230 m north of site;
- Speedway Petrol Station, 280 m north of site; and
- 7 Eleven Petrol Station, 390 m north of site.

A review of the site history and relevant searches indicated the campus site previously consisted of multiple smaller lots that were used for industrial, educational and residential use. The majority of the site was owned by a company that manufactured agricultural machinery in the 1930's, their warehouses were demolished before 1943. The land was acquired under the Public Work Act 1981 on behalf of the Minister for Public Instruction. Anecdotal evidence ideates that the site was used as a military based during the world war, a large portion of the site was clear of development between 1943 and 1951. Multiple residential buildings were located on the eastern boundary of the campus prior to 1986; the buildings were demolished following the Minister of Education acquiring properties in the late 1970s. The lot was fully acquired by the Minister of Education and the Minister Administering the Technical and Further Education in 2016.

The campus was not reported to be on any NSW EPA published databases, had no record of the storage of hazardous chemicals on the current investigation site and not declared in the planning certificates to be significantly contaminated or subject to any management order. There were, however, numerous depots with licenced goods stored across the TAFE campus. No evidence, either from the Dangerous Goods search, site walkover or other, indicated the presence of any historical or current Underground Storage Tanks (UST) or Above ground Storage Tanks (AST) used for petroleum fuel storage. No dangerous goods storage was noted for the current site.

The most significant risks associated with contamination at the campus were considered by Greencap to be associated military use, chemical storage, historical filling and manufacturing. The most significant off-site risks were considered by Greencap to be associated with the adjoining sub-station, the water treatment facility further north, and the adjoining train line. Contaminants of concern were identified as metals, hydrocarbons, pesticides, solvents, volatile compounds and asbestos.

The report states that a *detailed site assessment is recommended across the full site prior to future development or utility works involving disturbance of site soils*.

5. Conceptual Site Model

A Conceptual Site Model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e., it enables an assessment of the potential source - pathway - receptor linkages (complete pathways). This CSM has been prepared taking into consideration the results of the previous investigations both on site and the campus in general.

5.1 Potential Sources

Based on Greencap (2018) report, the following potential sources of contamination and associated contaminants of potential concern (COPC) have been identified for the current site:

S1 Imported fill, previous site uses impacting fill / surficial soils and demolition of former buildings impacting fill/ surficial soil.

COPC include: heavy metals, TRH, BTEX, PAH, PCB, OCP, OPP, phenols and asbestos; and

S2 Pest control; Pesticides (such as OCP and OPP) used beneath ground slabs.

5.2 Potential Receptors

- R1 - Future site users (including workers, students and visitors);
- R2 - Future construction workers (for development of the site);
- R3 - Future maintenance workers (post-development);
- R4 - Adjacent land users (including residents and workers in adjacent properties);
- R5 - Surface waters (beyond site boundary);
- R6 - Groundwater; and
- R7 - In ground building structures.

5.3 Potential Pathways

Potential pathways for the identified contamination to impact on the receptors include the following:

- P1 - Ingestion and dermal contact with soil;
- P2 - Inhalation of dust;
- P3 - Inhalation of vapours;
- P4 - Leaching of contaminants and vertical migration into groundwater;
- P5 - Lateral migration of groundwater;
- P6 - Direct contact of contaminated ground with in ground structures; and
- P7 - Surface water runoff

5.4 Summary of CSM

A ‘source - pathway - receptor’ approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways. The possible pathways between the above sources (S1 to S2) and receptors (R1 to R7) are provided in Table 1 below.

Table 1: Conceptual Site Model

Source	Transport Pathway	Receptor	Risk Management Action Recommended
S1 Imported fill, previous site uses impacting fill/ surficial soils and demolition of former buildings impacting fill/ surficial soil COPC include: heavy metals, TRH, BTEX, PAH, PCB, OCP, OPP, phenols and asbestos	P1: Ingestion and dermal contact P2: Inhalation of dust P3: Inhalation of vapours	R1: Future site users R2: Future construction workers R3 : Future maintenance workers	An intrusive investigation to assess possible contamination issues including chemical testing of the soils and groundwater.
	P3: Inhalation of vapours	R4: Adjacent land users	
	P4: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater	
	P5: Lateral migration of groundwater providing base flow to water bodies P7: Surface water runoff	R5:Surface water	
	P6: Contact with contaminated ground	R7: In ground building structures	
S2 Pest control COPC include: Pesticides (such as OCP and OPP) used beneath ground slabs	P1: Ingestion and dermal contact P2: Inhalation of dust P3: Inhalation of vapours P4: Leaching of contaminants and vertical migration into groundwater P7: Surface water runoff	R1: Future site users R2: Future construction workers R5:Surface water R6: Groundwater	

6. Fieldwork, Analytical Rationale and Method

6.1 Data Quality Objectives and Project Quality Procedures

The DSI has been devised broadly in accordance with the seven-step data quality objective (DQO) process which is provided in Appendix C, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013 (NEPC, 2013). The DQO process is outlined as follows:

- Stating the Problem;
- Identifying the Decision;

- Identifying Inputs to the Decision;
- Defining the Boundary of the Assessment;
- Developing a Decision Rule;
- Specifying Acceptable Limits on Decision Errors; and
- Optimising the Design for Obtaining Data.

An evaluation of the DQO is presented in Appendix C.

6.2 Data Quality Indicators

The performance of the investigation in achieving the DQO was assessed through the application of Data Quality Indicators (DQI), defined as follows:

Precision: A quantitative measure of the variability (or reproducibility) of data;

Accuracy: A quantitative measure of the closeness of reported data to the "true" value;

Representativeness: The confidence (expressed qualitatively) that data are representative of each media present on the site;

Completeness: A measure of the amount of useable data from a data collection activity; and

Comparability: The confidence (expressed qualitatively) that data can be considered equivalent for each sampling and analytical event.

An evaluation of the DQI is presented in Appendix C.

6.3 Soil

6.3.1 Sample Locations and Rationale

Table A of the NSW EPA (1995) *Sampling Design Guidelines* recommends a minimum of eight sampling points for a site of 0.25 ha for site characterisation based on the detection of circular hot spots using a systemic grid sampling pattern. Given no identified point sources of contamination, a systematic sampling pattern was adopted for the assessment of the site.

6.3.2 Sampling Methodology

The bore drilling was carried out on the 21 and 28 March 2020, and consisted of:

- Setting out and scanning for buried services at all borehole locations (BH1 - BH8);
- Drilling of eight boreholes depths of between 1.0 m and 8.1 m bgl using with a truck mounted drilling rig. The boreholes were commenced using solid flight augers down to bedrock and samples were collected for laboratory testing in each borehole. Standard penetration tests (SPTs) were carried out at BH1, BH3, BH6 then the boreholes were continued using rotary wash boring techniques with water and using NMLC diamond core drilling techniques to obtain continues core samples of the bedrock; and

- Soil samples were collected for each observed soil type, and at regular depth intervals. Observations were made and recorded on the borehole logs (see Appendix B) for staining, odours and anthropogenic.

All sampling data was recorded on DP's borehole logs. The general sampling procedure adopted for the collection of soil samples was as follows:

- Collection of soil samples from auger returns using disposable sampling equipment;
- Transfer of samples into laboratory-prepared glass jars, completely filled to ensure the headspace within the sample jar was minimised, and capped immediately to minimise loss of volatiles;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth; and
- Placement of the glass jars, with Teflon lined lid, into a cooled, insulated and sealed container for transport to the laboratory.

Replicate samples were collected in zip-lock bags for PID screening.

Borehole locations and levels were determined using a differential GPS (DGPS) receiver.

6.3.1 Analytical Rationale

All soil samples that were selected for analysis were from filling (apart from one sample) given that field observations suggested that contamination is more likely to be associated with the filling (and near surface soils) than natural soil.

At least one soil sample from each bore was selected for analysis, with more samples selected where fill was deepest or signs of potential contamination observed.

Samples were analysed for the primary COPC including metals, TRH, BTEX, PAH, OCP, OPP, PCB, phenols and asbestos. Additionally pH and CEC were analysed on selected samples to determine environmental investigation levels. PID screening was utilised to assess the presence of VOC.

6.4 Monitoring Well Installation and Sampling Details

Groundwater monitoring wells were installed in three boreholes (BH1, BH3 and BH8) to depths of approximately 8.0 m bgl. The depth of well installation was based on water level observations reported in DP (2019). The groundwater monitoring wells were installed to measure water levels and evaluate the potential for groundwater contamination. The wells were positioned on the higher and lower elevations of the site to assess groundwater conditions entering the site and leaving the site.

The installed wells were constructed of 50 mm diameter acid washed, Class 18, PVC casing and machine slotted well screen intervals. Joints were screw threaded, thereby avoiding the use of glues and solvents which may contaminate the groundwater. The wells were completed with a gravel pack extending above the well screen, a bentonite plug and the backfilled with sand above the bentonite plug and a Gatic cover at the surface.

Well construction details are shown on the borehole logs, Appendix B. The wells were screened from approximately the top of the sandstone bedrock profile to the base of the borehole.

Following installation of groundwater wells, the three wells developed on 1 April 2020 by purging until the well was dry. The purpose of well development was to remove as far as practicable fluid and sediment introduced via drilling and to facilitate connection of the well to the local groundwater regime. At the time of development, two wells were dry and one had a minor amount of residual water from the drilling process. The wells were again checked on 7 April 2020 and found to be dry.

7. Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in the current investigation is informed by the preliminary conceptual site model which identified receptors to potential contamination (refer to Section 6). Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising investigation levels, screening levels and management limits of Schedule B1 of NEPC, 2013. The NEPC guidelines are endorsed by NSW EPA under the CLM Act 1997.

The investigation levels, screening levels and management limits are applicable to generic land use settings and include consideration of, where relevant, the soil type and the depth of contamination. The investigation and screening levels are not intended to be used as clean up levels. Rather, they establish concentrations above which further appropriate investigation (e.g., Tier 2 assessment) should be undertaken. They are intentionally conservative and are based on a reasonable worst-case scenario.

7.1.1 Health Investigation and Screening Levels

The Health Investigation Levels (HIL) and Health Screening Levels (HSL) are scientifically-based, generic assessment criteria designed to be used in the first stage (Tier 1) of an assessment of potential human health risk from chronic exposure to contaminants.

HIL are applicable to assessing health risk arising via all relevant pathways of exposure for a range of metals and organic substances. The HIL are generic to all soil types and apply generally to a depth of 3 m below the surface for residential use. Site-specific conditions may determine the depth to which HIL apply for other land uses.

HSLs are applicable to selected petroleum compounds and fractions to assess the risk to human health via the inhalation pathway. HSL have been developed in NEPC (2013) for different land uses, soil types and depths to contamination.

The generic HIL and HSL are considered to be appropriate for the assessment of contamination at the site. HIL D and HSL D have been adopted given that proposed for continued use as part of the TAFE, and the proposed bulk excavation of soils across the site footprint.

As soil types encountered were variable, the most conservative HSL for the different soil types (sand, silt and clay) have been adopted. HSL for a depth of 0 m to < 1 m have been adopted as these are more conservative than those for greater depths.

The adopted HIL and HSL for the COPC are shown in Table 2.

Table 2: HIL and HSL for Soil Contaminants

Contaminant	HIL D (mg/kg)	HSL D for vapour intrusion (mg/kg)
Metals and Inorganics		
Arsenic	3000	-
Cadmium	900	-
Chromium (VI)	3600	-
Copper	240 000	-
Lead	1500	-
Mercury (inorganic)	730	-
Nickel	6000	-
Zinc	400 000	-
Phenols (Pentachlorophenol as initial screen)	660	-
TRH		
$C_6 – C_{10}$ (less BTEX)	-	260
$>C_{10}-C_{16}$ (less Naphthalene)	-	NL
BTEX		
Benzene	-	3
Toluene	-	NL
Ethylbenzene	-	NL
Xylenes	-	230
PAH		
Benzo(a)pyrene TEQ	40	-
Naphthalene	-	NL
Total PAHs	4000	-
OCP		
DDT+DDE+DDD	3600	-
Aldrin + Dieldrin	45	-
Chlordane	530	-
Endosulfan (total)	2000	-
Endrin	100	-
Heptachlor	50	-
HCB	80	-
Methoxychlor	2500	-
OPP		
Chlorpyrifos	2000	-
Other Organics		
PCBs (non dioxin- like PCB only)	7	-

Note: TEQ is Toxic Equivalency Quotient.

NL is 'Not Limiting'. If the derived soil HSL exceeds the soil saturation concentration, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, the HSL is given as NL.

7.1.2 Ecological Investigation and Screening Levels

Ecological Investigation Levels (EIL) and ecological screening levels (ESL) to be determined in accordance with NEPC (2013), if ultimately deemed appropriate.

Schedule B5A of NEPC (2013) states that the aim *of the EILs is that varying levels of protection will be provided to the following ecological receptors at all sites:*

- *Biota supporting ecological processes, including microorganisms and soil invertebrates;*
- *Native flora and fauna;*
- *Introduced flora and fauna; and*
- *Transitory or permanent wildlife.*

Furthermore Schedule B5A of NEPC (2013) states that *Commercial and industrial land, particularly in long-established industrial areas, is often heavily contaminated by past activities or fill materials used to level the area. In these cases, jurisdictions may determine that HILs are the most appropriate soil quality criteria and that EILs are not applicable. In many cases, the only generic ecological value for this land use will be 'transitory wildlife'.*

It is noted that the value of the site for soil organisms and the risk of exposure of soil contamination to transitory wildlife are considered very low, given that the commercial / industrial setting; the current hard covered site; and the proposed building and hardstand will occupy the entire site footprint.

Therefore, it is considered that human health risk screening levels are more appropriate and EIL and ESL are not relevant to the current assessment.

7.1.3 Management Limits - Petroleum Hydrocarbons

In addition to appropriate consideration and application of the HSL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards; and
- Effects on buried infrastructure e.g., penetration of, or damage to, in-ground services.

Management Limits to avoid or minimise these potential effects have been adopted in NEPC (2013) as interim Tier 1 guidance. Management Limits have been derived in NEPC (2013) for the same four petroleum fractions as the HSLs (F1 to F4). The adopted Management Limits, from Table 1B (7), Schedule B1 of NEPC (2013) are shown in Table 13. The following site specific data and assumptions have been used to determine the Management Limits:

- The Management Limits will apply to any depth within the soil profile;
- The Management Limits for commercial and industrial apply; and
- The soils encountered at the site comprised various types including sand and clay. A "coarse" soil texture (being the most conservative soil type) has been adopted.

Table 3: Management Limits

Contaminant	Management Limit - Commercial / Industrial (mg/kg)
TRH C_6 – C_{10}	700
TRH >C_{10}-C_{16}	1000
TRH >C_{16}-C_{34}	3500
TRH >C_{34}-C_{40}	10 000

7.1.4 Asbestos in Soil

Bonded asbestos-containing material (ACM) is the most common form of asbestos contamination across Australia, generally arising from:

- Inadequate removal and disposal practices during demolition of buildings containing asbestos products;
- Widespread dumping of asbestos products and asbestos containing fill on vacant land and development sites; and
- Commonly occurring in historical fill containing unsorted demolition materials.

Mining, manufacturing or distribution of asbestos products may result in sites being contaminated by friable asbestos including free fibres. Severe weathering or damage to bonded ACM may also result in the formation of friable asbestos comprising fibrous asbestos (FA) and / or asbestos fines (AF).

Asbestos only poses a risk to human health when asbestos fibres are made airborne and inhaled. If asbestos is bound in a matrix such as cement or resin, it is not readily made airborne except through substantial physical damage. Bonded ACM in sound condition represents a low human health risk, whilst both FA and AF materials have the potential to generate, or be associated with, free asbestos fibres. Consequently, FA and AF must be carefully managed to prevent the release of asbestos fibres into the air.

A detailed asbestos assessment was not undertaken as part of these works as it was unknown at the time of preparing the proposal if asbestos was a likely contaminant. As an initial screen, the site assessment criteria for asbestos are as follows:

- No visible asbestos-containing materials (ACM) at the sampling locations; and
- No asbestos detected at the laboratory reporting limit of 0.1 g/kg.

8. Results

8.1 Fieldwork Results

As noted in Section 2, the field work for the investigation comprised the drilling of eight boreholes (BH1 to BH8). The general sequence of subsurface materials encountered in the boreholes is described below. Details of the subsurface conditions encountered are given in the borehole logs in Appendix B, together with notes defining classification methods and descriptive terms:

PAVEMENT:	Asphalt 20 - 60 mm thick over roadbase gravel to depths in the range of 0.1 - 0.3 m bgl;
FILL:	Sandy clay and gravelly sand to depths in the range 0.4 - 1.2 m bgl;
SANDY CLAY and SANDSTONE:	Sandy clay layer in BH1 to depth of 2.1 m bgl, very low strength and highly weathered sandstone in all the boreholes to depths in the range 1.0 - 2.1 m bgl; and
SANDSTONE ROCK:	Initially extremely very low to low strength, increasing to medium to high strength with depth. All three cored boreholes were terminated in medium strength sandstone at depths in the range 6.2 - 8.1 m bgl.

No free groundwater was observed during augering.

There were no visual or olfactory indicators (i.e., staining or odours) to suggest the presence of contamination within the boreholes.

8.2 Laboratory Results

The results of laboratory analysis are summarised in the following tables in Appendix D:

- Table D1: Summary of Analytical Results - Soil;
- Table D2: Summary of Analytical Results - Waste Classification.

The laboratory certificates together with the chain of custody and sample receipt advice are provided in Appendix E.

The Data Quality Assessment including the Quality Assurance and Quality Control findings is presented in Appendix C. The results of that assessment indicate that the laboratory and field data are reliable and suitable for the purpose of the investigation.

9. Discussion of Results

9.1 Soil

As shown in Table D1, Appendix D, reported concentrations of BTEX, OCP and OPP were below the laboratory practical quantitation limit (PQL) and therefore less the adopted SAC. Detectable concentrations of metals, TRH, PAHs and PCBs were recorded in some soil samples, but below the SAC. The remaining analytes reported concentrations below the SAC.

Asbestos was not detected at the laboratory's limit of reporting of 0.1 g/kg.

9.2 Preliminary Waste Classification

The preliminary waste classification was generally undertaken in accordance with the NSW EPA *Waste Classification Guidelines* 2014 (EPA, 2014).

Table 4: Six Step Procedure for Waste Classification

Step	Comments	Rationale
1. Is the waste special waste?	No	No asbestos containing materials (ACM), clinical or related waste, or waste tyres were observed in the boreholes. Asbestos was not detected by the analytical laboratory.
2. Is the waste liquid waste?	No	The fill comprised a soil matrix.
3. Is the waste "pre-classified"?	No	The filling material is not pre-classified with reference to EPA (2014).
4. Does the waste possess hazardous waste characteristics?	No	The waste was not observed to contain or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances, corrosive substances, coal tar, batteries, lead paint or dangerous goods containers.
5. Determining a wastes classification using chemical assessment	Conducted	Refer to Table D2, Appendix D.
6. Is the waste putrescible or non-putrescible?	No	The fill does not contain materials considered to be putrescible [1].

Note

1. Wastes that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forest and crop materials, and natural fibrous organic and vegetative materials (EPA, 2014).

As shown in Table D2, Appendix D, all contaminant concentrations for the analysed fill samples were within the contaminant thresholds (CT1s) for General Solid Waste (GSW) with the exception of nickel

in samples BH2/0.05-0.15 m (86 mg/kg), BH4/0.1-0.2 (74 mg/kg), BH6/0.15-0.25 (72 mg/kg) and BH3/0.1-0.2 (51 mg/kg) - exceeding the GSW CT1 (40 mg/kg). TCLP testing was conducted on the 'worst case' samples BH2/0.05-0.15 m, and BH4/0.1-0.2 for the analytes exceeding the CT1 thresholds. The SCC and TCLP concentrations were within the contaminant thresholds SCC1 and TCLP1, for GSW.

On the basis of the observations at the time of sampling and the reported analytical results, the filling at the site is preliminarily classified as General Solid Waste (non-putrescible), as defined in EPA (2014).

Elevated nickel concentrations were recorded for some of the roadbase samples. The concentrations are typical of blue metal which is present within the roadbase. The roadbase can be assessed for re-use under the NSW EPA recovered aggregate order (2014) or waste classified separately to the general fill, including TCLP testing.

Note that this is not a formal waste classification to inform off-site disposal. Any soils excavated from the site, requiring off-site disposal, must have a formal waste classification prior to disposal. This is likely to entail additional sampling and testing of soils.

9.3 Groundwater

As discussed herein, no groundwater was found to be present in the three groundwater monitoring wells installed to depths of 8 m bgl.

No on site or off-site (hydraulically upgradient) sources of groundwater contamination in proximity to the site have been identified. Furthermore, the testing of soil samples across the site has not reported concentrations of contaminants considered to require remediation. The concentrations are also not considered to present a risk of groundwater contamination.

Given the above, and the depth to groundwater beneath the site (i.e. in excess of 8 m) it is considered that groundwater beneath the site is not a receptor or source of contamination at the site.

10. Conclusion

On the basis of the scope of works undertaken and the results presented herein, it is concluded that there are not likely to be any significant contamination risks to human health or the ecology associated with the site. The site is therefore suitable, from a contamination perspective, for the proposed development.

As part of future civil and construction works on the development, the following actions are recommended:

- It is recommended that an unexpected finds protocol (UFP) be developed for implementation during the future civil, and construction works such that any finds of suspected contamination are approximately investigated and managed;
- Any soils required to be removed from site must be waste classified in accordance with the POEO Act (1997) and, where applicable EPA (2014); and
- Any materials imported to the site as part of the development must be legally able to be applied to land and must be suitable for the proposed land use.

11. Limitations

Douglas Partners (DP) has prepared this report (or services) for this project at See Street, Meadowbank in accordance with DP's proposal SYD200270.P.001.Rev0 dated 13 March 2020 and THE work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of TAFE NSW for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This

design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the (geotechnical / environmental / groundwater) components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

About This Report

Drawing

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

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

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

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

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole 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. They may not be the same at the time of construction as are indicated in the report; and
- 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 first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or 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 a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

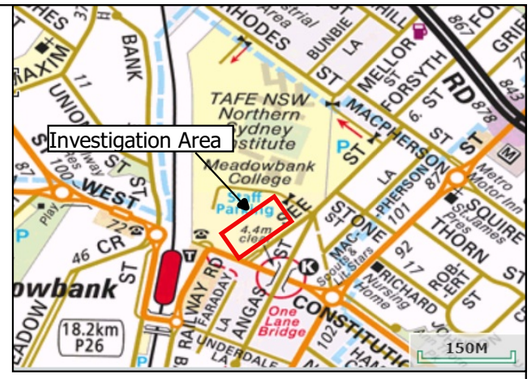
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



LOCALITY MAP

Notes:
1. Basemap from nearmap.com (dated 31/03/2020)
2. Locality map from street-directory.com.au (dated 31/03/2020)

Legend

- Approx Site Boundary
- Contamination Boreholes
- Geotechnical and Contamination Boreholes / Groundwater Wells
- Geotechnical and Contamination Boreholes

0 10 20 30 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	TAFE NSW		
OFFICE:	Sydney	DRAWN BY:	AS
SCALE:	As shown	DATE:	17.04.2020

TITLE: **Borehole Locations**
Proposed Multi-Storey Car Park
See Street, Meadowbank (TAFE Campus)

N

PROJECT No:	86469.12
DRAWING No:	1
REVISION:	0

Appendix B

Descriptive Notes, Borehole Logs

Sampling Methods

Douglas Partners

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm 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 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

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

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with ‘Mix of Soil and Cobbles/Boulders’ with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- ‘Moist, dry of plastic limit’ or ‘w <PL’ (i.e. hard and friable or powdery).
- ‘Moist, near plastic limit’ or ‘w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- ‘Moist, wet of plastic limit’ or ‘w >PL’ (i.e. soils usually weakened and free water forms on the hands when handling).
- ‘Wet’ or ‘w ≈LL’ (i.e. near the liquid limit).
- ‘Wet’ or ‘w >LL’ (i.e. wet of the liquid limit).

Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $Is_{(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Abbreviation	Unconfined Compressive Strength MPa	Point Load Index * $Is_{(50)}$ MPa
Very low	VL	0.6 - 2	0.03 - 0.1
Low	L	2 - 6	0.1 - 0.3
Medium	M	6 - 20	0.3 - 1.0
High	H	20 - 60	1 - 3
Very high	VH	60 - 200	3 - 10
Extremely high	EH	>200	>10

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
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	HW	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	No signs of decomposition or staining.
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	DW	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 weathered products in pores.

Rock Descriptions

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq \text{100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

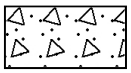
Symbols & Abbreviations

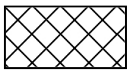
Graphic Symbols for Soil and Rock

General

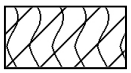

Asphalt

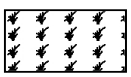

Road base

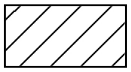

Concrete

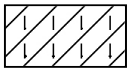

Filling

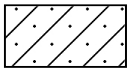
Soils


Topsoil

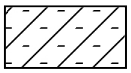

Peat

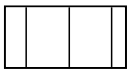

Clay

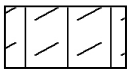

Silty clay

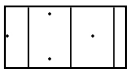

Sandy clay

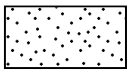

Gravelly clay

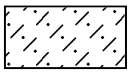

Shaly clay

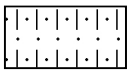

Silt


Clayey silt


Sandy silt

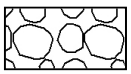

Sand

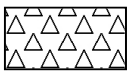

Clayey sand


Silty sand


Gravel

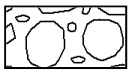

Sandy gravel


Cobbles, boulders

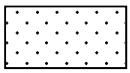

Talus

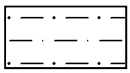
Sedimentary Rocks

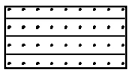

Boulder conglomerate

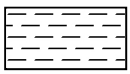

Conglomerate


Conglomeratic sandstone

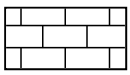

Sandstone


Siltstone

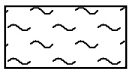

Laminite

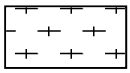

Mudstone, claystone, shale

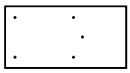

Coal


Limestone

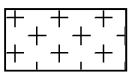
Metamorphic Rocks

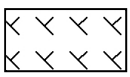

Slate, phyllite, schist

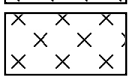

Gneiss

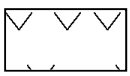

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

BOREHOLE LOG

CLIENT: TAFE NSW
PROJECT: Meadowbank Carpark
LOCATION: Meadowbank

SURFACE LEVEL: 26.3 AHD
EASTING: 323428
NORTHING: 6256682
DIP/AZIMUTH: 90°/--

BORE No: BH1
PROJECT No: 86469.12
DATE: 21/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
26	0.02	ASPHALTIC CONCRETE		A	0.01				Gatic Cover
	0.2	FILL/ Sandy GRAVEL: fine to medium, grey, fine to medium sand, dry, appears well compacted, roadbase			0.02				
				A	0.4				
					0.5				
	0.8	Fill/ Sandy CLAY: moderate plasticity, pale grey mottled pale brown and orange, trace fine sand, w<PL, appears stiff			0.9				
25	1			A	1.0		30/120 refusal		Gravel 0.1-1.4m
		Sandy CLAY SC: low plasticity, pale grey and pale brown, fine to coarse sand, trace fine sandstone gravel, w<PL, hard, residual		S	1.12				
				A	1.2				
					1.4				
				A	1.5				Bentonite 1.4-1.9m
	2								
24	2.1	SANDSTONE: medium to coarse grained, yellow brown, very low strength, highly weathered, Hawkesbury Sandstone		S	2.5		15/10 refusal		Blank 0.0-5.0m
	2.65				2.51				
		SANDSTONE: medium to coarse grained, pale grey brown and red brown, approx 10% clay seams, very low to low strength with medium strength bands, highly to moderately weathered, fractured and slightly fractured, Hawkesbury Sandstone			2.65		PL(A) = 0.4		
	3				2.75				
23					3.35		PL(A) = 0.1		
				C					
	4								
	4.0								
22					4.6				
					4.7		PL(A) = 0.2		
	5								Gravel 1.9-8.0m
21	5.41			C					
	5.65	SANDSTONE: medium grained, pale grey and red brown, medium strength with very low strength band, highly to moderately weathered, slightly fractured, Hawkesbury Sandstone			5.72		PL(A) = 0.7		
	6								
20					6.4				
									Mchine slotted PVC screen 2.1-8.0m
	7				6.92		PL(A) = 0.4		
19				C					
	7.85								
	8	8.0			7.95		PL(A) = 0.4		End Cap
		Bore discontinued at 8.0m terminated at target depth			8.0				
18									
	9								
17									

RIG: Scout 4 **DRILLER:** Groundtest **LOGGED:** AS/SI **CASING:** HW to 2.5m

TYPE OF BORING: Soild Flight Auger (SFA) to 2.5m, NMLC to 8.0m

WATER OBSERVATIONS: No free ground water oberved during SFA

REMARKS: * BD1/20200321 from 0.9 m-1.0 m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: TAFE NSW
PROJECT: Meadowbank Carpark
LOCATION: Meadowbank

SURFACE LEVEL: 26.5 AHD
EASTING: 323408
NORTHING: 6256663
DIP/AZIMUTH: 90°/--

BORE No: BH2
PROJECT No: 86469.12
DATE: 28/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
26	0.05	ASPHALTIC CONCRETE		A	0.05				
				A	0.12				
	0.3	FILL/ Sandy GRAVEL: fine to medium, grey, fine to medium sand, dry, appears well compacted, roadbase			0.15				
					0.3				
		Fill/ Gravelly SAND: fine to medium, pale brown, fine to coarse gravel, dry, appears well compacted		A	0.5				
	0.85				0.6				
25	1.0	SANDSTONE: medium to coarse grained, red brown, very low to low strength, highly weathered, Hawkesbury Sandstone							
		Bore discontinued at 1.0m terminated at target depth							
24	2								
23	3								
22	4								
21	5								
20	6								
19	7								
18	8								
17	9								

RIG: Scout 4 **DRILLER:** Groundtest **LOGGED:** CL **CASING:** Uncased

TYPE OF BORING: Soild Flight Auger (SFA) to 1.0m

WATER OBSERVATIONS: No free ground water oberved during SFA

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: TAFE NSW
PROJECT: Meadowbank Carpark
LOCATION: Meadowbank

SURFACE LEVEL: 26.7 AHD
EASTING: 323385
NORTHING: 6256646
DIP/AZIMUTH: 90°/--

BORE No: BH3
PROJECT No: 86469.12
DATE: 28/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
26.7	0.05	ASPHALTIC CONCRETE		A	0.07				Gatic Cover
26.6	0.1			A	0.08				
26.3	0.4	FILL/ Sandy GRAVEL: fine to medium, grey, fine to medium sand, dry, appears well compacted, roadbase			0.1				Bentonite 0.1-0.5
				A	0.2				Blank 0.0-1.0m
		Fill/ Gravelly SAND: fine to medium, pale brown, fine to coarse gravel, dry, appears well compacted			0.4				
					0.5				
25.7	1	SANDSTONE: medium to coarse grained, pale yellow, very low strength, highly weathered, Hawkesbury Sandstone			0.9				
				A	1.0		30/150 refusal		
				S	1.15				
24.7	2								
23.7	3								
22.7	4								Gravel 0.5-8.0m
									Mchine slotted PVC screen 1.0-8.0m
21.7	5								
20.7	6								
19.7	7								
18.7	8								End Cap
18.7	8.0	Bore discontinued at 8.0m terminated at target depth							
17.7	9								

RIG: Scout 4 **DRILLER:** Groundtest **LOGGED:** CL/SI **CASING:** HW to 1m, HQ to 1.2m

TYPE OF BORING: Soild Flight Auger (SFA) to 1.0m, Wash Bore (water) to 1.2, NMLC to 8.0m

WATER OBSERVATIONS: No free ground water oberved during SFA

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: TAFE NSW
PROJECT: Meadowbank Carpark
LOCATION: Meadowbank

SURFACE LEVEL: 26.5 AHD
EASTING: 323392
NORTHING: 6256661
DIP/AZIMUTH: 90°/--

BORE No: BH4
PROJECT No: 86469.12
DATE: 28/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
26	0.06	ASPHALTIC CONCRETE							
	0.2	FILL/ Sandy GRAVEL: fine to medium, grey, fine to medium sand, dry, appears well compacted, roadbase		A	0.1				
				A	0.2				
	0.5	Fill/ Gravelly SAND: fine to medium, pale brown, fine to coarse gravel, dry, appears well compacted			0.3				
25	1.0	SANDSTONE: medium to coarse grained, pale yellow, very low strength, highly weathered, Hawkesbury Sandstone		A	0.5				
		Bore discontinued at 1.0m terminated at target depth			0.6				
24	2								
23	3								
22	4								
21	5								
20	6								
19	7								
18	8								
17	9								

RIG: Scout 4 **DRILLER:** Groundtest **LOGGED:** CL **CASING:** Uncased

TYPE OF BORING: Soild Flight Auger (SFA) to 1.0m

WATER OBSERVATIONS: No free ground water oberved during SFA

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: TAFE NSW
PROJECT: Meadowbank Carpark
LOCATION: Meadowbank

SURFACE LEVEL: 26.4 AHD
EASTING: 323416
NORTHING: 6256681
DIP/AZIMUTH: 90°/--

BORE No: BH5
PROJECT No: 86469.12
DATE: 28/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
26	0.04	ASPHALTIC CONCRETE		A	0.04				
	0.3	FILL/ Sandy GRAVEL: fine to medium, grey, fine to medium sand, dry, appears well compacted, roadbase		A	0.14 0.4				
	0.8	Fill/ Gravelly SAND: fine to medium, pale brown, fine to coarse gravel, dry, appears well compacted		A	0.5 0.8				
25	1	SANDSTONE: medium to coarse grained, pale brown, very low strength, highly weathered, Hawkesbury Sandstone		A	0.9 1.4				
	1.5	From 1.4m: red-brown Bore discontinued at 1.5m terminated at target depth			1.5				
24	2								
	3								
23	4								
22	5								
21	6								
20	7								
19	8								
18	9								
17									

RIG: Scout 4 **DRILLER:** Groundtest **LOGGED:** CL **CASING:** Uncased

TYPE OF BORING: Soild Flight Auger (SFA) to 1.5m

WATER OBSERVATIONS: No free ground water oberved during SFA

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: TAFE NSW
PROJECT: Meadowbank Carpark
LOCATION: Meadowbank

SURFACE LEVEL: 25.4 AHD
EASTING: 323370
NORTHING: 6256669
DIP/AZIMUTH: 90°/--

BORE No: BH6
PROJECT No: 86469.12
DATE: 28/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
25	0.13	CONCRETE PAVERS							
	0.3	FILL/ Sandy GRAVEL: fine to medium, grey, fine to medium sand, dry, appears well compacted, roadbase		A	0.15 0.3				
				A	0.4 0.5				
		SANDSTONE: medium to coarse grained, pale yellow, very low to low strength, highly weathered, Hawkesbury Sandstone							
24	1			S	1.0 1.1		38/100 refusal		
		From 1.14m: red-brown, with ironstone bands, low strength							
23	2								
22	3								
21	4								
20	5								
19	6								
	6.2	Bore discontinued at 6.2m terminated at target depth							
18	7								
17	8								
16	9								

RIG: Scout 4 **DRILLER:** Groundtest **LOGGED:** CL/SI **CASING:** HW to 1m, HQ to 1.15m

TYPE OF BORING: Soild Flight Auger (SFA) to 1.0m, Wash Bore (water) to 1.14, NMLC to 6.2m

WATER OBSERVATIONS: No free ground water oberved during SFA

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: TAFE NSW
PROJECT: Meadowbank Carpark
LOCATION: Meadowbank

SURFACE LEVEL: 25.4 AHD
EASTING: 323393
NORTHING: 6256685
DIP/AZIMUTH: 90°/--

BORE No: BH7
PROJECT No: 86469.12
DATE: 21/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
25	0.04	ASPHALTIC CONCRETE		A	0.04				
	0.3	FILL/ Sandy GRAVEL: fine to medium, grey, fine to medium sand, dry, appears well compacted, roadbase			0.1				
				A	0.4				
		Fill/ Sandy CLAY: low plasticity, brown, fine to medium sand, trace fine gravel, w<PL, appears stiff			0.5				
	0.85								
24	1.0	SANDSTONE: medium to coarse grained, yellow brown, very low strength, highly weathered, Hawkesbury Sandstone		A	0.9				
					1.0				
		Bore discontinued at 1.0m terminated at target depth							
23	2								
22	3								
21	4								
20	5								
19	6								
18	7								
17	8								
16	9								

RIG: Scout 4 **DRILLER:** Groundtest **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Soild Flight Auger (SFA) to 1.0m

WATER OBSERVATIONS: No free ground water oberved during SFA

REMARKS: * BD2/20200321 from 0.02 m-0.1 m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: TAFE NSW
PROJECT: Meadowbank Carpark
LOCATION: Meadowbank

SURFACE LEVEL: 24.2 AHD
EASTING: 323411
NORTHING: 6256697
DIP/AZIMUTH: 90°/--

BORE No: BH8
PROJECT No: 86469.12
DATE: 21/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
24	0.02	ASPHALTIC CONCRETE		A	0.02				Gatic Cover
	0.3	FILL/ Sandy GRAVEL: fine to medium, grey, fine to medium sand, dry, appears well compacted, roadbase			0.1				Gravel 0.1-1.4m
				A	0.4				Bentonite 0.3-0.7m
					0.5				Blank 0.0-1.1m
		FILL/ Silty SAND: fine to coarse, brown and pale brown, trace fine gravel, dry, appears well compacted		A	0.7				
	0.8				0.8				
23	1	Below 0.6m: pale grey and brown, fine to medium sandstone gravel		A	0.9				1
				S	1.0		20/150 refusal		
	1.2				1.15				
		SANDSTONE: medium to coarse grained, yellow brown, very low strength, highly weathered, Hawkesbury Sandstone			1.2				
					1.45		PL(A) = 1.1		
22	2	SANDSTONE: medium to coarse grained, pale grey and brown, faintly cross-bedded, high then medium strength, moderately and slightly weathered, slightly fractured and unbroken, Hawkesbury Sandstone		C					2
					2.35		PL(A) = 1.3		
21	3				3.1				3
					3.8		PL(A) = 0.7		
20	4								4
				C					Gravel 0.7-8.15
									Mchine slotted PVC screen 1.1-8.0m
					4.8		PL(A) = 0.8		
19	5								5
					5.75		PL(A) = 0.5		
18	6				6.15				6
					6.5		PL(A) = 0.9		
17	7			C					7
					7.4		PL(A) = 0.4		
16	8				8.05		PL(A) = 0.4		8
	8.11	Bore discontinued at 8.11m terminated at target depth			8.11				End Cap
15	9								9

RIG: Scout 4 **DRILLER:** Groundtest **LOGGED:** AS/SI **CASING:** HW to 1.2m

TYPE OF BORING: Soild Flight Auger (SFA) to 2.5m, NMLC to 8.11m

WATER OBSERVATIONS: No free ground water oberved during SFA

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Appendix C

Data Quality Assessment

DATA QUALITY ASSESSMENT

Q1. Data Quality Objectives

The Detailed Site Investigation (DSI) was prepared with reference to the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 as amended 2013 (NEPC, 2013). The DQO process is outlined as follows:

- Stating the Problem;
- Identifying the Decision;
- Identifying Inputs to the Decision;
- Defining the Boundary of the Assessment;
- Developing a Decision Rule;
- Specifying Acceptable Limits on Decision Errors; and
- Optimising the Design for Obtaining Data.

The DQOs have been addressed within the report as shown in Table Q1.

Table Q1: Data Quality Objectives

Data Quality Objective	Report Section where Addressed
State the Problem	S1 Introduction
Identify the Decision	S1 Introduction S9 Discussion of Results S10 Conclusion
Identify Inputs to the Decision	S1 Introduction S3 Site Identification, Description and Site Geology, Topography and Hydrogeology Mapping S4 Review of Previous PSI Report S5 Conceptual Site Model S7 Site Assessment Criteria S8.1 Fieldwork Results S8.2 Laboratory Results
Define the Boundary of the Assessment	S3 Site Identification, Description Drawing 1 - Appendix A
Develop a Decision Rule	S7 Site Assessment Criteria
Specify Acceptable Limits on Decision Errors	S6 Fieldwork, Analysis and QA/QC S7 Site Assessment Criteria QA/QC Procedures and Results – Sections Q2, Q3

Optimise the Design for Obtaining Data	S2 Scope of Works S6 Fieldwork, Analysis and QA/QC QA/QC Procedures and Results – Sections Q2, Q3

Q2. Field and Laboratory Quality Control

The field and laboratory quality control (QC) procedures and results are summarised in Table Q2. Reference should be made to the fieldwork and analysis procedures in Section 6 and the laboratory certificates in Appendix E for further details.

Table Q2: Laboratory QC

Item	Frequency	Acceptance Criteria	Achievement
Analytical laboratories used		NATA accreditation	yes
Holding times		In accordance with NEPC (2013) which references various Australian and international standards	yes
Laboratory / Reagent Blanks	1 per lab batch	<PQL	yes
Laboratory duplicates	10% primary samples	Laboratory specific [1]	
Matrix Spikes	1 per lab batch	70-130% recovery (inorganics); 60-140% (organics); 10-140% (SVOC, speciated phenols)	yes
Surrogate Spikes	organics by GC	70-130% recovery (inorganics); 60-140% (organics); 10-140% (SVOC, speciated phenols)	yes
Control Samples	1 per lab batch	70-130% recovery (inorganics); 60-140% (organics); 10-140% (SVOC, speciated phenols)	yes

NOTES: 1 ELS: <5xPQL – any RPD; >5xPQL – 0-50%RPD

In summary, the QC data is considered to be of sufficient quality to be acceptable for the assessment.

Q2.1 Intra-Laboratory Replicates

Intra-laboratory replicates were analysed as an internal check of the reproducibility within the primary laboratory Envirolab Services (ELS) and as a measure of consistency of sampling techniques. The comparative results of analysis between original and intra-laboratory replicate samples are summarised in Table Q3.

Note that, where both samples are below LOR / PQL the difference and RPD has been given as zero. Where one sample is reported below LOR / PQL, but a concentration is reported for the other, the LOR / PQL value has been used for calculation of the RPD for the less than LOR / PQL sample.

The calculated RPD values were within the acceptable range of ± 30 for inorganic analytes and ± 50% for organics with the exception of those in shading. However, the actual differences in concentrations were low.

Overall, the intra-laboratory replicate comparisons indicate that the sampling techniques were generally consistent and repeatable.

Inter-laboratory replicate sample analysis has not been undertaken, however, it is considered that the data quality and reliability is not affected as the primary samples and intra-laboratory duplicate samples were analyzed at a NATA accredited laboratory. The duplicate sample laboratory results indicated that the results are reliable.

Table Q3: Relative Percentage Difference Results – Intra-laboratory Replicates

Lab	Sample ID	Date Sampled	Media	Units	Metals										PAH				TRH				BTEX				Phenol
					As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	Fe	Mn	total	BaP TEQ	BaP	Naphthalene	C6-C10	>C10-C16	>C16-C34	>C34-C40	Benzene	Ethylbenzene	Toluene	Xylene Total	Phenol
SOIL																											
ELS	BD2/20200321	21/03/2020	filling	mg/kg	<4	<0.4	11	34	21	<0.1	10	200	-	-	0.56	<0.5	0.06	<1	<25	<50	<100	<100	<0.2	<1	<0.5	<1	-
ELS	BH7/0.04-0.1	21/03/2020	filling	mg/kg	<4	<0.4	13	36	21	<0.1	17	44	-	-	0.3	<0.5	<0.05	<1	<25	<50	<100	<100	<0.2	<1	<0.5	<1	-
Difference				mg/kg	0	0	2	2	0	0	7	156	-	-	0.26	0.0	0.01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-
RPD				%	0	0	17	6	0	0	**52**	**128**	**-**	**-**	60	0.0	18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-

Notes: - not applicable, not tested

Q2.2 Review of Laboratory Comments

The laboratory certificates all included the QA / QC testing and results undertaken.

Comments provided in the laboratory certificates, including any exceedances of their QA / QC, are discussed in Table Q4, below. Overall, it is considered that the acceptable standards were achieved for the laboratory analysis and that the results are acceptable for use in this assessment.

Table Q4: Laboratory Comments

Lab Report ID	Lab Comment	DP Comment
ELS 239493	Asbestos: A portion of the supplied samples were sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that these sub-samples are indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container. Note: Samples requested for asbestos testing were sub-sampled from jars provided by the client. Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 239493-7 for Zn. Therefore a triplicate result has been issued as laboratory sample number 239493-10	This is not considered to impact the usability of the data
ELS 239952	Asbestos: A portion of the supplied samples were sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that these sub-samples are indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container. Note: Samples requested for asbestos testing were sub-sampled from jars provided by the client.	This is not considered to impact the usability of the data

Q3. Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs):

- Completeness - A measure of the amount of usable data from a data collection activity;
- Comparability - The confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness - The confidence (qualitative) of data representativeness of media present on-site;
- Precision - A measure of variability or reproducibility of data; and

- Accuracy - A measure of closeness of the data to the 'true' value.

The DQIs were assessed as outlined in the following Table Q5.

Table Q5: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Planned systematic and selected target locations sampled; Preparation of field logs, sample location plan and chain of custody (COC) records; Preparation of field groundwater sampling sheets; Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody; Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM); Completion of COC documentation; NATA endorsed laboratory certificates provided by the laboratory; Satisfactory frequency and results for field and laboratory QC samples as discussed in Section Q2.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project; Works undertaken by appropriately experienced and trained DP environmental scientist / engineer; Use of NATA registered laboratories, with test methods the same or similar between laboratories; Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled; Spatial and temporal distribution of sample locations; Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs; Samples were extracted and analysed within holding times; Samples were analysed in accordance with the analysis request.
Precision	Acceptable RPD between original samples and replicates; Satisfactory results for all other field and laboratory QC samples.
Accuracy	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been complied with. As such, it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

Appendix D

Summary of Laboratory Results for Soil and Waste Classification

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Table D1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH

			Metals								TRH						BTEX				PAH			
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
		PQL	4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	0.05
Sample ID	Depth	Sampled Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BH1	0.02 - 0.1m	21/03/2020	<4	<0.4	21	41	24	<0.1	18	43	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH7	0.04 - 0.1m	21/03/2020	<4	<0.4	13	36	21	<0.1	17	44	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	0.3
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BD2/20200321	0.04 - 0.1m	21/03/2020	<4	<0.4	11	34	21	<0.1	10	200	<25	<50	<25	<50	110	<100	<0.2	<0.5	<1	<1	<1	0.06	<0.5	0.56
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BD2/20200321 - [TRIPLICATE]	0.04 - 0.1m	21/03/2020	<4	<0.4	15	32	21	<0.1	14	55	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH8	0.4 - 0.5m	21/03/2020	<4	<0.4	10	10	89	<0.1	6	92	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.1	<0.5	0.4
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH1	0.4 - 0.5m	21/03/2020	4	<0.4	5	4	6	<0.1	<1	3	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH7	0.4 - 0.5m	21/03/2020	<4	<0.4	14	3	31	<0.1	<1	22	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH8	0.02 - 0.1m	21/03/2020	<4	<0.4	11	74	22	<0.1	10	55	<25	<50	<25	<50	120	<100	<0.2	<0.5	<1	<1	<1	0.06	<0.5	0.4
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH2	0.05 - 0.15m	28/03/2020	<4	<0.4	7	46	2	<0.1	86	26	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH3	0.07 - 0.08m	28/03/2020	4	<0.4	16	16	10	<0.1	18	18	<25	<50	<25	<50	260	2900	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH4	0.1 - 0.2m	28/03/2020	<4	<0.4	10	32	3	<0.1	74	24	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH5	0.08 - 0.14m	28/03/2020	<4	<0.4	8	19	12	<0.1	7	19	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.06	<0.5	0.06
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH6	0.15 - 0.25m	28/03/2020	<4	<0.4	9	36	2	<0.1	72	25	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH2	0.2 - 0.3m	28/03/2020	<4	<0.4	10	16	3	<0.1	40	14	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH3	0.1 - 0.2m	28/03/2020	<4	<0.4	13	22	18	<0.1	51	28	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH4	0.2 - 0.3m	28/03/2020	<4	<0.4	20	3	7	<0.1	6	4	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH5	4 - 0.5m	28/03/2020	<4	<0.4	5	4	12	<0.1	4	26	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA
BH6	0.4 - 0.5m	28/03/2020	<4	<0.4	3	2	2	<0.1	<1	2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			3000 NA	900 NA	3600 NA	2E+05 NA	1500 NA	730 NA	6000 NA	400000 NA	NC NA	NC NA	260 NA	NL NA	NC NA	NC NA	3 NA	NL NA	NL NA	230 NA	NL NA	NC NA	40 NA	4000 NA

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report **Blue** = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected

Notes:

HIL/HSL	NEPC, Schedule B1 - HIL D (Commercial / Industrial), HSL D (Commercial / Industrial)
ML	NEPC, Schedule B1 - C/Ind (Commercial / Industrial)
a	QA/QC replicate of sample listed directly below the primary sample
b	reported naphthalene laboratory result obtained from BTEXN suite
c	criteria applies to DDT only

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Table D1: Summary of Laboratory Results – Phenol, OCP, OPP, PCB, Asbestos

			Phenol	OCP											OPP	PCB	Asbestos		
			Phenol	DDT+DDE+DDD c	DDD	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endrin	Heptachlor	HCB	Methoxychlor	Chlorpyriphos	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos (50 g)
		PQL	5	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			
Sample ID	Depth	Sampled Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
BH1	0.02 - 0.1m	21/03/2020	NT 660 NA	NT 3600 NA	NT NC NA	NT NC NA	NT NC NA	NT 45 NA	NT 530 NA	NT 2000 NA	NT 100 NA	NT 50 NA	NT 80 NA	NT 2500 NA	NT 2000 NA	NT 7 NA	NAD	NAD	NAD
BH7	0.04 - 0.1m	21/03/2020	NT 660 NA	NT 3600 NA	NT NC NA	NT NC NA	NT NC NA	NT 45 NA	NT 530 NA	NT 2000 NA	NT 100 NA	NT 50 NA	NT 80 NA	NT 2500 NA	NT 2000 NA	NT 7 NA	NAD	NAD	NAD
BD2/20200321	0m	21/03/2020	NT 660 NA	NT 3600 NA	NT NC NA	NT NC NA	NT NC NA	NT 45 NA	NT 530 NA	NT 2000 NA	NT 100 NA	NT 50 NA	NT 80 NA	NT 2500 NA	NT 2000 NA	NT 7 NA	NT	NT	NT
BD2/20200321 - [TRIPLICATE]	0m	21/03/2020	NT 660 NA	NT 3600 NA	NT NC NA	NT NC NA	NT NC NA	NT 45 NA	NT 530 NA	NT 2000 NA	NT 100 NA	NT 50 NA	NT 80 NA	NT 2500 NA	NT 2000 NA	NT 7 NA	NT	NT	NT
BH8	0.4 - 0.5m	21/03/2020	NT 660 NA	NT 3600 NA	NT NC NA	NT NC NA	NT NC NA	NT 45 NA	NT 530 NA	NT 2000 NA	NT 100 NA	NT 50 NA	NT 80 NA	NT 2500 NA	NT 2000 NA	NT 7 NA	NAD	NAD	NAD
BH1	0.4 - 0.5m	21/03/2020	<5 660 NA	<0.1 3600 NA	<0.1 NC NA	<0.1 NC NA	<0.1 NC NA	<0.1 45 NA	<0.1 530 NA	<0.1 2000 NA	<0.1 100 NA	<0.1 50 NA	<0.1 80 NA	<0.1 2500 NA	<0.1 2000 NA	<0.1 7 NA	NAD	NAD	NAD
BH7	0.4 - 0.5m	21/03/2020	<5 660 NA	<0.1 3600 NA	<0.1 NC NA	<0.1 NC NA	<0.1 NC NA	<0.1 45 NA	<0.1 530 NA	<0.1 2000 NA	<0.1 100 NA	<0.1 50 NA	<0.1 80 NA	<0.1 2500 NA	<0.1 2000 NA	<0.1 7 NA	NAD	NAD	NAD
BH8	0.02 - 0.1m	21/03/2020	<5 660 NA	<0.1 3600 NA	<0.1 NC NA	<0.1 NC NA	<0.1 NC NA	<0.1 45 NA	<0.1 530 NA	<0.1 2000 NA	<0.1 100 NA	<0.1 50 NA	<0.1 80 NA	<0.1 2500 NA	<0.1 2000 NA	<0.1 7 NA	NAD	NAD	NAD
BH2	0.05 - 0.15m	28/03/2020	NT 660 NA	NT 3600 NA	NT NC NA	NT NC NA	NT NC NA	NT 45 NA	NT 530 NA	NT 2000 NA	NT 100 NA	NT 50 NA	NT 80 NA	NT 2500 NA	NT 2000 NA	NT 7 NA	NAD	NAD	NAD
BH3	0.07 - 0.08m	28/03/2020	NT 660 NA	NT 3600 NA	NT NC NA	NT NC NA	NT NC NA	NT 45 NA	NT 530 NA	NT 2000 NA	NT 100 NA	NT 50 NA	NT 80 NA	NT 2500 NA	NT 2000 NA	NT 7 NA	NAD	NAD	NAD
BH4	0.1 - 0.2m	28/03/2020	NT 660 NA	NT 3600 NA	NT NC NA	NT NC NA	NT NC NA	NT 45 NA	NT 530 NA	NT 2000 NA	NT 100 NA	NT 50 NA	NT 80 NA	NT 2500 NA	NT 2000 NA	NT 7 NA	NAD	NAD	NAD
BH5	0.08 - 0.14m	28/03/2020	NT 660 NA	NT 3600 NA	NT NC NA	NT NC NA	NT NC NA	NT 45 NA	NT 530 NA	NT 2000 NA	NT 100 NA	NT 50 NA	NT 80 NA	NT 2500 NA	NT 2000 NA	NT 7 NA	NAD	NAD	NAD
BH6	0.15 - 0.25m	28/03/2020	NT 660 NA	NT 3600 NA	NT NC NA	NT NC NA	NT NC NA	NT 45 NA	NT 530 NA	NT 2000 NA	NT 100 NA	NT 50 NA	NT 80 NA	NT 2500 NA	NT 2000 NA	NT 7 NA	NAD	NAD	NAD
BH2	0.2 - 0.3m	28/03/2020	<5 660 NA	<0.1 3600 NA	<0.1 NC NA	<0.1 NC NA	<0.1 NC NA	<0.1 45 NA	<0.1 530 NA	<0.1 2000 NA	<0.1 100 NA	<0.1 50 NA	<0.1 80 NA	<0.1 2500 NA	<0.1 2000 NA	<0.1 7 NA	NAD	NAD	NAD
BH3	0.1 - 0.2m	28/03/2020	<5 660 NA	<0.1 3600 NA	<0.1 NC NA	<0.1 NC NA	<0.1 NC NA	<0.1 45 NA	<0.1 530 NA	<0.1 2000 NA	<0.1 100 NA	<0.1 50 NA	<0.1 80 NA	<0.1 2500 NA	<0.1 2000 NA	<0.1 7 NA	NAD	NAD	NAD
BH4	0.2 - 0.3m	28/03/2020	<5 660 NA	<0.1 3600 NA	<0.1 NC NA	<0.1 NC NA	<0.1 NC NA	<0.1 45 NA	<0.1 530 NA	<0.1 2000 NA	<0.1 100 NA	<0.1 50 NA	<0.1 80 NA	<0.1 2500 NA	<0.1 2000 NA	<0.1 7 NA	NAD	NAD	NAD
BH5	4 - 0.5m	28/03/2020	<5 660 NA	<0.1 3600 NA	<0.1 NC NA	<0.1 NC NA	<0.1 NC NA	<0.1 45 NA	<0.1 530 NA	<0.1 2000 NA	<0.1 100 NA	<0.1 50 NA	<0.1 80 NA	<0.1 2500 NA	<0.1 2000 NA	<0.1 7 NA	NAD	NAD	NAD
BH6	0.4 - 0.5m	28/03/2020	<5 660 NA	<0.1 3600 NA	<0.1 NC NA	<0.1 NC NA	<0.1 NC NA	<0.1 45 NA	<0.1 530 NA	<0.1 2000 NA	<0.1 100 NA	<0.1 50 NA	<0.1 80 NA	<0.1 2500 NA	<0.1 2000 NA	<0.1 7 NA	NAD	NAD	NAD

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report **Blue** = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected

Notes:

HIL/HSL	NEPC, Schedule B1 - HIL D (Commercial / Industrial), HSL D (Commercial / Industrial)
ML	NEPC, Schedule B1 - ML R/P/POS (Residential, Parkland and Public Open Space)
a	QA/QC replicate of sample listed directly below the primary sample
b	reported naphthalene laboratory result obtained from BTEXN suite
c	criteria applies to DDT only

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Geotechnics | Environment | Groundwater

Table D2: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, Phenol, OCP, OPP, PCB, Asbestos

			Metals							TRH		BTEX						PAH																Phenol	OCP		OPP	PCB	Asbestos		
			Arsenic	Cadmium	Total Chromium	Lead	Mercury (inorganic)	Nickel	Nickel in TCLP	TRH C6 - C9	C10- C36 (recoverable hydrocarbons	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)	Benzo(a)pyrene (BaP)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b,j+k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs	Phenol	Total Endosulfan	Total Analysed OCP	Total Analysed OPP	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Total Asbestos
		PQL	4	0.4	1	1	0.1	1	1	25	50	0.2	0.5	1	2	1	3	0.05	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.05	5	0.1	0.1	0.1	0.1	-	-	-
Sample ID	Depth	Sampled Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
BH1	0.02 - 0.1m	21/03/2020	<4	<0.4	21	24	<0.1	18	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	NT	NT	NT	NT	NT	NAD	NAD	NAD
BH7	0.04 - 0.1m	21/03/2020	<4	<0.4	13	21	<0.1	17	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<1	0.1	0.1	0.3	NT	NT	NT	NT	NT	NAD	NAD	NAD
BD2/20200321	0.04 - 0.1m	21/03/2020	<4	<0.4	11	21	<0.1	10	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	0.06	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<1	0.1	0.2	0.56	NT	NT	NT	NT	NT	NT	NT	NT
BD2/20200321 - [TRIPLICATE]	0.04 - 0.1m	21/03/2020	<4	<0.4	15	21	<0.1	14	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
BH8	0.4 - 0.5m	21/03/2020	<4	<0.4	10	89	<0.1	6	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<1	<0.1	0.1	0.4	NT	NT	NT	NT	NT	NAD	NAD	NAD
BH1	0.4 - 0.5m	21/03/2020	4	<0.4	5	6	<0.1	<1	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH7	0.4 - 0.5m	21/03/2020	<4	<0.4	14	31	<0.1	<1	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH8	0.02 - 0.1m	21/03/2020	<4	<0.4	11	22	<0.1	10	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	0.06	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<1	<0.1	0.1	0.4	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH2	0.05 - 0.15m	28/03/2020	<4	<0.4	7	2	<0.1	86	0.2	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	NT	NT	NT	NT	NT	NAD	NAD	NAD
BH3	0.07 - 0.08m	28/03/2020	4	<0.4	16	10	<0.1	18	NT	<25	510	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	NT	NT	NT	NT	NT	NAD	NAD	NAD
BH4	0.1 - 0.2m	28/03/2020	<4	<0.4	10	3	<0.1	74	0.1	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	NT	NT	NT	NT	NT	NAD	NAD	NAD
BH5	0.08 - 0.14m	28/03/2020	<4	<0.4	8	12	<0.1	7	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	0.06	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	0.06	NT	NT	NT	NT	NT	NAD	NAD	NAD
BH6	0.15 - 0.25m	28/03/2020	<4	<0.4	9	2	<0.1	72	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	NT	NT	NT	NT	NT	NAD	NAD	NAD
BH2	0.2 - 0.3m	28/03/2020	<4	<0.4	10	3	<0.1	40	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH3	0.1 - 0.2m	28/03/2020	<4	<0.4	13	18	<0.1	51	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH4	0.2 - 0.3m	28/03/2020	<4	<0.4	20	7	<0.1	6	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH5	4 - 0.5m	28/03/2020	<4	<0.4	5	12	<0.1	4	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
BH6	0.4 - 0.5m	28/03/2020	<4	<0.4	3	2	<0.1	<1	NT	<25	<50	<0.2	<0.5	<1	<2	<1	<3	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
Waste Classification Criteria																																									
CT1 (mg/kg)			100	20	100	100	4	40	N/A	650	10000	10	288	600	N/A	N/A	1000	0.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	200	288	60	<50	4	<50	N/A	N/A	N/A
SCC1 (mg/kg)			500	100	1900	1500	50	1050	N/A	650	10000	18	518	1080	N/A	N/A	1800	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	200	518	108	<50	7.5	<50	N/A	N/A	N/A
TCLP1 (mg/L)			N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CT2 (mg/kg)			400	80	400	400	16	160	N/A	2600	40000	40	1152	2400	N/A	N/A	4000	3.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	800	1152	240	<50	16	<50	N/A	N/A	N/A
SCC2(mg/kg)			2000	400	7600	6000	200	4200	N/A	2600	40000	72	2073	4320	N/A	N/A	7200	23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	800	2073	432	<50	30	<50	N/A	N/A	N/A
TCLP2 (mg/L)			N/A	N/A	N/A	N/A	N/A	N/A	8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CT1 exceedance TCLP1 and/or SCC1 exceedance CT2 exceedance TCLP2 and/or SCC2 exceedance Asbestos detection

NT = Not tested NC = No criteria AD = Asbestos detected NAD = No asbestos detected

Notes:

*	QA/QC replicate of sample listed directly below the primary sample
**	Total chromium used as initial screen for chromium(VI).
***	Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)
****	Criteria for scheduled chemicals used as an initial screen
*****	Criteria for Chlorpyrifos used as initial screen
PQL	Practical quantitation limit
CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Gene
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Gene
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restr
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restr

Appendix E

Laboratory Certificates of Analysis, Sample Receipt Advice and Chain of Custody

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 239493

Client Details

Client	Douglas Partners Pty Ltd
Attention	Paul Gorman
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86469.12, Meadowbank Carpark**
Number of Samples	9 SOIL
Date samples received	23/03/2020
Date completed instructions received	23/03/2020

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	30/03/2020
Date of Issue	30/03/2020

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

Asbestos Approved By
Analysed by Asbestos Approved Identifier: Lucy Zhu
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Hannah Nguyen, Senior Chemist
Josh Williams, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Priya Samarawickrama, Senior Chemist
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		239493-1	239493-2	239493-3	239493-4	239493-5
Your Reference	UNITS	BH1	BH7	BH8	BH1	BH7
Depth		0.02-0.1	0.04-0.1	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		21/03/2020	21/03/2020	21/03/2020	21/03/2020	21/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Date analysed	-	26/03/2020	26/03/2020	26/03/2020	26/03/2020	26/03/2020
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	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	95	105	101	105	101

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		239493-6	239493-7	239493-8	239493-9
Your Reference	UNITS	BH8	BD2/20200321	TS-20200321	TB-20200321
Depth		0.02-0.1	-	-	-
Date Sampled		21/03/2020	21/03/2020	21/03/2020	21/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL
Date extracted	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Date analysed	-	26/03/2020	26/03/2020	26/03/2020	26/03/2020
TRH C_6 - C_9	mg/kg	<25	<25	[NA]	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	[NA]	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	[NA]	<25
Benzene	mg/kg	<0.2	<0.2	115%	<0.2
Toluene	mg/kg	<0.5	<0.5	106%	<0.5
Ethylbenzene	mg/kg	<1	<1	102%	<1
m+p-xylene	mg/kg	<2	<2	101%	<2
o-Xylene	mg/kg	<1	<1	101%	<1
naphthalene	mg/kg	<1	<1	[NA]	<1
Total +ve Xylenes	mg/kg	<3	<3	[NA]	<3
Surrogate aaa-Trifluorotoluene	%	108	100	101	113

svTRH (C10-C40) in Soil						
Our Reference		239493-1	239493-2	239493-3	239493-4	239493-5
Your Reference	UNITS	BH1	BH7	BH8	BH1	BH7
Depth		0.02-0.1	0.04-0.1	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		21/03/2020	21/03/2020	21/03/2020	21/03/2020	21/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	26/03/2020
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
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	%	118	114	111	112	108

svTRH (C10-C40) in Soil			
Our Reference		239493-6	239493-7
Your Reference	UNITS	BH8	BD2/20200321
Depth		0.02-0.1	-
Date Sampled		21/03/2020	21/03/2020
Type of sample		SOIL	SOIL
Date extracted	-	25/03/2020	25/03/2020
Date analysed	-	25/03/2020	25/03/2020
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
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	120	110
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	120	110
Surrogate o-Terphenyl	%	120	118

PAHs in Soil						
Our Reference		239493-1	239493-2	239493-3	239493-4	239493-5
Your Reference	UNITS	BH1	BH7	BH8	BH1	BH7
Depth		0.02-0.1	0.04-0.1	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		21/03/2020	21/03/2020	21/03/2020	21/03/2020	21/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
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	0.1	<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	0.3	0.4	<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	100	100	97	99

PAHs in Soil			
Our Reference		239493-6	239493-7
Your Reference	UNITS	BH8	BD2/20200321
Depth		0.02-0.1	-
Date Sampled		21/03/2020	21/03/2020
Type of sample		SOIL	SOIL
Date extracted	-	25/03/2020	25/03/2020
Date analysed	-	25/03/2020	25/03/2020
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	0.2	0.2
Pyrene	mg/kg	0.1	0.2
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	0.06	0.06
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	0.4	0.56
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	101

Organochlorine Pesticides in soil				
Our Reference		239493-4	239493-5	239493-6
Your Reference	UNITS	BH1	BH7	BH8
Depth		0.4-0.5	0.4-0.5	0.02-0.1
Date Sampled		21/03/2020	21/03/2020	21/03/2020
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	25/03/2020	25/03/2020	25/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020
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	%	102	103	102

Organophosphorus Pesticides in Soil				
Our Reference		239493-4	239493-5	239493-6
Your Reference	UNITS	BH1	BH7	BH8
Depth		0.4-0.5	0.4-0.5	0.02-0.1
Date Sampled		21/03/2020	21/03/2020	21/03/2020
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	25/03/2020	25/03/2020	25/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020
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	%	102	103	102

PCBs in Soil				
Our Reference		239493-4	239493-5	239493-6
Your Reference	UNITS	BH1	BH7	BH8
Depth		0.4-0.5	0.4-0.5	0.02-0.1
Date Sampled		21/03/2020	21/03/2020	21/03/2020
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	25/03/2020	25/03/2020	25/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020
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	%	102	103	102

Acid Extractable metals in soil						
Our Reference		239493-1	239493-2	239493-3	239493-4	239493-5
Your Reference	UNITS	BH1	BH7	BH8	BH1	BH7
Depth		0.02-0.1	0.04-0.1	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		21/03/2020	21/03/2020	21/03/2020	21/03/2020	21/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Date analysed	-	26/03/2020	26/03/2020	26/03/2020	26/03/2020	26/03/2020
Arsenic	mg/kg	<4	<4	<4	4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	21	13	10	5	14
Copper	mg/kg	41	36	10	4	3
Lead	mg/kg	24	21	89	6	31
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	18	17	6	<1	<1
Zinc	mg/kg	43	44	92	3	22

Acid Extractable metals in soil				
Our Reference		239493-6	239493-7	239493-10
Your Reference	UNITS	BH8	BD2/20200321	BD2/20200321 - [TRIPLICATE]
Depth		0.02-0.1	-	-
Date Sampled		21/03/2020	21/03/2020	21/03/2020
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	25/03/2020	25/03/2020	25/03/2020
Date analysed	-	26/03/2020	26/03/2020	26/03/2020
Arsenic	mg/kg	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	11	11	15
Copper	mg/kg	74	34	32
Lead	mg/kg	22	21	21
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	10	10	14
Zinc	mg/kg	55	200	55

Misc Soil - Inorg				
Our Reference		239493-4	239493-5	239493-6
Your Reference	UNITS	BH1	BH7	BH8
Depth		0.4-0.5	0.4-0.5	0.02-0.1
Date Sampled		21/03/2020	21/03/2020	21/03/2020
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	25/03/2020	25/03/2020	25/03/2020
Date analysed	-	26/03/2020	26/03/2020	26/03/2020
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5

Moisture						
Our Reference		239493-1	239493-2	239493-3	239493-4	239493-5
Your Reference	UNITS	BH1	BH7	BH8	BH1	BH7
Depth		0.02-0.1	0.04-0.1	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		21/03/2020	21/03/2020	21/03/2020	21/03/2020	21/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Date analysed	-	26/03/2020	26/03/2020	26/03/2020	26/03/2020	26/03/2020
Moisture	%	8.9	8.9	5.1	9.2	6.1

Moisture			
Our Reference		239493-6	239493-7
Your Reference	UNITS	BH8	BD2/20200321
Depth		0.02-0.1	-
Date Sampled		21/03/2020	21/03/2020
Type of sample		SOIL	SOIL
Date prepared	-	25/03/2020	25/03/2020
Date analysed	-	26/03/2020	26/03/2020
Moisture	%	6.9	8.3

Asbestos ID - soils						
Our Reference		239493-1	239493-2	239493-3	239493-4	239493-5
Your Reference	UNITS	BH1	BH7	BH8	BH1	BH7
Depth		0.02-0.1	0.04-0.1	0.4-0.5	0.4-0.5	0.4-0.5
Date Sampled		21/03/2020	21/03/2020	21/03/2020	21/03/2020	21/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	30/03/2020	30/03/2020	30/03/2020	30/03/2020	30/03/2020
Sample mass tested	g	Approx. 35g	Approx. 40g	Approx. 35g	Approx. 35g	Approx. 40g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-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	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

Asbestos ID - soils		
Our Reference		239493-6
Your Reference	UNITS	BH8
Depth		0.02-0.1
Date Sampled		21/03/2020
Type of sample		SOIL
Date analysed	-	30/03/2020
Sample mass tested	g	Approx. 40g
Sample Description	-	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected Synthetic mineral fibres detected
Trace Analysis	-	No asbestos detected

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.
AT-008	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	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-003	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-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	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-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS.
Org-012/017	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS and/or GC-MS/MS. 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.

Method ID	Methodology Summary
Org-012/017	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-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	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-016	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-4	239493-5
Date extracted	-			25/03/2020	4	25/03/2020	25/03/2020		25/03/2020	25/03/2020
Date analysed	-			26/03/2020	4	26/03/2020	26/03/2020		26/03/2020	26/03/2020
TRH C_6 - C_9	mg/kg	25	Org-016	<25	4	<25	<25	0	98	87
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	4	<25	<25	0	98	87
Benzene	mg/kg	0.2	Org-016	<0.2	4	<0.2	<0.2	0	88	78
Toluene	mg/kg	0.5	Org-016	<0.5	4	<0.5	<0.5	0	96	86
Ethylbenzene	mg/kg	1	Org-016	<1	4	<1	<1	0	102	92
m+p-xylene	mg/kg	2	Org-016	<2	4	<2	<2	0	101	90
o-Xylene	mg/kg	1	Org-016	<1	4	<1	<1	0	98	87
naphthalene	mg/kg	1	Org-014	<1	4	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	100	4	105	105	0	97	95

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	239493-5
Date extracted	-			25/03/2020	4	25/03/2020	25/03/2020		25/03/2020	25/03/2020
Date analysed	-			25/03/2020	4	25/03/2020	25/03/2020		25/03/2020	26/03/2020
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	4	<50	<50	0	105	123
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	4	<100	<100	0	73	73
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	4	<100	<100	0	92	71
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	4	<50	<50	0	105	123
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	4	<100	<100	0	73	73
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	4	<100	<100	0	92	71
Surrogate o-Terphenyl	%		Org-003	118	4	112	111	1	108	108

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	239493-5
Date extracted	-			25/03/2020	4	25/03/2020	25/03/2020		25/03/2020	25/03/2020
Date analysed	-			25/03/2020	4	25/03/2020	25/03/2020		25/03/2020	25/03/2020
Naphthalene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	90	100
Acenaphthylene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	108	102
Phenanthrene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	86	108
Anthracene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	82	102
Pyrene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	76	98
Benzo(a)anthracene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	100	124
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012/017	<0.2	4	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012/017	<0.05	4	<0.05	<0.05	0	78	96
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	100	4	97	100	3	100	119

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	239493-5
Date extracted	-			25/03/2020	4	25/03/2020	25/03/2020		25/03/2020	25/03/2020
Date analysed	-			25/03/2020	4	25/03/2020	25/03/2020		25/03/2020	25/03/2020
alpha-BHC	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	94	120
HCB	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	92	118
gamma-BHC	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	90	116
delta-BHC	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	98	126
Heptachlor Epoxide	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	94	122
gamma-Chlordane	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	94	124
Dieldrin	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	98	128
Endrin	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	88	122
Endosulfan II	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	94	124
Endrin Aldehyde	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	90	110
Methoxychlor	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	103	4	102	105	3	118	117

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	239493-5
Date extracted	-			25/03/2020	4	25/03/2020	25/03/2020		25/03/2020	25/03/2020
Date analysed	-			25/03/2020	4	25/03/2020	25/03/2020		25/03/2020	25/03/2020
Dichlorvos	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	88	94
Dimethoate	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	86	110
Fenitrothion	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	78	100
Malathion	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	92	63
Chlorpyriphos	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	90	114
Parathion	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	68	94
Bromophos-ethyl	mg/kg	0.1	AT-008	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	80	112
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-012/017	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	103	4	102	105	3	118	117

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	239493-5
Date extracted	-			25/03/2020	4	25/03/2020	25/03/2020		25/03/2020	25/03/2020
Date analysed	-			25/03/2020	4	25/03/2020	25/03/2020		25/03/2020	25/03/2020
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	4	<0.1	<0.1	0	77	94
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	4	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	103	4	102	105	3	118	117

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	239493-5
Date prepared	-			25/03/2020	4	25/03/2020	25/03/2020		25/03/2020	25/03/2020
Date analysed	-			26/03/2020	4	26/03/2020	26/03/2020		26/03/2020	26/03/2020
Arsenic	mg/kg	4	Metals-020	<4	4	4	5	22	107	90
Cadmium	mg/kg	0.4	Metals-020	<0.4	4	<0.4	<0.4	0	103	90
Chromium	mg/kg	1	Metals-020	<1	4	5	6	18	115	89
Copper	mg/kg	1	Metals-020	<1	4	4	4	0	107	104
Lead	mg/kg	1	Metals-020	<1	4	6	7	15	113	106
Mercury	mg/kg	0.1	Metals-021	<0.1	4	<0.1	<0.1	0	94	101
Nickel	mg/kg	1	Metals-020	<1	4	<1	<1	0	102	91
Zinc	mg/kg	1	Metals-020	<1	4	3	3	0	110	105

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	7	25/03/2020	25/03/2020		[NT]	[NT]
Date analysed	-			[NT]	7	26/03/2020	26/03/2020		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	7	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	7	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	7	11	13	17	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	7	34	50	38	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	7	21	21	0	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	7	<0.1	0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	7	10	14	33	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	7	200	61	107	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date prepared	-			25/03/2020	[NT]	[NT]	[NT]	[NT]	25/03/2020	[NT]
Date analysed	-			26/03/2020	[NT]	[NT]	[NT]	[NT]	26/03/2020	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	[NT]	[NT]	101	[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

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples were sub-sampled from jars provided by the client.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 239493-7 for Zn. Therefore a triplicate result has been issued as laboratory sample number 239493-10.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86469.12	**Suburb:**	Meadowbank	**To:**	EnviroLab
Project Name:	Meadowbank Carkpark	**Order Number**			12 Ashley Street, Chatswood 2067
Project Manager:	PG	**Sampler:**	AS	**Attn:**	Aileen Hie
Emails:	Paul.Gorman@douglaspartners.com.au Alyssa.Spencer@douglaspartners.com.au			**Phone:**	(02) 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☒ Esky ☒ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 3a	Combo 8a	Combo 3	BTEX						Notes/preservation
BH1/0.02-0.1	1	21103120	S	G	X									
BH7/0.04-0.1	2				X									
BH8/0.4-0.5	3				X									
BH1/0.4-0.5	4					X								
BH7/0.4-0.5	5					X								
BH8/0.02-0.1	6					X								
BD2/20200321	7						X							
TS_20200321	8							X						
TB_20200321	9	↓	↓	↓				X						
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

ENVIROLAB group
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 239493
Date Received: 23/3/20
Time Received: 1600
Received by: JW
Temp: Cool/~~Ambient~~
Cooling: ~~Ice~~/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Lab Report/Reference No:

Metals to Analyse: 8HM unless specified here:

Total number of samples in container: 7 **Relinquished by:** AS **Transported to laboratory by:**

Send Results to: Douglas Partners **Address:** 96-98 Hermitage Road, West Ryde **Phone:** 288780632 **Fax:**

Signed: Alyssa Spencer **Received by:** ED Sydney CHANNE MCCMER **Date & Time:** 23/3/20 1600

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	Douglas Partners Pty Ltd
Attention	Paul Gorman

Sample Login Details

Your reference	86469.12, Meadowbank Carpark
Envirolab Reference	239493
Date Sample Received	23/03/2020
Date Instructions Received	23/03/2020
Date Results Expected to be Reported	30/03/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	9 SOIL
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	6.1
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
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 ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils
BH1-0.02-0.1	✓	✓	✓				✓		✓
BH7-0.04-0.1	✓	✓	✓				✓		✓
BH8-0.4-0.5	✓	✓	✓				✓		✓
BH1-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓
BH7-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓
BH8-0.02-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓
BD2/20200321	✓	✓	✓				✓		
TS-20200321	✓								
TB-20200321	✓								

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.

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 239952

Client Details

Client	Douglas Partners Pty Ltd
Attention	Paul Gorman
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86469.12, Meadowbank TAFE NSW**
Number of Samples	12 SOIL
Date samples received	30/03/2020
Date completed instructions received	30/03/2020

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	31/03/2020
Date of Issue	31/03/2020

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Lucy Zhu
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Josh Williams, Senior Chemist
Ken Nguyen, Reporting Supervisor
Lucy Zhu, Asbestos Supervisor
Priya Samarawickrama, Senior Chemist
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		239952-1	239952-2	239952-3	239952-4	239952-5
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.05-0.15	0.07-0.08	0.1-0.2	0.08-0.14	0.15-0.25
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
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	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	96	103	105	95	100

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		239952-6	239952-7	239952-8	239952-9	239952-10
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.2-0.3	0.1-0.2	0.2-0.3	04-0.5	0.4-0.5
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
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	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	90	105	95	94	97

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		239952-11	239952-12
Your Reference	UNITS	TS/2513	TB/2513
Depth		-	-
Date Sampled		28/03/2020	28/03/2020
Type of sample		SOIL	SOIL
Date extracted	-	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020
TRH C_6 - C_9	mg/kg	[NA]	<25
TRH C_6 - C_{10}	mg/kg	[NA]	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	[NA]	<25
Benzene	mg/kg	111%	<0.2
Toluene	mg/kg	111%	<0.5
Ethylbenzene	mg/kg	118%	<1
m+p-xylene	mg/kg	120%	<2
o-Xylene	mg/kg	121%	<1
naphthalene	mg/kg	[NA]	<1
Total +ve Xylenes	mg/kg	[NA]	<3
Surrogate aaa-Trifluorotoluene	%	110	107

svTRH (C10-C40) in Soil						
Our Reference		239952-1	239952-2	239952-3	239952-4	239952-5
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.05-0.15	0.07-0.08	0.1-0.2	0.08-0.14	0.15-0.25
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
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	510	<100	<100	<100
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	260	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	2,900	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	3,100	<50	<50	<50
Surrogate o-Terphenyl	%	82	95	98	101	105

svTRH (C10-C40) in Soil						
Our Reference		239952-6	239952-7	239952-8	239952-9	239952-10
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.2-0.3	0.1-0.2	0.2-0.3	04-0.5	0.4-0.5
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
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
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	%	93	92	95	94	93

PAHs in Soil						
Our Reference		239952-1	239952-2	239952-3	239952-4	239952-5
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.05-0.15	0.07-0.08	0.1-0.2	0.08-0.14	0.15-0.25
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
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	0.06	<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	<0.05	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	93	97	97	95

PAHs in Soil						
Our Reference		239952-6	239952-7	239952-8	239952-9	239952-10
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.2-0.3	0.1-0.2	0.2-0.3	04-0.5	0.4-0.5
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
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	96	97	94

Organochlorine Pesticides in soil						
Our Reference		239952-6	239952-7	239952-8	239952-9	239952-10
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.2-0.3	0.1-0.2	0.2-0.3	04-0.5	0.4-0.5
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
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	81	108	85	93

Organophosphorus Pesticides in Soil						
Our Reference		239952-6	239952-7	239952-8	239952-9	239952-10
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.2-0.3	0.1-0.2	0.2-0.3	04-0.5	0.4-0.5
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
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	81	108	85	93

PCBs in Soil						
Our Reference		239952-6	239952-7	239952-8	239952-9	239952-10
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.2-0.3	0.1-0.2	0.2-0.3	04-0.5	0.4-0.5
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
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	81	108	85	93

Acid Extractable metals in soil						
Our Reference		239952-1	239952-2	239952-3	239952-4	239952-5
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.05-0.15	0.07-0.08	0.1-0.2	0.08-0.14	0.15-0.25
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Arsenic	mg/kg	<4	4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	16	10	8	9
Copper	mg/kg	46	16	32	19	36
Lead	mg/kg	2	10	3	12	2
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	86	18	74	7	72
Zinc	mg/kg	26	18	24	19	25

Acid Extractable metals in soil						
Our Reference		239952-6	239952-7	239952-8	239952-9	239952-10
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.2-0.3	0.1-0.2	0.2-0.3	04-0.5	0.4-0.5
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	10	13	20	5	3
Copper	mg/kg	16	22	3	4	2
Lead	mg/kg	3	18	7	12	2
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	40	51	6	4	<1
Zinc	mg/kg	14	28	4	26	2

Misc Soil - Inorg						
Our Reference		239952-6	239952-7	239952-8	239952-9	239952-10
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.2-0.3	0.1-0.2	0.2-0.3	04-0.5	0.4-0.5
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Moisture						
Our Reference		239952-1	239952-2	239952-3	239952-4	239952-5
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.05-0.15	0.07-0.08	0.1-0.2	0.08-0.14	0.15-0.25
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	01/04/2020	01/04/2020	01/04/2020	01/04/2020	01/04/2020
Moisture	%	2.8	6.8	3.3	8.7	9.3

Moisture						
Our Reference		239952-6	239952-7	239952-8	239952-9	239952-10
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.2-0.3	0.1-0.2	0.2-0.3	04-0.5	0.4-0.5
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	01/04/2020	01/04/2020	01/04/2020	01/04/2020	01/04/2020
Moisture	%	4.4	5.4	9.0	5.6	7.1

Asbestos ID - soils						
Our Reference		239952-1	239952-2	239952-3	239952-4	239952-5
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.05-0.15	0.07-0.08	0.1-0.2	0.08-0.14	0.15-0.25
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Sample mass tested	g	Approx. 45g	Approx. 35g	Approx. 40g	Approx. 30g	Approx. 40g
Sample Description	-	Grey coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Grey coarse-grained soil & rocks	Beige coarse-grained soil & rocks	Beige 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	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

Asbestos ID - soils						
Our Reference		239952-6	239952-7	239952-8	239952-9	239952-10
Your Reference	UNITS	BH2	BH3	BH4	BH5	BH6
Depth		0.2-0.3	0.1-0.2	0.2-0.3	04-0.5	0.4-0.5
Date Sampled		28/03/2020	28/03/2020	28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date analysed	-	31/03/2020	31/03/2020	31/03/2020	31/03/2020	31/03/2020
Sample mass tested	g	Approx. 20g	Approx. 45g	Approx. 40g	Approx. 45g	Approx. 30g
Sample Description	-	Beige coarse-grained soil & rocks	Beige coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Beige coarse-grained soil & rocks	Beige 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	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

Misc Inorg - Soil				
Our Reference		239952-6	239952-7	239952-9
Your Reference	UNITS	BH2	BH3	BH5
Depth		0.2-0.3	0.1-0.2	04-0.5
Date Sampled		28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020
pH 1:5 soil:water	pH Units	8.4	9.6	9.3

CEC				
Our Reference		239952-6	239952-7	239952-9
Your Reference	UNITS	BH2	BH3	BH5
Depth		0.2-0.3	0.1-0.2	04-0.5
Date Sampled		28/03/2020	28/03/2020	28/03/2020
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	31/03/2020	31/03/2020	31/03/2020
Date analysed	-	31/03/2020	31/03/2020	31/03/2020
Exchangeable Ca	meq/100g	2.5	12	7.7
Exchangeable K	meq/100g	0.2	0.4	0.2
Exchangeable Mg	meq/100g	1.1	2.2	2.4
Exchangeable Na	meq/100g	0.37	1.6	<0.1
Cation Exchange Capacity	meq/100g	4.1	16	10

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.
AT-008	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
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-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	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-003	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-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	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-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS.

Method ID	Methodology Summary
Org-012/017	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS and/or GC-MS/MS. 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-012/017	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-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	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-016	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	-			31/03/2020	1	31/03/2020	31/03/2020		31/03/2020	[NT]
Date analysed	-			31/03/2020	1	31/03/2020	31/03/2020		31/03/2020	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	<25	1	<25	<25	0	85	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	1	<25	<25	0	85	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	90	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	81	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	81	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	86	[NT]
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	78	[NT]
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	89	1	96	115	18	73	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	6	31/03/2020	31/03/2020		[NT]	[NT]
Date analysed	-			[NT]	6	31/03/2020	31/03/2020		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	[NT]	6	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	[NT]	6	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	6	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	6	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	6	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	6	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	6	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	6	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	6	90	96	6	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
Date analysed	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	125	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	90	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	77	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	125	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	90	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	77	[NT]
Surrogate o-Terphenyl	%		Org-003	97	[NT]	[NT]	[NT]	[NT]	130	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
Date analysed	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
Naphthalene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Acenaphthylene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Phenanthrene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Anthracene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Pyrene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	78	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012/017	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012/017	<0.05	[NT]	[NT]	[NT]	[NT]	82	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	91	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
Date analysed	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
alpha-BHC	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
HCB	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	88	[NT]
gamma-BHC	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
delta-BHC	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
gamma-Chlordane	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Dieldrin	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Endrin	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Endosulfan II	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	72	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Methoxychlor	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	89	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
Date analysed	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
Dichlorvos	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	74	[NT]
Dimethoate	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Fenitrothion	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Malathion	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Chlorpyriphos	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Parathion	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Bromophos-ethyl	mg/kg	0.1	AT-008	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-012/017	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	89	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
Date analysed	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	122	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-006	89	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date prepared	-			31/03/2020	6	31/03/2020	31/03/2020		31/03/2020	[NT]
Date analysed	-			31/03/2020	6	31/03/2020	31/03/2020		31/03/2020	[NT]
Arsenic	mg/kg	4	Metals-020	<4	6	<4	<4	0	105	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	6	<0.4	<0.4	0	103	[NT]
Chromium	mg/kg	1	Metals-020	<1	6	10	11	10	114	[NT]
Copper	mg/kg	1	Metals-020	<1	6	16	13	21	106	[NT]
Lead	mg/kg	1	Metals-020	<1	6	3	3	0	116	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	6	<0.1	<0.1	0	99	[NT]
Nickel	mg/kg	1	Metals-020	<1	6	40	36	11	105	[NT]
Zinc	mg/kg	1	Metals-020	<1	6	14	13	7	107	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			31/03/2020	6	31/03/2020	31/03/2020		31/03/2020	[NT]
Date analysed	-			31/03/2020	6	31/03/2020	31/03/2020		31/03/2020	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	6	<5	<5	0	104	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
Date analysed	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
Date analysed	-			31/03/2020	[NT]	[NT]	[NT]	[NT]	31/03/2020	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
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LCS	Laboratory Control Sample
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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

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Sample 239952-2 was sub-sampled from a jar provided by the client.

Asbestos: Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples 239952-1, 3 to 10 were sub-sampled from bags provided by the client.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86469.12	**Suburb:**	Meadowbank	**To:**	EnviroLab
Project Name:	TAFE NSW	**Order Number**			12 Ashley Street, Chatswood 2067
Project Manager:	Paul Gorman	**Sampler:**	CL	**Attn:**	Aileen Hie
Emails:	Paul.Gorman@douglaspartners.com.au	Alyssa.Spencer@douglaspartners.com.au		**Phone:**	(02) 9910 6200
Date Required:	Same day ☐ 24 hours ☒ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☒ Esky ☒ Fridge ☐ Shelved	Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 3a	Combo 8a	[illegible]	BTEX	pH	CEC				Notes/preservation
BH2 0.05-0.15	1	28/03/20	S		X									
BH3 0.07-0.08	2	"	"		"									
BH4 0.1-0.2	3	"	"		"									
BH5 0.04-0.14	4	"	"		"									
BH6 0.15-0.25	5	"	"		↓									
BH2 0.2-0.3	6	"	"			X			X	X				
BH3 0.1-0.2	7	"	"			"			X	X				
BH4 0.2-0.3	8	"	"			"			"	"				
BH5 0.4-0.5	9	"	"			"			X	X				
BH6 0.4-0.5	10	↓	"			↓			"	"				
TS 28/3/20	11	—	"					X						
TB 28/3/20	12	—	↓					X						
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

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

Job No: 239952
Date Received: 30.3.20
Time Received: 1655
Received By: MO
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Lab Report/Reference No: 239952

Metals to Analyse: 8HM unless specified here:

Total number of samples in container: 12 **Relinquished by:** AS **Transported to laboratory by:** Dropped off

Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

Signed: [signature] **Received by:** Michael Opie ELS **Date & Time:**

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	Douglas Partners Pty Ltd
Attention	Paul Gorman

Sample Login Details

Your reference	86469.12, Meadowbank TAFE NSW
Envirolab Reference	239952
Date Sample Received	30/03/2020
Date Instructions Received	30/03/2020
Date Results Expected to be Reported	31/03/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	12 SOIL
Turnaround Time Requested	1 day
Temperature on Receipt (°C)	15.2
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
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 ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils	Misc Inorg - Soil	CEC
BH2-0.05-0.15	✓	✓	✓				✓		✓		
BH3-0.07-0.08	✓	✓	✓				✓		✓		
BH4-0.1-0.2	✓	✓	✓				✓		✓		
BH5-0.08-0.14	✓	✓	✓				✓		✓		
BH6-0.15-0.25	✓	✓	✓				✓		✓		
BH2-0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BH3-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BH4-0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓		
BH5-04-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BH6-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓		
TS/2513	✓										
TB/2513	✓										

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.

Envirolab Services Pty Ltd
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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 239952-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Celine Li
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86469.12, Meadowbank TAFE NSW**
Number of Samples	12 SOIL
Date samples received	30/03/2020
Date completed instructions received	08/04/2020

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

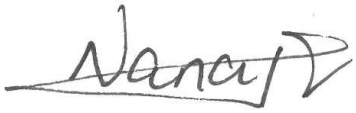
Date results requested by	17/04/2020
Date of Issue	15/04/2020

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

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

Results Approved By
Loren Bardwell, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

Metals in TCLP USEPA1311			
Our Reference		239952-A-1	239952-A-3
Your Reference	UNITS	BH2	BH4
Depth		0.05-0.15	0.1-0.2
Date Sampled		28/03/2020	28/03/2020
Type of sample		SOIL	SOIL
Date extracted	-	09/04/2020	09/04/2020
Date analysed	-	09/04/2020	09/04/2020
pH of soil for fluid# determ.	pH units	10.0	9.8
pH of soil TCLP (after HCl)	pH units	1.9	1.8
Extraction fluid used	-	1	1
pH of final Leachate	pH units	5.1	5.0
Nickel in TCLP	mg/L	0.2	0.1

Method ID	Methodology Summary
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
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 in house method INORG-004. Please note that the mass used may be scaled down from the default based on sample mass available.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL: Metals in TCLP USEPA1311						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	239952-A-1
Date extracted	-			09/04/2020	[NT]	[NT]	[NT]	[NT]	09/04/2020	09/04/2020
Date analysed	-			09/04/2020	[NT]	[NT]	[NT]	[NT]	09/04/2020	09/04/2020
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	[NT]	[NT]	90	89

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From: Simon Song <SSong@envirolab.com.au>
Sent: Wednesday, 8 April 2020 10:34 AM
To: Celine Li <Celine.Li@douglaspartners.com.au>
Cc: Andrew (Fitzy) Fitzsimons <AFitzsimons@envirolab.com.au>
Subject: RE: TCLP -239493

No problem

Ref: 239952-A
Due: 17/4/20

Fitz, A job

Kind Regards,

Simon Song | Customer Service | Envirolab Services Pty Ltd

***Celebrating 15 years of* Great Science. Great Service.**
12 Ashley Street Chatswood NSW 2067
T 612 9910 6200 **F** 612 9910 6201
E ssong@envirolab.com.au | **W** www.envirolab.com.au

View reduced sampling bottle provision for PFAS in water | COVID-19 Update

Please note that all samples submitted to the Envirolab Group laboratories will be analysed under the Envirolab Group Terms and Conditions. The Terms and Conditions are accessible by clicking this link

From: Celine Li <Celine.Li@douglaspartners.com.au>
Sent: Wednesday, 8 April 2020 10:31 AM
To: Simon Song <SSong@envirolab.com.au>
Subject: TCLP -239493

Hi Simon,

1 & 3

Could we please schedule TCLP test on samples BH2/0.05-0.15 and BH4/0.1-0.2 for Nickel ? Standard TAT please.

Lab reference is 239~~493~~ 952

Thanks,

Celine Li | Environmental Engineer
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 9809 0666 | M: 0428 199 646 | E: Celine.Li@douglaspartners.com.au

To find information on our COVID-19 preparations, please visit douglaspartners.com.au/news/covid-19