Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Site Contamination Report (Contamination)

Proposed Residential Subdivision Development
20-22 MacPherson Street, Warriewood

Prepared for
Green Kingswood Pty Ltd

Project 207253.02
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Douglas Partners
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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
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Executive Summary

Douglas Partners Pty Ltd (DP) has been engaged by BMN Properties Pty Ltd c/-- Jimbo & Co to complete this Site Contamination Assessment (Preliminary Site Investigation - PSI) for a proposed residential development at 20-22 MacPherson Street, Warriewood. The objective of the investigation is to assess the potential for contamination and contamination status of the site and whether further investigation and / or management is required with regard to the proposed development.

The investigation included a review of previous investigations undertaken at the site, a review of available site history, a site walkover, intrusive sampling from fifteen boreholes and three groundwater monitoring wells, laboratory analysis for contaminants of potential concern (COPC) and interpretation of results with reference to current NSW EPA endorsed guidelines. Supplementary site works were conducted in November 2022 including a supplementary round of groundwater monitoring and surface water monitoring followed by a revision to the original report from 2021.

A review of previous reports, site history and an interview with site personnel indicated that the site was used for agricultural purposes since at least 1920, then for indoor plant propagation and then as a plant nursey (current use) since *circa* 1976. At least some site buildings were constructed between 1951 and 1961. The surrounding land use is understood to have had a long history of horticulture use as well as residential and some commercial developments.

The SafeWork Records indicate that there was one AST and two USTs at the site however the detailed records were missing and therefore the location of these items is unknown. The SafeWork records provided indicate that the AST was used to store flammable gas.

Potential sources of contamination identified at the site included fill of unknown origin, the site's former agricultural and plant propagation (horticultural) land use, the site's current plant nursey / garden centre land use, former / disused underground petroleum storage tanks (USTs), an on-site diesel above ground storage tank (AST) and chemical storage, hazardous material from site buildings and off site up-gradient commercial land uses.

The current and previous site investigations encountered fill in all test locations to depths of between 0.3 m and 1.3 m below ground level. Signs of contamination identified in the fill included anthropogenic materials, including an asbestos fibre cement fragment in one location and a hydrocarbon odour in one location.

The results of the soil analytical testing for the current and previous site investigations detected potentially friable asbestos in fill at three locations (MW101, HA104 and BH4). Other chemical contaminants were within the Site Assessment Criteria (SAC) with the exception of TRH F3 and benzo(a)pyrene in one location, which exceeded the ecological screening values. These exceedances were not considered to be of concern for the proposed development for the reasons discussed herein. Additionally, an elevated concentration of arsenic was detected in one location. The result of the groundwater analytical testing for the current investigation detected concentrations of zinc and PFOS in exceedance of the SAC. Additionally, elevated concentrations of arsenic and DDT were detected in the two down-gradient wells. This may be associated with current and former land uses (i.e., pesticide application). Based on the currently available data the zinc and PFOS concentrations were considered to be consistent with urban background levels, however the DDT and arsenic were considered to potentially be associated with an on-site source.

The supplementary groundwater and surface water testing identified similar concentrations of PFAS and heavy metals in the groundwater and creek water, however, there was no evidence that the concentration of these contaminants tested increased from the up-stream to the down-stream locations.

The laboratory results indicated that ASS is likely to be present in all soils below the water table near the creek (i.e., the north-east site boundary) and in some horizons further away from the creek.

Based on the results of this assessment it is considered that the site can be rendered suitable for the proposed development subject to remediation of contamination issues at the site.

It is recommended that:

- A detailed site investigation be undertaken to assess data gaps at the site, including further assessment for the recorded USTs, characterisation of contamination in the existing building footprints when access becomes available and further groundwater assessment.
- A remediation action plan (RAP) is required to address the identified asbestos contamination and the former USTs as well any other contamination identified during further investigation or site works. The RAP should include an Unexpected Finds Protocol (UFP) and an Asbestos Finds Protocol describing how unexpected contamination and asbestos finds identified during constructions works will be managed. A detailed asbestos assessment may be required to inform the remediation decision. A validation assessment report will be required to validate the success of the remediation works recommended by the RAP.
- A hazardous building materials (HBM) assessment will be required for existing site buildings / structures prior to demolition. Hazardous materials will need to be removed in accordance with relevant legislation and guidelines prior to demolition and certified by a suitably qualified person.
- An acid sulfate soil management plan (ASSMP) is required to provide the methods by which acid sulfate soil (ASS) at the site are to be managed during the works. Delineation of ASS is difficult, and it is recommended it be assumed that all soils from beneath the water table are ASS for planning purposes.
- All soil disposed off-site will require classification in accordance with the POEO Act prior to disposal. Based on the results of this investigation the soils have been given a preliminary classification of general solid waste - asbestos waste. All soils containing ASS will require treatment prior to disposal.

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Proposed Residential Subdivision Development
20-22 MacPherson Street, Warriewood

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by BMN Properties Pty Ltd T/A Baz Family Trust to complete this site contamination report (contamination) (PSI) undertaken for a proposed residential subdivision development for the site at 20-22 MacPherson Street, Warriewood (the site). The site is shown on Drawing 1, Appendix A.

The investigation was undertaken in accordance with DP's proposal 207253.02.P.001.Rev0 dated 1 November 2021. The investigation was undertaken concurrently with a preliminary geotechnical assessment, reported separately[1].

The objective of the PSI is to assess the potential for contamination at the site based on past and present land uses and to comment on the need for further investigation and/ or management with regard to the anticipated residential land use. It is understood that the report will be used to support a due diligence assessment for the proposed development which is understood to involve the demolition of the existing site structures and construction of a subdivision consisting of 53 two and three storey residential dwellings with an internal access road. No basement excavations are anticipated.

This report must be read in conjunction with all appendices including the notes provided in Appendix A.

The following key guidelines were consulted in the preparation of this report:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013); and
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

2. Scope of Works

The scope of works was undertaken in two phases as below

Phase 1: September 2021

- Review of published topographical, geological, soil landscape, acid sulfate soil (ASS) and hydrogeological maps;
- Review of the NSW Department of Primary Industries groundwater database for registered groundwater bores in the vicinity of the site;

[1] DP, *Report on Preliminary Geotechnical Assessment, Proposed Subdivision Development, 20-22 MacPherson Street, Warriewood*, Reference 207253.00.R.001.Rev0, dated 30 September 2021.

- Review of DP's previous reports and existing data for the site;
- Review of records held by SafeWork NSW pertaining to the storage of hazardous good and chemicals;
- Review of the NSW EPA Register for notices issued under the *Contaminated Land Management Act 1997* (CSM Act) and the *Protection of the Environment Operations Act 1997*;
- Undertake a site walkover to observe site features and identify Potential Areas of Environmental Concern (PAEC);
- Development of a Preliminary Conceptual Site Model (CSM);
- Undertake a Dial-Before-You-Dig search and scanning of borehole locations for buried services;
- Drilling of eight boreholes using a drilling rig to a depth of at least 0.5 m into natural soils;
- Drilling of seven boreholes using a hand auger to a depth of 0.2 m into natural soils or prior refusal (whichever was lesser);
- Extension of four boreholes to a depth of 3.0 m or prior refusal to allow for the collection of ASS samples;
- Extension of three boreholes to a depth of between 4.0 m and 5.0 m and installation of groundwater monitoring wells;
- Logging of encountered soil materials and pertinent field information;
- Collection of soil samples from the near surface, every 0.5 m, changes in strata and at signs of contamination;
- Development of the monitoring wells by removing a minimum of three well volumes or purging until the well was dry and allowing wells to recharge for one week prior to sampling;
- Collection of groundwater samples from the monitoring wells using a low-flow pump. The physical parameters of pH, conductivity, dissolved oxygen, redox potential and turbidity were measured and recorded whilst sampling;
- Laboratory analysis of selected soil and groundwater samples by National Association of Testing Authorities (NATA) accredited laboratories for various combinations of the following contaminants/ analytes:
  - Heavy metals (including As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
  - Total recoverable hydrocarbons (TRH);
  - Benzene, toluene, ethylbenzene and xylenes (BTEX);
  - Polycyclic aromatic hydrocarbons (PAH);
  - Organochlorine pesticides (OCP);
  - Organophosphorus pesticides (OPP);
  - Polychlorinated biphenyls (PCB);
  - Herbicides;
  - Total phenols (soil only);
  - Per- and polyfluroalkyl substances (PFAS);
  - Volatile organic compounds (VOC) (groundwater only);
  - Asbestos (soil only); and
  - ASS (soil only).

- Field sampling and laboratory analysis with reference to standard environmental protocols including 10% replicates, trip spikes and trip blanks, appropriate chain-of-custody procedures and in-house laboratory QA / QC testing; and
- Provision of this Due Diligence Assessment (PSI), including analysis of data with respect to NSW EPA guidelines for the proposed land use and provision of a preliminary waste classification.

Phase 2 Works – November 2022

- Collection of samples from each of the three pre-existing groundwater monitoring wells;
- Collection of water samples from Narrabeen Creek both upgradient and down-gradient of the site;
- Analysis of samples at a NATA accredited laboratory for:
  - Total and filtrable metals (including arsenic);
  - Organochlorine pesticide (OCP); and
  - Per- and polyfluroalkyl substances (PFAS).
- Data assessment; and
- Provision of this updated site contamination report.

3. Site Information

Site Address	20-22 MacPherson Street, Warriewood
Legal Description	Lot 1, Deposited Plan 592091
Area	20,000 m^2
Zoning	Zone R3 Medium Density Residential
Local Council Area	Northern Beaches Council
Current Use	Retail Nursey
Surrounding Uses	North - Narrabeen Creek East - Residential South - Residential West - Commercial and Residential

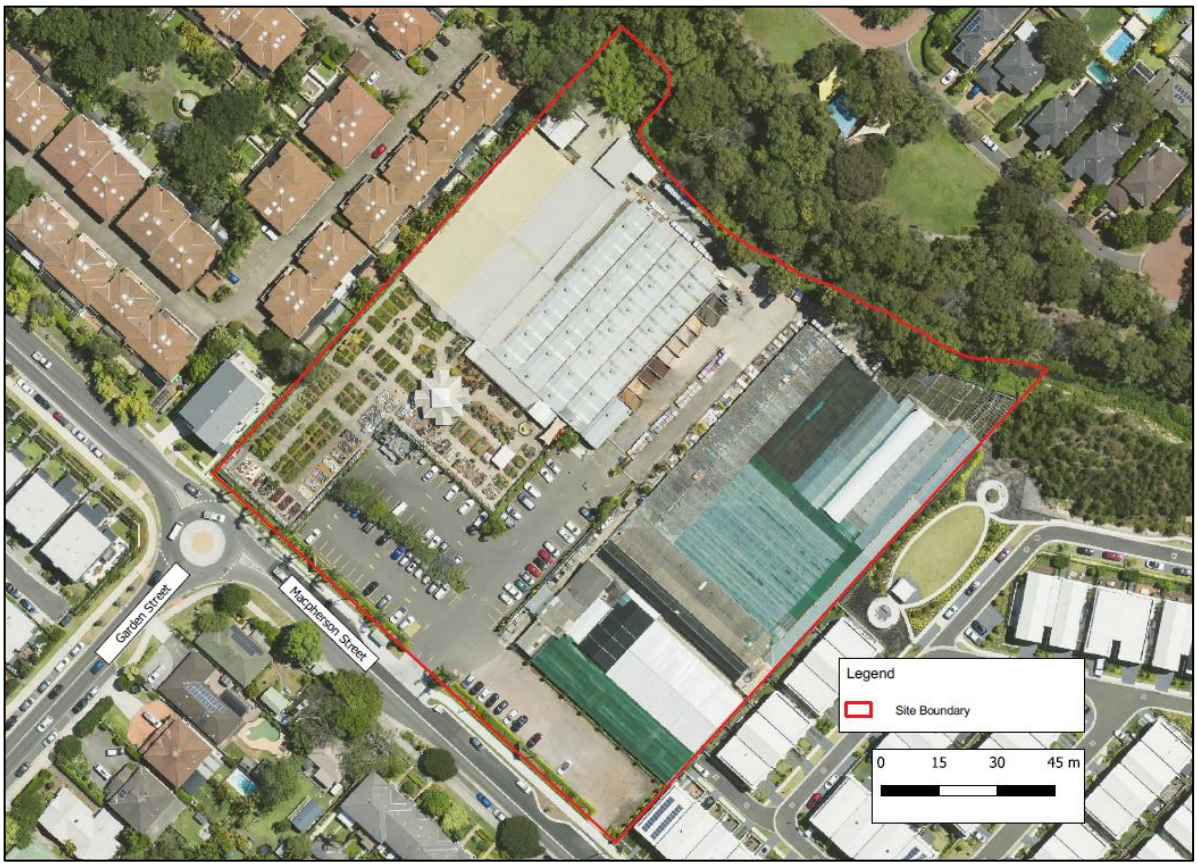


Figure 1: Site Location

The site is currently occupied by 'Flower Power' retail nursey and contains large buildings, greenhouses, external garden displays, an at grade carpark and ancillary areas. The majority of the site is sealed with either concrete slabs or asphalt hardstand.

4. Environmental Setting

4.1 Topography

Regional topography around the site generally slopes downwards in an easterly to south-easterly direction.

Based on preliminary information from a site survey conducted by Crag & Rhodes, as provided by the client, the site has an overall different in elevation of about 2.3 m from the south-western corner of the site which is at about RL 11.5 m relative to Australian Height Datum (AHD) to the north-eastern corner, which is at about RL 9.2 m AHD.

4.2 Site Geology

Published geological mapping indicates that the site is underlain by quaternary alluvial sediment comprising channel and flood plain alluvium, gravel, sand, silt and clay. The Quaternary sediments are underlain by the Newport Formation comprising interbedded laminite, shale and quartzitic to lithic quartz sandstone.

Published soils landscape mapping indicates that the site is underlain by swamp soils, generally comprising deep, well sorted sandy humus podzols and dark mottled siliceous sands overlying buried acid peats in depressions and deep podzols and pale siliceous sands on sandy rises.

4.3 Acid Sulfate Soils

Published ASS risk mapping indicates that the site is located in an area with low probability of ASS occurrence. It is noted, however, that localised occurrences may occur, and previous data indicates there is a risk of ASS occurrence at the site. Furthermore, swamp soils are often ASS.

The site is located approximately 260 m north-west of an area with a high probability of ASS occurrence.

4.4 Surface Water and Groundwater

The closest water course to the site is Narrabeen Creek, located approximately 5 m north-east [down-gradient] of the site.

A search of the publicly available registered groundwater bore indicated that there are five registered groundwater bores within 1 km of the site. The groundwater bores are summarised in Table 1.

Table 1: Summary of Available Information from Nearby Registered Groundwater Bores

Bore ID Authorised Purpose	Location Relative to Site	Final Depth (m)	Standing Water Level (m bgl)
GW108034 Test Bore	100 m south-east	2.5	0.9
GW106699 Test Bore	295 m south-east	2.5	0.9
GW106698 Monitoring Bore	310 m south-east	3	N/A
GW106697 Monitoring Bore	380 m south-east	3	N/A
GW108132 Recreational	775 m north	210	17.5

Based on the regional topography and the inferred flow direction of nearby water courses, the anticipated flow direction of groundwater beneath the site is to the north-east, towards Narrabeen Creek, the likely receiving surface water body for the groundwater flow path.

Given the local geology (i.e., alluvial sediments and sandstone), the groundwater in the fractured rock beneath the site is anticipated to be relatively fresh. Accordingly, potential beneficial uses could include irrigation or drinking water, although the future use of the groundwater for these purposes in the vicinity of the site is considered unlikely given the urban setting.

5. Previous Reports and Site History

DP has previously undertaken the following investigations at the site:

- DP, *Preliminary Contamination Assessment, Sector 3, MacPherson Street, Warriewood Valley*, Project No. 37273, dated November 2004 (DP, 2004a); and
- DP, *Preliminary Geotechnical Assessment, Warriewood Valley Sector 3 Rezoning*, *MacPherson Street, Warriewood,* Project No. 37274, dated December 2004 (DP, 2004b).

5.1 DP (2004a)

DP (2004a) was a Preliminary Contamination Assessment conducted on a larger site encompassing the current subject site and extending approximately 150 m east. The assessment included a review of site history, drilling and sampling from 15 boreholes (four of which were located on the current subject site) and laboratory analysis of selected samples. The test locations from DP (2004a) within the current subject site are shown on Drawing 1, Appendix A.

The site history review included historical aerial photographs and title deeds. The title deeds indicated that the site had a likely agricultural land use from at least 1920 (if not earlier) and a likely retail land use from circa 1976. The historical aerial photographs showed the site being used for agricultural purposes with greenhouses from at least 1947. The photographs also showed warehouse style buildings constructed at the site between 1951 and 1961 and a commercial nursey land use from between 1970 and 1986. Overall, the site history suggests an agricultural land use until the site was developed for its current retail nursey land use in the 1970's - 1980's.

Potential sources of contamination at the site identified from the history review included past and present land uses, placement of contaminated fill over the site and migration of contaminants from adjacent areas. Additionally, several buildings constructed of fibre cement were observed at the site and were considered to be a possible source of asbestos fragments / debris.

The field investigation encountered fill to depths of less than 1 m bgl across most of the site and to depths of greater than 1.5 m bgl at BH1. The fill comprised grey, brown and orange sands, silts and clays with varying proportions of gravel and anthropogenic materials. Fill soils were underlain by alluvial / estuarine sands and clays. Field observations and pH screening also indicated that ASS may be present on the site.

The results of laboratory analysis found that all contaminants in samples from the current subject site were within the adopted site assessment criteria (SAC) for a residential land use with the exception of asbestos in one location (BH4). Chrysotile asbestos fibres were detected in BH4 at 0.5 m bgl. It is noted that benzo(a)pyrene exceeded the ecological screening level (ESL) adopted for the current investigation in one location however this exceedance is not considered to be of concern for the reasons included in Section 12.1. Laboratory results are tabulated with the SAC derived for the current investigation in Table 1, Appendix H.

The results of ASS screening found that the oxidised pH value was lower than pH 3.5 in one sample from BH2 and the change in pH (field pH - oxidised pH) was greater than 1.0 in all samples tested from the current site, indicating the presence of possible ASS (PASS). The results of the ASS screening are included in Table 3, Appendix H.

The assessment recommended that a hazardous material assessment is conducted at the site. It also recommended that further investigation be undertaken to characterise the extent of asbestos contamination in fill and that it is appropriately remediated and validated.

5.2 DP (2004b)

DP (2004b) was a Preliminary Geotechnical Assessment conducted concurrently with DP (2004a). The assessment included six cone penetration tests (CPTs), two of which were located on the current subject site.

The CPTs identified variable subsurface conditions including fill to depths of between 0.3 m and 1.5 m bgl underlain by alluvial sediments. The alluvial sediments were found to be of variable composition between and within test locations. Groundwater was encountered at depths of 1.0 m bgl (CPT16) and 2.0 m bgl (CPT17).

6. Site History

6.1 Public Registers and Planning Records

EPA Notices available under Section 58 of the Contaminated Lands Management Act (CLM Act) Database searched 22 September 2021	There were no records of notices for the site or adjacent sites within a 1.5 km search radius.

Sites notified to EPA under Section 60 of the CLM Act Database searched 22 September 2021	The site was not listed as a notified contaminated site. One site was notified as contaminated within a 1.5 km search radius: • BP Service Station Mona Vale - 1721 Pittwater Road, Mana Vale - 1.03 km north-east - Service Station - Contamination regulated under the CLM Act.
Licences listed under Section 308 of the Protection of the Environment Operations Act 1997 (POEO Act) Database searched 22 September 2021	There were no licences issued for the site. One site within a 1.5 km search radius was licenced: • Warriewood Sewage Treatment System - Warriewood Road, Warriewood - 690 m south-east - Sewage Treatment - Licence issued 25 May 2000; and • Mona Vale Hospital - Coronation Street, Mona Vale - 1.1 km east - Hazardous, Industrial or Group A Waste Generation or Storage - issued 21 June 2000.
SafeWork NSW	A SafeWork NSW records search was completed on 21 October 2021. The response stated *Unfortunately, the file 35/022954 matching your request is marked as 'missing' as per the Repository records, however I have at least attached a screen shot of the historical SCID database indicating 2 underground and 1 above-ground tanks. There is unfortunately no site sketch in the SCID database.* The UST volumes were listed as being 12,000 L and 4,600 L. The location of the USTs is unknown. The AST (7,500 L) appears to be for a flammable gas. The response from SafeWork is included in Appendix B.

6.2 Site History Integrity Assessment

The information used to establish the history of the site was sourced from reputable and reliable reference documents, many of which were official records held by Government departments / agencies. The databases maintained by various Government agencies potentially can contain quality information, but some of these do not contain any data at all.

6.3 Summary of Site History

The site history information, including information obtained for DP (2004a), suggests that the site had a likely agricultural land use from at least 1920 and a likely commercial nursey site use from between 1970 and 1986 (estimated 1976). Warehouses and site structures were likely constructed in the 1950's.

At the time of the investigation, no EPA notices or licences were issued to the site. The SafeWork records indicated that there was one AST and two USTs at the site, however as the primary records were missing the locations of these items or further details were not available.

7. Site Walkover

7.1 Observations

A site walkover was undertaken by an experienced environmental scientist on 20 August 2021. The general site topography was consistent with that described in Section 4.1.

At the time of the site walkover the site was occupied by a 'Flower Power Garden Centre', with the following general layout:

- The main retail area in the north-west / west (internal and external areas);
- A plant nursery / propagation area in north-east/ east (mainly covered);
- Car parking in the south / south-west;
- A driveway and trade / bulk supplies areas through centre of the site (running north-east to south-west); and
- A storage / support area along the north-eastern boundary between the north-west boundary and the nursery area (internal and external areas).

Narrabeen Creek forms the north-east site boundary. A fence along the creek prevented access, however the site was estimated visually to be about 2 m above the creek. Some exposed soils and rubbish were observed in the bank between the site and the creek.

The following key site features pertinent to the PSI were observed (refer to photographs in Appendix C):

- The majority of the site was covered by asphalt or concrete hardstand, with some small areas of exposed soils;
- The retail area (photos 1 and 2) included:
  - A main large building and adjacent covered area in the north, as well as ancillary structures;
  - A café and a yoga studio;
  - Stocked products including plants, home goods and gardening supplies; and
  - An outdoor landscaped retail area to the south of the covered area; several cracks were observed in the pavement in this area.
- The plant nursery / propagation area in the north-east / east (photos 3 to 8) included:
  - Several enclosed plant nurseries / greenhouses and a small external area in the north;
  - Was an area partially covered by hardstand with some areas of exposed soil;
  - Structures constructed of fibre cement, with several asbestos danger signs and hazardous materials warning signs observed in this area marking the presence of asbestos (photos 5 and 6); and
  - A chemical store room in the south western portion of the nurseries, which was observed to contain small containers of 'Vertimec Pro' insecticide, 'Hasten' herbicide, 'DuPont Fontelis' fungicide, 'Tomcat 2' rodenticide, 'D-Ter' animal and bird repellent, 'ParaMite' miticide, 'Abamectin' insecticide / miticide, 'AzaMax' insecticide, moss killer, chlorine, 'Bunnybait' rabbit poison and chemical spraying containers (photo 7).
- The car parking area included (photo 8):
  - A gravel surfaced car park in the southern corner (the 'staff carpark'); and

  - Asphalt surfaced car parking and roadways, with planted medium strip areas in the south-west.
- The central driveway / trade area (photos 9 and 10):
  - Had areas of asphalt or concrete paving, and areas with gravel surface to the sites; and
  - Contained areas of bulk supplies, including soil, mulch and aggregate (in product bays) and building supplies such as pavers, and bags of fertilisers.
- The northern storage / support area (photos 11 to 17) included:
  - Indoor and outdoor areas;
  - Storage areas for various items, including (at the time of inspection) being used for 'click and collect' storage, plants, piles of gardening materials, potting mix, mulch, etc. (photo 11);
  - An above-ground diesel tank in the northern corner of the site along the boundary; the tank was located within a bund, and no signs of staining or spillage were observed (photo 12);
  - Indoor storage areas and staff amenities;
  - Some chemical storage including chlorine, possible petroleum (in small containers), and a 'hazardous material storage cupboard (not accessed); all observed chemical storage was on concrete, and in small closed container (photos 14 to 16); and
  - A green storage drum labelled 'Bowen Chemicals White Petroleum Jelly' located along the north-east site boundary fence (within the site), raised on a pallet above the ground; no spillage of signs of leakage were observed (photo 17).

The site is located within a primarily residential area (photo 17), with a park across Narrabeen Creek to the north of the site.

7.2 Interview with Site Personnel

DP interviewed Mr John Sammut of Flower Power on 20 August 2021, with the following pertinent information obtained:

- The site has been occupied by Flower Power for approximately 40 years;
- The site was used for indoor plant propagation prior to commencement of the Flower Power operations;
- The surrounding area has a long history of horticulture use, including tomato production; and
- Insecticide and fungicides are applied as required by a Contractor, with the chemicals not stored on-site outside of the application times, and this approach has been adopted for approximately 20 - 25 years. Prior to that pest control was conducted by the site staff, and some on-site storage of chemicals is likely to have occurred.

8. Preliminary 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 0 receptor linkages (complete pathways).

Potential Sources

Based on the current investigation, the following potential sources of contamination and associated contaminants of potential concern (COPC) have been identified.

- S1: Fill: Associated with levelling for site formation purposes and demolition / degradation of former buildings.
  - COPC include metals, TRH, BTEX, PAH, OCP, OPP, PCB, phenols and asbestos.
- S2: Former agricultural and plant propagation (horticultural) land use.
  - COPC include metals, TRH, BTEX, PAH, OCP and OPP.
- S3: Current nursey / garden centre land use.
  - COPC include metals, TRH, BTEX, OCP, OPP, VOC, PFAS, glyphosate, phenoxy acid herbicides and triazine herbicides.
- S4: On site above ground storage tank (AST) for diesel and chemical storage and two underground storage tanks indicated in the SafeWork records.
  - COPC include TRH, BTEX, OCP, OPP, VOC, glyphosate, phenoxy acid herbicides and triazine herbicides.
- S5: Site buildings and structures.
  - COPC include asbestos, synthetic mineral fibres (SMF), lead (in paint) and PCB.
- S6: Off-site, up-gradient commercial land use.
  - COPC include metals, TRH, BTEX, VOC and PFAS.

Potential Receptors

The following potential human receptors have been identified:

- R1: Current users [commercial];
- R2: Construction and maintenance workers;
- R3: End users [residential]; and
- R4: Adjacent site users [residential and commercial].

The following potential environmental receptors have been identified:

- R5: Surface water [Narrabeen creek, freshwater];
- R6: Groundwater; and
- R7: Terrestrial ecology.

Potential Pathways

The following potential pathways have been identified:

- P1: Ingestion and dermal contact;
- P2: Inhalation of dust and / or vapours;
- P3: Surface water run-off;
- P4: Lateral migration of groundwater providing base flow to water bodies;
- P5: Leaching of contaminants and vertical migration into groundwater; and
- P6: Contact with terrestrial ecology.

Summary of Potentially Complete Exposure Pathways

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 (potential complete pathways). The possible pathways between the above sources (S1 to S6) and receptors (R1 to R7) are provided in below Table 2.

Table 2: Summary of Potentially Complete Exposure Pathways

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S1: Fill Metals, TRH, BTEX, PAH, PCB, OCP, OPP, phenols and asbestos. **S2: Former agricultural plant propagation (horticultural) land use** Metals, TRH, BTEX, PAH, OCP and OPP. **S3: Current site use as a plant nursey/ garden centre** Metals, TRH, BTEX, OCP, OPP, VOC, PFAS, glyphosate, phenoxy acid herbicides and triazine herbicides.	P1: Ingestion and dermal contact P2: Inhalation of dust and/ or vapours	R1: Current site users [commercial] R2: Construction and maintenance workers R3: End site users [residential]	An intrusive investigation of soils and groundwater to identify the presence and nature of fill and surface soils. An intrusive groundwater investigation to obtain data on the contamination status of groundwater entering and exiting the site [included in this investigation].
	P2: Inhalation of dust and/ or vapours	R4: Adjacent site users [residential and commercial].	
	P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies	R5: Surface water [Narrabeen Creek]	
	P5: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater	
	P6: Contact with terrestrial ecology	R7: Terrestrial ecology	

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S4: On site AST for diesel and chemical storage and two underground storage tanks indicated in the SafeWork records. TRH, BTEX, OCP, OPP, VOC, glyphosate, phenoxy acid herbicides and triazine herbicides.			
S4: Site buildings and structures Asbestos, SMF, lead and PCB.	P1: Ingestion and dermal contact P2: Inhalation of dust and/ or vapours	R1: Current and end users [commercial and recreational] R2: Construction and maintenance workers R3: Adjacent site users [commercial and recreational].	A hazardous building materials assessment is required for the existing buildings/ structures. Hazardous materials will need to be removed in accordance with relevant legislation and guidelines prior to demolition.
S5: Off site, up-gradient commercial land use Metals, TRH, BTEX, VOC and PFAS.	P5: Leaching of contaminants and vertical migration into groundwater	R5: Groundwater	

9. Sampling and Analysis Quality Plan

9.1 Data Quality Objectives

The DSI was devised with reference to the seven-step data quality objective process which is provided in Appendix B Schedule B2, NEPC (2013). The DQO process is outlined in Appendix D.

9.2 Soil Sampling Rationale

Based on the CSM and DQO the following sampling rationale was adopted.

A systematic sampling strategy based on NSW EPA *Contaminated Sites, Sampling Design Guidelines* (NSW EPA, 1995) (the current guidelines at the time of the investigation) and NSW EPA *Guidelines for Assessing Former Orchards and Market Gardens* (NSW EPA, 1995) to determine borehole locations which was adapted based on areas of access. Borehole locations are shown on Drawing 1, in Appendix A.

Table A of NSW EPA (1995) recommends a minimum of 30 sampling points for a site of 2 ha for site characterisation based on the detection of circular hot spots using a systemic grid sampling pattern. Given the preliminary nature of the due-diligence investigation / PSI and the availability of some data from previous test locations, a total of 15 test locations were positions across accessible areas of the site.

Soil samples were collected from each borehole from the near surface (or directly beneath the concrete slab/ asphalt hardstand), 0.5 m, 1.0 m and every 0.5 m thereafter, and changes in lithology or signs of contamination.

Four boreholes (MW101, MW103, MW111 and BH115) were extended to a depth of at least 3.0 m bgl and below the water table to allow for collection of ASS samples from each quadrant of the site.

The general sampling methods are described in the field work methodology, included in Appendix E.

9.3 Groundwater Sampling Rationale

In order to assess the current groundwater contamination status at the site and evaluate whether historical/ current/ off site land uses have impacted on groundwater, sampling from three monitoring wells (MW101, MW103 and MW111) was undertaken in September 2021 and November 2022.

The locations were selected based on the following rationale:

- MW111 is positioned hydraulically up-gradient of the site and provides data on the concentration of contaminants in groundwater entering the site; and
- MW101 and MW103 are positioned hydraulically down-gradient and will provide data on the concentration of contaminants in groundwater exiting the site. The results from MW101 and MW103 will be used to evaluate whether historical land uses in the northern portion (MW101) and southern portion (MW103) of the site have impacted on groundwater quality.

The general sampling methods are described in the field work methodology, included in Appendix F.

9.4 Creek Sampling

In order to assess the potential impact of the contaminants detected in groundwater on surface water, samples were collected at two locations in November 2022, SW1 located up-stream of the site and SW2, located downstream of the site.

The general sampling methods are described in the field work methodology, included in Appendix F.

10. Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in the current investigation are informed by the CSM (Section 8) which identified human and environmental receptors to potential contamination on the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic residential land use scenario based on the proposed development (residential). The derivation of the SAC is included in Appendix E and the adopted SAC are listed on the summary analytical results tables in Appendix H.

11. Results

11.1 Field Work Results

The borehole logs for this assessment are included in Appendix G. The logs recorded the following general sub-surface profile:

Concrete Slab:	In MW101, HA102, MW103, BH106, HA110, HA112 and BH113. The slab included 2-20 mm aggregate and was 50-160 mm thick.
Asphalt Hardstand:	To depths of between 0.02 m and 0.07 m bgl in BH109, MW111, BH114 and BH115.
Fill/ Roadbase:	Medium to coarse gravel, dark grey, with sand. Encountered to 0.13 m bgl in HA102.
Fill:	Fill comprising Silty Sand, Sand, Sandy Clay and Silty Clay with varying proportions of gravel (including igneous, ironstone, marble and sandstone) was encountered in all boreholes. Traces of anthropogenic material were observed in MW101 including plastic, brick fragments, wire, wood, glass, metal sheeting and an asbestos fibre cement fragment. Terracotta fragments were observed in HA104 and BH106 and brick fragments were observed in BH106. Possible ash was observed in MW111 and BH113. A hydrocarbon odour was observed in HA102. Fill was encountered to depths of between 0.3 m and 1.3 m bgl. HA104 was terminated in fill at 1.2 m bgl.
Sandy Clay and Clay:	Low to medium plasticity, dark brown and grey, with varying proportions of fine sand, fine to medium gravel and rootlets, alluvial. Encountered to 2.6 m bgl MW101. Encountered to borehole termination depths in HA102, HA105 and HA107.
Sand and Clayey Sand:	Medium grained, brown and grey, trace silt, alluvial. Encountered to depths of between 2.2 m and 3.5 m bgl in MW101, MW103, MW111 and BH115. Encountered to borehole termination depth in BH106, HA108, BH109, HA110, HA112, BH113 and BH114.

Silty Clay and Sandy Clay:	Low to medium then medium to high plasticity, dark brown, pale grey and orange, medium grained sand, trace rootlets and wood fragments (MW101 only), alluvial. Encountered to borehole termination depth in MW101, MW103, MW111 and BH115.

No other visual or olfactory evidence was observed / recorded in the investigation (e.g., staining, odours, free phase product) to suggest the presence of contamination within the soils or groundwater apart from the anthropogenic materials in MW101, HA104, BH106, MW111 and BH113 and the hydrocarbon odour in HA102.

The fill was generally underlain by natural alluvial sands, although layers of natural silty clay and sandy clay were encountered in some boreholes, particularly those which were extended to greater depths to allow for ASS sampling or installation of monitoring wells. Some of the natural soil layers, particularly beneath the water table along the north-east site boundary, had a grey colour that may be indicative of ASS.

Fill was recorded to variable depths across the site although the deepest fill was generally encountered along the north-east site boundary (to depths of up to 1.3 m bgl). The fill in the south-west portion of the site was generally the shallowest (to depths of between 0.3 and 0.65 m bgl). This is consistent with previous investigations undertaken at the site (DP, 2004a and 2004b).

Free groundwater was observed during drilling at depths between 1.5 m and 3.0 m bgl. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time. Groundwater monitoring wells were installed in three locations (MW101, MW103 and MW111). Groundwater levels were gauged on 1 September 2021 using an electronic oil / water interface meter prior to developing the wells and again on 8 September 2017 prior to sampling. The measured water levels prior to sampling are shown in Table 3.

Table 3: Summary of Groundwater Level Measurements on 8 September 2021

Well ID	Location of Monitoring Well	Ground Level * m (AHD)	SWL m (bgl)	SWL m (AHD)
8 September 2021				
MW101	Down-gradient	8.2	1.44	6.76
MW103	Down-gradient	7.7	2.17	5.53
MW111	Up-gradient	10.9	2.44	8.46
2 November 2021				
MW101	Down-gradient	8.2	1.2	7.0
MW103	Down-gradient	7.7	2.15	5.55
MW111	Up-gradient	10.9	1.78	9.12

Notes:
*Surveyed by dGPS
AHD – Australian Height Datum
SWL – standing water level
bgl – below ground level

Based on the groundwater level measurements, groundwater is interpreted to be flowing to the north-east towards Narrabeen Creek. This was expected given the topography and the location of the down-gradient discharge point (i.e., Narrabeen Creek).

The stabilised groundwater field parameters recorded prior to sampling are shown on the groundwater field sheets included in Appendix H and summarised below.

Physical parameters were measured whilst sampling (where possible) and are summarised in Table 4.

Table 4: Summary of Field Parameters (Groundwater and Surface Water)

Well / Sample ID	Temp. (ºC)	DO (ppm)	TDS (ppm)	EC* (µS/cm)	pH	Redox (mV)
8 September 2021						
MW101	16.6	0.09	261	336.6	5.85	-74
MW103	15.5	0.01	177	270.1	5.12	135.4
MW111	19.8	2.0	229	316.6	4.90	230
8 September 2021						
MW101	18.7	0.9		266.5	3.34	219
MW103	16.3	0.2		249.1	4.75	451
MW111	20.1	3.9		266.3	11.7	223.5

Notes:
*Calculated from TDS result

The dissolved oxygen levels indicated generally anoxic conditions. The pH was slightly acidic. The electrical conductivity values are typical of fresh water as would be expected of alluvial sediments. Redox potential (Eh) indicates slightly oxidising conditions in MW103 and MW111, and reducing conditions in MW101.

11.2 Laboratory Analytical Results

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

- Table 1: Summary of Results of Soil Analysis;
- Table 2: Summary of Waste Classification Assessment;
- Table 3: Summary of ASS Assessment; and
- Table 4: Summary of Results of Groundwater Analysis.

The laboratory certificates of analysis together with the chain of custody and sample receipt information are provided in Appendix J.

12. Discussion

12.1 Soils

The analytical results for BTEX, phenol, OCP, OPP, PCB and herbicides were below the laboratory practical quantitation limit (PQL) and therefore the SAC for all samples tested. Concentrations of metals, TRH, PAH and PFAS were above the PQL in some samples, but within the SAC with the following exceptions:

- TRH F3 fraction in HA104/0-0.1 (370 mg/kg), which marginally exceeded the ESL of 300 mg/kg; and
- Benzo(a)pyrene (B(a)P) in HA104/0-0.1 (1.6 mg/kg) which exceeded the ESL of 0.7 mg/kg.

Asbestos was detected in MW101 and HA104. In MW101, a fragment of bonded asbestos containing material (ACM) was collected from 0.4 m. Additionally, bonded ACM was detected in MW101/1.4-1.5. Fibrous asbestos and asbestos fines (FA and AF) were detected in MW101/0.4-0.5 (0.0209%) and HA104/0-0.1 (0.0022%), exceeding the HSL of 0.001%.

It is noted that the B(a)P ESL is a low reliability value. Higher reliability screening levels have been published in CRC CARE *Risk-based Management and Remediation Guidance for Benzo(a)pyrene* (CRC CARE, 2017). The high reliability value of 33 mg/kg (or ranging from 21 mg/kg to 135 mg/kg) for fresh B(a)P suggests that the concentrations of B(a)P detected in HA104 is unlikely to pose an unacceptable risk to terrestrial ecology and therefore the exceedance is not considered to be of concern.

The 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL) for TRH F3 fraction was calculated from all near surface samples to be 169 mg/kg and was below the ESL. The exceedance within HA104 is therefore not considered to be of concern. The 95% UCL was calculated using USEPA ProUCL and the output is included in Appendix H.

It is noted that an elevated concentrations of arsenic above the PQL but below the SAC was detected in BH113 (91 mg/kg). The HIL and EIL for arsenic is 100 mg/kg and it is considered that there may be some localised fill soils with concentrations of arsenic in exceedance of the SAC.

12.2 Preliminary Waste Classification

In order to assess the potential waste classification for fill soils to be removed as part of the proposed development, a preliminary waste classification of fill soils in the boreholes was undertaken.

The NSW EPA (2014) *Waste Classification Guidelines* contains a six step procedure for determining the type of waste and the waste classification. Part of the procedure, for materials not classified as special waste or pre-classified waste, is a comparison of analytical data initially against contaminant threshold (CT) values specific to a waste category. Alternatively, the data can be assessed against specific contaminant concentration (SCC) thresholds when used in conjunction with TCLP thresholds. The CT, SCC, and TCLP values relevant to this preliminary waste classification are shown in the Table 2, Appendix H.

The following Table 5 presents the results of the six step procedure outlined in NSW EPA (2014) for determining the type of waste and the waste classification. This process applies to the fill (including surface soils) at the site.

Table 5: Six Step Classification Procedure

Step	Comments	Rationale
1. Is the waste special waste?	Yes	Asbestos-containing materials (ACM) was observed in MW101. Asbestos was detected in fill by the analytical laboratory in MW101 between 0.4 and 1.5 m, HA104/0-0.1 m and BH4/0.5 m (from DP, 2004a).
2. Is the waste liquid waste?	No	The fill comprised a soil matrix.
3. Is the waste "pre-classified"?	No	The fill is not pre-classified with reference to NSW EPA (2014).
4. Does the waste possess hazardous waste characteristics?	No	The fill 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 2, Appendix H.
6. Is the waste putrescible or non-putrescible?	Non-putrescible	The fill does not contain materials considered to be putrescible [a].

Note: a 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 (NSW EPA, 2014).

As shown in Table 2 (Appendix 1), all contaminant concentrations for the analysed fill samples from the current investigation were within the CT1s for GSW with the exception of nickel in BH109/0.02-0.1 and B(a)P in HA104/0-0.1. It is noted that BH1/0.5 m from DP (2004a) also recorded a B(a)P concentration in exceedance of the CT1.

Additional TCLP extract and analysis was conducted on the two samples with CT1 exceedances to gain an understanding of the leachable characteristics of the nickel and B(a)P. The results indicated low leaching characteristics in both samples and were within the contaminant thresholds SCC1 and TCLP1 for GSW.

Given the presence of asbestos in fill soils in three locations (including BH4 from DP, 2004a), the preliminary classification for the fill material across the site is **General Solid Waste – Special Waste Asbestos (GSW-A).** Any fill soils that contain ASS will require treatment under an ASS management plan prior to off-site disposal to meet the GSW requirements.

Note: The information provided in this section does not constitute a formal waste classification for off-site disposal purposes. Should soils require off-site disposal a formal waste classification assessment, utilising the information in this report and from subsequent testing, must be undertaken and reported.

12.3 Acid Sulfate Soils

The action criteria for ASS were sourced from Acid Sulfate Soils Management Advisory Committee *Acid Sulfate Soils Assessment Guidelines*, 1998 (ASSMAC 1998) and is included in Table 3, Appendix H.

The initial screening results indicated:

- pH_F results were between 4.5 and 7.1;
- pH_{FOX} values were between 1.6 and 5.0; and
- pH_{FOX} minus pH_F values were <-1 in all samples collected from MW101 and MW103 and in some of the samples collected from MW111 and BH115. The pH_{FOX} minus pH_F values were highest in MW101 and MW103.

Additional Chromium Reducible Sulfur (SCr) testing undertaken on four 'worst case samples' based on the initial screening (MW101/0.9-1.0, MW101/1.9-2.0, MW103/3.4-3.5 and BH115/2.9-3.0). All samples exceeded the ASSMAC (1998) screening criteria for the disturbance of >1,000 tonnes of material and all samples taken below the water table exceeded the ASSMAC (1998) screening criteria for the disturbance of 1-1000 tonnes of material.

The laboratory results indicate that ASS is likely to be present in all soils below the water table near the creek (i.e., the north-east site boundary) and in some horizons further away from the creek. The results from MW101 also indicate the potential for some ASS in clayey fill at and immediately above the groundwater level observed on site during fieldwork.

12.4 Groundwater

September 2021 Results

The analytical results for TRH, BTEX, PAH, OPP, herbicides, PCB and VOC were below the laboratory practical quantitation limit (PQL) and therefore the SAC for all samples tested. Concentrations of metals, OCP and PFAS were above the PQL in some samples, but within the SAC with the following exceptions:

- Zinc in MW101 (32 µg/L), replicate sample BD1/20210908 (27 µg/L) MW103 (36 µg/L) and MW111 (23 µg/L), which exceeded the hardness corrected groundwater investigation level (GIL) of 15 µg/L.
- PFOS in MW101 (0.002 µg/L), MW103 (0.0025 µg/L) and MW111 (0.002 µg/L), which exceeded the GIL of 0.00023 µg/L.
- It is also noted that the concentration of DDE was 0.002 µg/L, DDT was 0.004 µg/L (which was below the GIL of 0.006 µg/L and DDD was 0.002 µg/L.

The concentrations of zinc and PFOS in the three monitoring wells are considered to be within the normal range of background levels for urbanised areas of Sydney. Furthermore, similar concentrations of zinc and PFOS were detected in up and down gradient wells, suggesting site use has not added significantly to concentrations of those contaminants.

MW101 is positioned hydraulically down-gradient indicating that the DDT (and DDD and DDE) detected in MW101 may have been sourced from the site.

Additionally, elevated concentrations of arsenic above the PQL but below the SAC were detected in the two hydraulically down-gradient wells (MW101 and MW103), indicating a possible on-site arsenic source and which is consistent with current and former land uses.

November 2022 Results

The November 2022 monitoring round including analysis of OCP, PFAS and heavy metals.

Concentrations of metals, PFAS were above the PQL in some samples, but within the SAC with the following exceptions:

- Total zinc in MW101 (250 µg/L) which exceeded the hardness corrected groundwater investigation level (GIL) of 15 µg/;
- Total copper in MW101 (14 µg/L) which exceeded GIL of 1.4 µg/L;
- Dissolved copper in MMW103 (2 µg/L) which exceeded GIL of 2µg/L;
- Total lead in MW101 (24 µg/L) which exceeded GIL of 3.4 µg/L; and
- PFOS in MW101 (0.0024 µg/L), MW103 (0.0021 µg/L) and MW111 (0.0058 µg/L), which exceeded the GIL of 0.00023 µg/L. The concentration of PFOS was largely the same as the previous round of testing. It is noted that the highest concentration was recorded in the up-gradient sample.

The concentrations of OCP were below the detection limit (noting this was above the SAC).

12.5 Surface Water

The November 2022 monitoring round including analysis of OCP, PFAS and heavy metals in the surface water.

Concentrations of metals, PFAS were above the PQL in some samples, but within the SAC with the following exceptions:

- Total zinc in SW1 (15 µg/L) and SW2 (16 µg/L) which exceeded the GIL of 8 µg/L;
- Total copper in SW1 (2 µg/L) and SW2 (2 µg/L) which exceeded GIL of 1.4 µg/L;
- Dissolved copper in SW1 (4 µg/L) and SW2 (2 µg/L) which exceeded GIL of 1.4 µg/L;
- Dissolved zinc in SW1 (14 µg/L) and SW2 (13 µg/L) which exceeded GIL of 8 µg/L; and
- PFOS in SW1 (0.0089 µg/L), and SW2 (0.0084 µg/L) which exceeded the GIL of 0.00023 µg/L. The concentration of in the creek was marginally higher in the creek than in the groundwater.

The concentration of OCP was below the detection limit (noting this was above the SAC).

There was no evidence that the concentrations of the contaminants tested increased from the up-stream to the down-stream locations.

12.6 Data Quality Assurance and Quality Control

The data quality assurance and quality control (QA / QC) results are included in Appendix J. Based on the results of the field QA and field and laboratory QC, and evaluation against the data quality indicators (DQI) it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

13. Revised Conceptual Site Model

The data collected for this DSI has generally confirmed that certain potential contaminant sources outlined in the CSM outlined in Section 8 pose a potentially complete pathway to the identified receptors whilst others do not. No other sources of contamination have been identified as a result of the testing results. Groundwater data suggests that some contaminants (i.e., arsenic and DDT) likely to be derived from historical site activities may have migrated to groundwater. The CSM is summarised in Table 6.

Given the preliminary nature of the investigation, the potential for some contaminants to be present has not been ruled out even if all analytical results were within the SAC.

Table 6: Updated Summary of Potentially Complete Exposure Pathways (Proposed Residential Subdivision Development)

Source	Transport Pathway	Receptor	Further Investigation and/ or Remediation Action Required
S1: Fill Metals (i.e., arsenic in soil at BH113 and in groundwater at MW101 and MW103), TRH, BTEX, PAH and asbestos (in MW101, HA104 and BH4, possibly more widespread given the presence of building rubble in fill). S3: Current site use as a plant nursey/ garden centre and S4: On site above ground storage tank (AST) for diesel and	P1: Ingestion and dermal contact P2: Inhalation of dust and/ or vapours	R1: Current site users [commercial] R2: Construction and maintenance workers R3: End site users [residential]	A detailed site Investigation for contamination (DSI) including further investigation of DDT and arsenic in groundwater and intrusive sampling in existing building footprints. Preparation of a remediation action plan (RAP) to address asbestos contamination and possible arsenic and/or DDT contamination hotspot(s). Options for the management of ACM impacted fill include cap and contain, remediation of impacted soil and off-site disposal.
	P2: Inhalation of dust and/ or vapours	R4: Adjacent site users [residential and commercial].	
	P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies	R5: Surface water [Narrabeen Creek]	

Source	Transport Pathway	Receptor	Further Investigation and/ or Remediation Action Required
chemical storage and two underground tanks Metals, TRH, BTEX, OCP (i.e., DDT in groundwater in MW101 and arsenic in groundwater in MW101 and MW103)	P5: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater	A formal waste classification assessment for any soils requiring off-site disposal. ASS impacted soils will require treatment prior to off-site disposal.
	P6: Contact with terrestrial ecology	R7: Terrestrial ecology	
S5: Site buildings and structures Asbestos, SMF, lead and PCB.	P1: Ingestion and dermal contact P2: Inhalation of dust and/ or vapours	R1: Current site users [commercial] R2: Construction and maintenance workers R3: End site users [residential]	A hazardous building materials assessment (HBMA) is required for the existing buildings/ structures. Hazardous materials will need to be removed in accordance with relevant legislation and guidelines prior to demolition and certified by a suitably qualified person.
S6: Off site, up-gradient commercial land use Metals and PFAS (i.e., zinc and PFOS detected in groundwater at MW101, MW103 and MW111).	P5: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater	The results of the groundwater analysis indicate that groundwater is impacted by zinc and PFOS likely associated with the urbanised nature of the area. Remediation is not required for these contaminants in groundwater.

14. Conclusions

A review of previous reports, available site history and an interview with site personnel indicated that the site was used for agricultural purposes since at least 1920, then for indoor plant propagation and then as a plant nursey (current use) since *circa* 1976. The surrounding land use is understood to have had a long history of horticulture use as well as residential and some commercial developments.

The SafeWork Records indicate that there was one AST and two USTs at the site however the detailed records were missing and therefore the location of these items is unknown. The SafeWork records provided indicate that the AST was used to store flammable gas.

Potential sources of contamination identified at the site included fill of unknown origin, the site's former agricultural and plant propagation (horticultural) land use, the site's current plant nursey / garden centre land use, former / disused underground petroleum storage tanks (USTs), an on-site diesel above ground storage tank (AST) and chemical storage, hazardous material from site buildings and off site up-gradient commercial land uses.

The investigation encountered fill at all test locations to depths of between 0.3 m and 1.3 m bgl. The deepest fill was generally encountered along the north-east site boundary and the shallowest fill was generally encountered in the south-west portion of the site. Signs of contamination identified in the fill included anthropogenic materials in some locations (plastic, brick, wire, wood, glass, metal sheeting, terracotta and ash), and an asbestos fibre cement fragment in MW101 and a hydrocarbon odour in HA102. The fill was underlain by natural alluvial sands, with layers of silty clay and sandy clay in some locations. These findings are consistent with DP (2004a) and DP (2004b).

The laboratory results for soils detected asbestos in fill two locations including bonded ACM (MW101 only) and potentially friable FA/AF (MW101 and HA104). It is noted that FA/AF was also detected in fill at one location from DP (2004a) (BH4). As such, it is expected that asbestos contamination may be present in fill across the site. This is expected to include 'hotspots' with high volumes of asbestos and fill with a lower frequency of asbestos.

Apart from asbestos, the majority of analytes in soil were within the SAC for the proposed residential land use. B(a)P and TRH F3 fraction were detected above the ESL however these exceedances were not considered to be of concern for the reasons discussed in Section 12.1. Additionally, an elevated concentrations of arsenic slightly below the SAC was detected in BH113 and it is considered that there may be some fill soils with concentrations of arsenic in exceedance of the SAC.

The laboratory results indicated that all samples testing exceeded the ASS screening criteria and that ASS is likely to be present in all soils below the water table near the creek (i.e., the north-east site boundary) and in some horizons further away from the creek.

The fill soils at the site have been given a preliminary classification of General Solid Waste - Special Waste Asbestos (GSW-A). Any fill soils that contain ASS will require treatment prior to off-site disposal to meet the GSW requirements.

The laboratory results for groundwater detected concentrations of heavy metals and PFOS in exceedance of the SAC in both the groundwater and surface water. Additionally, an elevated concentration of arsenic was detected in the two down-gradient wells It was noted that the concentrations of PFOS and heavy metals did not appear to increase in the surface water between the up-stream and down-stream test locations which indicates that it is unlikely that the creek was significantly impacted by the groundwater at the site.

15. Recommendations

Based on the results of this assessment it is considered that the site can be rendered suitable for the proposed development subject to remediation of contamination issues at the site.

It is recommended that:

- A detailed site investigation be undertaken to assess data gaps at the site, including further assessment for the recorded USTs, characterisation of contamination in the existing building footprints when access becomes available and further groundwater assessment.

- A remediation action plan (RAP) is required to address the identified asbestos contamination and the former USTs as well any other contamination identified during further investigation or site works. The RAP should include an Unexpected Finds Protocol (UFP) and an Asbestos Finds Protocol describing how unexpected contamination and asbestos finds identified during constructions works will be managed. A detailed asbestos assessment may be required to inform the remediation decision. A validation assessment report will be required to validate the success of the remediation works recommended by the RAP.
- A hazardous building materials (HBM) assessment will be required for existing site buildings / structures prior to demolition. Hazardous materials will need to be removed in accordance with relevant legislation and guidelines prior to demolition and certified by a suitably qualified person.
- An acid sulfate soil management plan (ASSMP) is required to provide the methods by which acid sulfate soil (ASS) at the site are to be managed during the works. Delineation of ASS is difficult, and it is recommended it be assumed that all soils from beneath the water table are ASS for planning purposes.
- All soil disposed off-site will require classification in accordance with the POEO Act prior to disposal. Based on the results of this investigation the soils have been given a preliminary classification of general solid waste - asbestos waste. All soils containing ASS will require treatment prior to disposal.

16. References

CRC CARE. (2017). *Risk-based Management and Remediation Guidance for Benzo(a)pyrene.* Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (1995). *Contaminated Sites, Sampling Design Guidelines.* NSW Environment Protection Authority.

NSW EPA. (2005). *Guidelines for Assessing Former Orchards and Market Gardens .* NSW Environment Protection Authority.

NSW EPA. (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* NSW Environment Protection Authority.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land.* Contaminated Land Guidelines: NSW Environment Protection Authority.

17. Limitations

Douglas Partners (DP) has prepared this report for this project at 20-22 MacPherson Street, Warriewood in accordance with DP's proposal dated 1 November 2021 and acceptance received from Emma Nesbitt of Green Kingswood Pty Ltd dated 24 October 2022. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Green Kingswood Pty Ltd 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.

The assessment of atypical safety hazards arising from this advice is restricted to environmental components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

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.

Asbestos has been detected by laboratory analysis in fill at three test locations sampled and analysed. Building demolition materials were also observed in fill, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos. Hazardous building materials (including asbestos) have been identified in site buildings / structures.

Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions or to budget constraints (as discussed above), or to parts of the site being inaccessible and not available for inspection / sampling, or to vegetation preventing visual inspection and reasonable access. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that asbestos is not present.

Douglas Partners Pty Ltd

Appendix A

Notes About this Report

Drawings

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 metromap.com (dated 06/12/2020)
2. Site Boundary and test locations shown are approximate only

Legend

- Site Boundary
- Borehole location (current investigation)
  - BH= borehole (drill rig)
  - MW= borehole/ groundwater monitoring well
  - HA= borehole (hand auger)
- Surface Water Sample
- Previous Borehole Location (2004)
- Previous CPT Location (2004)

0 25 50 75 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	BMN Properties Pty Ltd T/A Baz Family Trust		
OFFICE:	Sydney	DRAWN BY:	NLE / KDP
SCALE:	1:1000 @ A3	DATE:	25.11.2022

TITLE: **SAMPLE LOCATIONS**
Site Contamination Report
20-22 MacPherson St, Warriewood

PROJECT No:	207253.01
DRAWING No:	1
REVISION:	0

Appendix B

SafeWork NSW Records

Locked Bag 2906, Lisarow NSW 2252
Customer Experience 13 10 50
ABN 81 913 830 179 | www.safework.nsw.gov.au

Our Ref: D21/178846

22 December 2022

Ms Nerilee Edwards
Douglas Partners Pty Ltd
Nerilee.Edwards@douglaspartners.com.au

Dear Ms Edwards

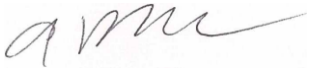
RE SITE: 20-22 Macpherson Street Warriewood NSW 2101

I refer to your site search request received by SafeWork NSW requesting information on Storage of Hazardous Chemicals for the above site.

Unfortunately, the file 35/022954 matching your request is marked as 'missing' as per the Repository records, however I have at least attached a screen shot of the historical SCID database indicating 2 underground and 1 above-ground tanks. There is unfortunately no site sketch in the SCID database.

For further information or if you have any questions, please call us on 13 10 50 or email licensing@safework.nsw.gov.au

Yours sincerely

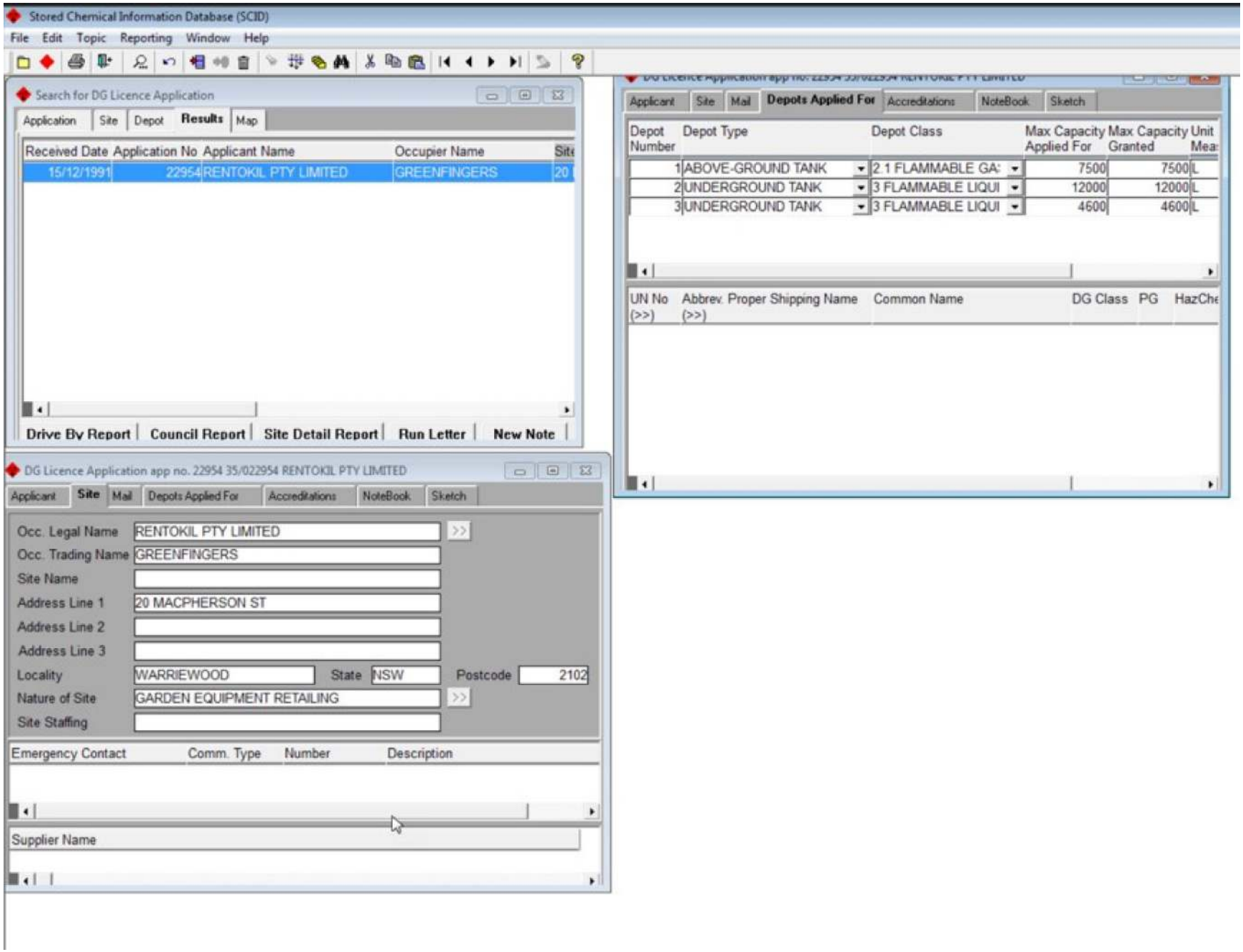


Gabriela Draper

Licensing Representative

Licensing and Funds, Better Regulation Division
SafeWork NSW | Customer Service
p 13 10 50
e licensing@safework.nsw.gov.au | www.safework.nsw.gov.au

Level 3, 32 Mann Street, Gosford, NSW 2250


Stored Chemical Information Database (SCID)
File Edit Topic Reporting Window Help
Search for DG Licence Application
Application Site Depot Results Map
Received Date Application No Applicant Name Occupier Name
15/12/1991 22954 RENTOKIL PTY LIMITED GREENFINGERS
Drive By Report Council Report Site Detail Report Run Letter New Note
DG Licence Application app no. 22954 35/022954 RENTOKIL PTY LIMITED
Applicant Site Mail Depots Applied For Accreditations NoteBook Sketch
Occ. Legal Name RENTOKIL PTY LIMITED
Occ. Trading Name GREENFINGERS
Site Name
Address Line 1 20 MACPHERSON ST
Address Line 2
Address Line 3
Locality WARRIEWOOD State NSW Postcode 2102
Nature of Site GARDEN EQUIPMENT RETAILING
Site Staffing
Emergency Contact Comm. Type Number Description
Supplier Name
Applicant Site Mail Depots Applied For Accreditations NoteBook Sketch
Depot Number Depot Type Depot Class Max Capacity Applied For Max Capacity Granted Unit Mea
1 ABOVE-GROUND TANK 2.1 FLAMMABLE GA 7500 7500 L
2 UNDERGROUND TANK 3 FLAMMABLE LIQUI 12000 12000 L
3 UNDERGROUND TANK 3 FLAMMABLE LIQUI 4600 4600 L
UN No (>>) Abbrev. Proper Shipping Name (>>) Common Name DG Class PG HazChe

Appendix C

Site Photographs

Photo 1 – Covered retail area

Photo 2 – Outdoor retail space

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **Preliminary Site Investigation for Contamination** **20-22 MacPherson Street, Warriewood**	PROJECT:	207253.01
		PLATE No:	1
		REV:	0
	CLIENT: BMN Properties Pty Ltd T/A Baz Family Trust	DATE:	30/09/21

Photo 3 – Inside of a plant nursery

Photo 4 – Inside of a plant nursery

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT:	207253.01
	Preliminary Site Investigation for Contamination	PLATE No:	2
	20-22 MacPherson Street, Warriewood	REV:	0
	CLIENT: BMN Properties Pty Ltd T/A Baz Family Trust	DATE:	30/09/21

Photo 5 – Asbestos danger sign inside plant nursery

Photo 6 – Exterior of plant nursey

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT:	207253.01
	Preliminary Site Investigation for Contamination	PLATE No:	3
	20-22 MacPherson Street, Warriewood	REV:	0
	CLIENT: BMN Properties Pty Ltd T/A Baz Family Trust	DATE:	30/09/21

Photo 7 – Chemical store-room in plant nursey[MN1]

Photo 8 – Carpark with plant nursery to the right (photograph taken from southern corner facing north-west)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT:	207253.01
	Preliminary Site Investigation for Contamination	PLATE No:	4
	20-22 MacPherson Street, Warriewood	REV:	0
	CLIENT: BMN Properties Pty Ltd T/A Baz Family Trust	DATE:	30/09/21

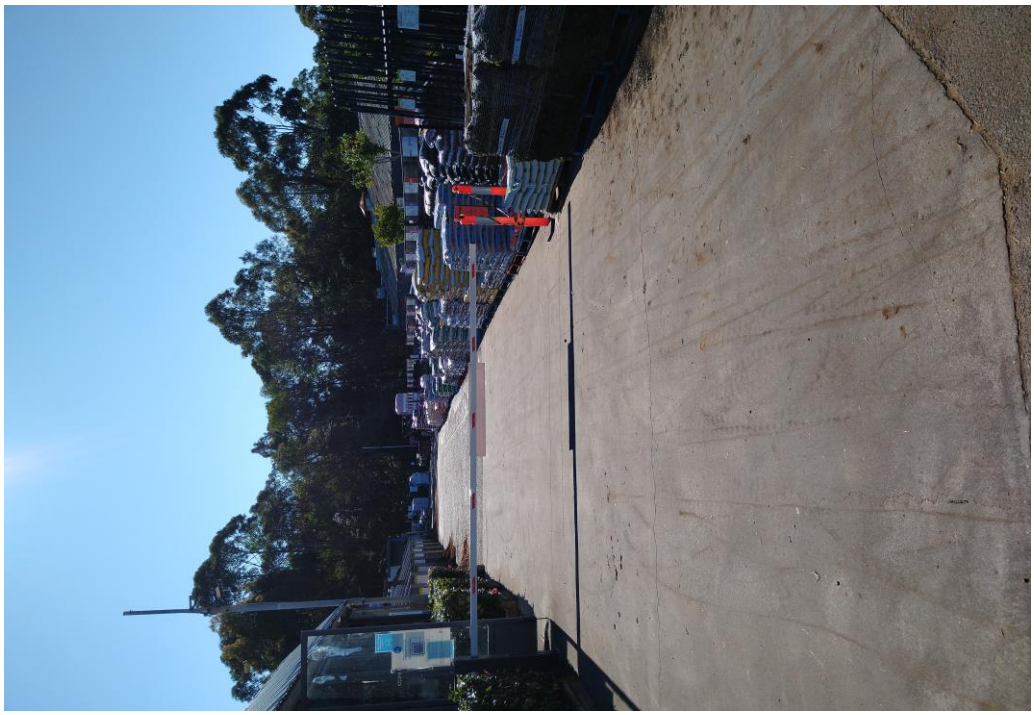


Photo 9 – Road running through middle of the site[MN2]

Photo 10 – Building material placed along the site road through the middle of the site (beside plant nursery)

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT:	207253.01
	Preliminary Site Investigation for Contamination	PLATE No:	5
	20-22 MacPherson Street, Warriewood	REV:	0
	CLIENT: BMN Properties Pty Ltd T/A Baz Family Trust	DATE:	30/09/21

Photo 11 – Storage of garden material along north site boundary

Photo 12 – Above-ground diesel tank in northern portion of site

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **Preliminary Site Investigation for Contamination** **20-22 MacPherson Street, Warriewood**	PROJECT:	207253.01
		PLATE No:	6
		REV:	0
	CLIENT: BMN Properties Pty Ltd T/A Baz Family Trust	DATE:	30/09/21

Photo 13 – Storage space in northern site corner within the main warehouse

Photo 14 – Hazardous Materials Storage Cupboard

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **Preliminary Site Investigation for Contamination** **20-22 MacPherson Street, Warriewood**	PROJECT:	207253.01
		PLATE No:	7
		REV:	0
	CLIENT: BMN Properties Pty Ltd T/A Baz Family Trust	DATE:	30/09/21

Photo 15 – Locker room with possible petroleum storage

Photo 16 – Chemical storage

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT:	207253.01
	Preliminary Site Investigation for Contamination	PLATE No:	8
	20-22 MacPherson Street, Warriewood	REV:	0
	CLIENT: BMN Properties Pty Ltd T/A Baz Family Trust	DATE:	30/09/21

Photo 17 – Petroleum jelly storage drum

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs** **Preliminary Site Investigation for Contamination** **20-22 MacPherson Street, Warriewood**	PROJECT: PLATE No: REV:	207253.01 9 0
	CLIENT: BMN Properties Pty Ltd T/A Baz Family Trust	DATE:	30/09/21

Appendix D

Data Quality Objectives

Appendix D
Data Quality Objectives
20-22 MacPherson Street, Warriewood

D1.0 Data Quality Objectives

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

Step	Summary
1: State the problem	The objective of the investigation is to assess the contamination status of the site with respect to the proposed land use. The report is being undertaken as the land is to be subdivided for a residential development. A preliminary conceptual site model (CSM) has been prepared (Section 8) for the proposed development. The project team consisted of experienced environmental engineers and scientists working in the roles of Project Principal, Project Reviewer, Project Manager, Field staff.
2: Identify the decisions / goal of the study	The site history has identified possible contaminating previous uses which are identified in the CSM (Section 8). The CSM identifies the associated contaminants of potential concern (COPC) and the likely impacted media. The site assessment criteria (SAC) for each of the COPC are detailed in Section 10. The decision is to establish whether or not the results fall below the SAC or whether or not the 95% upper confidence limit of the sample population falls below the SAC. On this basis, an assessment of the site's suitability from a contamination perspective and whether (or not) further assessment and / or remediation will be derived.
3: Identify the information inputs	Inputs to the investigation were the results of analysis of samples to measure the concentration of COPC identified in the CSM (Section 8) at the site using NATA accredited laboratories and methods, where possible. The SAC for each of the COPC are detailed in Section 10. A photoionization detector (PID) was used on-site to screen soils for VOC. PID readings were used to inform sample selection for laboratory analysis.
4: Define the study boundaries	The lateral boundaries of the investigation area are shown on Drawing 1, Appendix A. The vertical boundaries are to the extent of contamination impact as determined from the site history assessment and site observations. The assessment is limited to the timeframe over which the field investigation was undertaken. Constraints to the assessment are identified and discussed in the conclusions of the report, Section 14.
5: Develop the analytical approach (or decision rule)	The decision rule is to compare all analytical results with SAC (Section 10, based on NEPC (2013)). Where guideline values are absent, other sources of guideline values accepted by NEPC (2013) was adopted where possible.

Step	Summary
	Where a sample result exceeded the adopted criterion, a further site-specific assessment were made as to the risk posed by the presence of that contaminant(s). Initial comparisons were with individual results then, where required, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL) to assess potential risks posed by the site contamination. Quality control results are to be assessed according to their relative percent difference (RPD) values. For field duplicates, triplicates and laboratory results, RPDs should generally be below 30%; for field blanks and rinsates, results should be at or less than the limits of reporting (NEPC, 2013). The field and laboratory quality assurance assessment is included in Section 12.5.
6: Specify the performance or acceptance criteria	Baseline condition: Concentrations of contaminants at the site and/or statistical analysis of data (in line with NEPC (2013)) exceed human health and environmental SAC and pose a potentially unacceptable risk to receptors (null hypothesis). Alternative condition: Concentrations of contaminants at the site and statistical analysis of data (in line with NEPC (2013)) complies with human health and environmental SAC and as such, does not pose a potentially unacceptable risk to receptors (alternative hypothesis). Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it is assumed that the baseline condition is true. Uncertainty that may exist due to the above potential decision errors shall be mitigated as follows: • As well as a primary screening exercise, the use of the 95% UCL as per NEPC (2013) may be applied, i.e., 95% is the defined confidence level associated with the UCL on the geometric mean for contaminant data. The resultant 95%UCL shall subsequently be screened against the corresponding SAC. The statistical assessment was only able to be applied to certain datasets, such as those obtained via systematic sampling. Identification of areas for targeted sampling were via professional judgement and errors were not able to have a probability assigned to them.
7: Optimise the design for obtaining data	As the purpose of the sampling program is to assess for potential contamination across the site, the sampling program is reliant on professional judgement to identify and sample the potentially affected areas. Further details regarding the proposed sampling plan are presented in Section 9.

D1.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

Appendix E

Site Assessment Criteria

Appendix E
Site Assessment Criteria
20-22 MacPherson Street, Warriewood

E1.0 Introduction

E1.1 Guidelines

The following key guidelines were consulted for deriving the site assessment criteria (SAC):

- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013).
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater* (CRC CARE, 2011).
- HEPA *PFAS National Environmental Management Plan (NEMP)* (HEPA, 2020).
- ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018).
- NHMRC *Guidelines for Managing Risks In Recreational Water* (NHMRC, 2008).
- NHMRC, NRMMC *Australian Drinking Water Guidelines 6 2011, Version 3.2* (NHMRC, NRMMC, 2016).
- ANZECC *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000).

E1.2 General

The SAC applied in the current investigation are informed by the CSM which identified human and environmental receptors to potential contamination at the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The following inputs are relevant to the selection and/or derivation of the SAC:

- Land use: residential
  - Corresponding to land use category ‘A‘, residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry)).
- Soil type: sand and clay.

E2.0 Soils

E2.1 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table 1 and Table 2.

Table 1: Health Investigation Levels (mg/kg)

Contaminant	HIL-A
Metals	
Arsenic	100
Cadmium	20
Chromium (VI)	100
Copper	6000
Lead	300
Mercury (inorganic)	40
Manganese	3800
Nickel	400
Zinc	7400
PAH	
B(a)P TEQ	3
Total PAH	300
Phenols	
Phenol	3000
Pentachlorophenol	100
OCP	
DDT+DDE+DDD	240
Aldrin and dieldrin	6
Chlordane	50
Endosulfan	270
Endrin	10
Heptachlor	6
HCB	10
Methoxychlor	300

Contaminant	HIL-A
OPP	
Chlorpyrifos	160
PCB	
PCB	1
Herbicides	
2,4,5-T	600
2,4-D	900
MCPA	600
MCPB	600
Mecoprop	600
Picloram	4500
Other Pesticides	
Atrazine	320

Table 2: Health Screening Levels (mg/kg)

Contaminant	HSL-A&B	HSL-A&B
SAND	**0 m to <1 m**	**1 m to <2 m**
Benzene	0.5	0.5
Toluene	160	220
Ethylbenzene	55	NL
Xylenes	40	60
Naphthalene	3	NL
TRH F1	45	70
TRH F2	110	240
CLAY	**0 m to <1 m**	**1 m to <2 m**
Benzene	0.7	1
Toluene	480	NL
Ethylbenzene	NL	NL
Xylenes	110	310
Naphthalene	5	NL
TRH F1	50	90

Contaminant	HSL-A&B	HSL-A&B
TRH F2	280	NL

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} minus naphthalene
The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

The HSL for direct contact derived from CRC CARE (2011) are in Table 3.

Table 3: Health Screening Levels for Direct Contact (mg/kg)

Contaminant	DC HSL-A	DC HSL-IMW
Benzene	100	1100
Toluene	14 000	120 000
Ethylbenzene	4500	85 000
Xylenes	12 000	130 000
Naphthalene	1400	29 000
TRH F1	4400	82 000
TRH F2	3300	62 000
TRH F3	4500	85 000
TRH F4	6300	12 000

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} minus naphthalene
IMW intrusive maintenance worker

E2.2 Health Investigation Levels for Per- and Poly-Fluoroalkyl Substances in Soil

The laboratory analytical results for per- and poly-fluoroalkyl substances (PFAS) in soil have been assessed against HIL published in HEPA (2020). The HIL represent a nationally-agreed suite that should be used to inform site investigations. The HIL are intentionally conservative, and an exceedance of these criteria may not constitute a risk if other exposure pathways are controlled. An exceedance of the HIL should trigger further investigations, such as a site-specific risk assessment. At the time of this investigation, screening values were available only for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS).

The HIL derived from Table 2 of HEPA (2020) are in Table 4.

Table 4: Health Investigation Levels (mg/kg)

Contaminant	HIL-A
PFOS and PFHxS *	0.01
PFOA	0.1

Notes: * Includes PFOS only, PFHxS only and the sum of the two.

E2.3 Asbestos in Soil

The HSL for asbestos in soil are based on likely exposure levels for different scenarios published in NEPC (2013) for the following forms of asbestos:

- Bonded asbestos containing material (ACM); and
- Fibrous asbestos and asbestos fines (FA and AF).

The HSL are in Table 5.

Table 5: Health Screening Levels for Asbestos

Form of Asbestos	HSL-A
ACM	0.01%
FA and AF	0.001%
FA and AF and ACM	No visible asbestos for surface soil *

Notes: Surface soils defined as top 10 cm.
* Based on site observations at the sampling points and the analytical results of surface samples.

E2.4 Ecological Investigation Levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table 7 with inputs into their derivation shown in Table 6.

Table 6: Inputs to the Derivation of the Ecological Investigation Levels

Variable	Input	Rationale
Age of contaminants	“Aged” (>2 years)	Fill placed at site >2 years ago
pH	6.8	Average of 3 samples analysed
CEC	8.8 $cmol_c/kg$	Average of 3 samples analysed
Clay content	5 - 50%	Clay content input varied based on sample matrix
Traffic volumes	high	Site is adjacent to a trafficked road
State / Territory	NSW	Site is located in Warriewood, NSW

Table 7: Ecological Investigation Levels (mg/kg)

Contaminant	EIL-A-B-C
Metals	
Arsenic	100
Copper	190
Nickel	130
Chromium III	320 – 690*
Lead	1100
Zinc	440
PAH	
Naphthalene	170
OCP	
DDT	180

Notes: * Value ranges based on matrix of sample

E2.5 Ecological Screening Levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table 8.

Table 8: Ecological Screening Levels (mg/kg)

Contaminant	Soil Type	EIL-A-B-C
Benzene	Coarse	50
Toluene	Coarse	85
Ethylbenzene	Coarse	70
Xylenes	Coarse	105
TRH F1	Coarse/ Fine	180*
TRH F2	Coarse/ Fine	120*
TRH F3	Coarse	300
TRH F4	Coarse	2800
B(a)P	Coarse	0.7
Benzene	Fine	65
Toluene	Fine	105
Ethylbenzene	Fine	125

Contaminant	Soil Type	EIL-A-B-C
Xylenes	Fine	45
TRH F3	Fine	1300
TRH F4	Fine	5600
B(a)P	Fine	0.7

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

E2.6 Ecological Soil Guideline Values

The interim ecological soil guideline values (EGV) derived from Table3 of HEPA (2020) are in Table 9.

Table 9: Ecological Soil Guideline Values (mg/kg) – All Land Uses

Contaminant	Direct Exposure	Indirect Exposure
PFOS	1	0.01
PFOA	10	NC
PFHxS	NC	NC

Notes: NC no criterion

E2.7 Management Limits

In addition to appropriate consideration and application of the HSL and ESL, 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.

The adopted management limits are in Table 10.

Table 10: Management Limits (mg/kg)

Contaminant	Soil Type	ML-A-B-C
TRH F1	Coarse	700
TRH F2	Coarse	1000
TRH F3	Coarse	2500
TRH F4	Coarse	10 000
TRH F1	Fine	800
TRH F2	Fine	1000
TRH F3	Fine	3500
TRH F4	Fine	10 000

Notes: TRH F1 is TRH C_6-C_{10} including BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

E3.0 Groundwater

E3.1 Introduction

The groundwater investigation levels (GIL) used for interpretation of the groundwater data (as a Tier 1 assessment) have been selected based on the potential risks posed from contamination sourced from the site to receptors at or down-gradient of the site, as identified by the conceptual site model (CSM). The receptors, exposure points and pathways are summarised in Table 11.

Table 11: Summary of Potential Receptors and Potential Risks

Receptor	Location	Exposure Point	Exposure Pathway
Surface water aquatic ecosystem [Narrabeen Creek]	Down-gradient from site.	Receiving surface water body at the groundwater discharge point.	Exposure to contaminants.
Occupants of buildings	On site and down-gradient from site.	Enclosed buildings (existing commercial and proposed residential)	Inhalation of VOC (including TRH and BTEX) overlying VOC impacted groundwater via the vapour intrusion pathway.

The rationale for the selection of GIL is in Table 12.

Table 12: Groundwater Investigation Level Rationale

Receptor / Beneficial Use	GIL	Source	Comments / Rationale
Aquatic ecosystem	DGV	ANZG (2018)	Freshwater 99% LOP for bioaccumulative contaminants 95% LOP for non-bioaccumulative contaminants
Aquatic ecosystem	DGV	HEPA (2020)	Freshwater 99% LOP Screening values were only available for PFOS and PFOA at the time of this investigation.
Building occupants (vapour intrusion)	HSL	NEPC (2013)	2 m to <4 m
Recreational waters	GV	NHMRC (2008)	Based on the NHMRC (2018) values x10 to account for ingestion of water whilst undertaking recreational activities.

Notes: DGV default guideline value
% LOP percentage level of protection of species
HSL health screening level
GV guideline value
LTV long term value (up to 100 years)
STV short term value (up to 20 years)

E3.2 Groundwater Investigation Levels for Aquatic Ecosystems

The DGV for the protection of aquatic ecosystems derived from ANZG (2018) are in Table 13.

Table 13: Groundwater Investigation Levels for Protection of Aquatic Ecosystems (µg/L)

Contaminant	Fresh Water
Metals	
Arsenic	24 as As (III); 13 as As(V)
Cadmium	0.2
Chromium	3.3 as Cr(III); 1 as Cr(VI)
Copper	1.4
Lead	3.4
Mercury (inorganic)	0.06[a]
Nickel	1.1
Zinc	15[b]

Contaminant	Fresh Water
BTEX	
Benzene	600
Toluene	180
Ethylbenzene	80
m+p-xylene	72 as m-xylene; 200 as p-xylene
o-xylene	350
PAH	
B(a)P	0.1
Naphthalene	16
Anthracene	0.01
Fluoranthene	1
Phenanthrene	0.6
OCP	
Aldrin	0.001
alpha-chlordane	0.03
DDT	0.006
Dieldrin	0.01
Endosulfan I	0.03
Endosulfan II	0.03
gamma-Chlordane	0.03
Heptachlor	0.01
Hexachlorobenzene	0.05
Lindane	0.2
Methoxychlor	0.005
OPP	
Azinphos methyl (Guthion)	0.02
Chlorpyriphos	0.00004
Diazinon	0.01
Dimethoate	0.15
Fenitrothion	0.2
Malathion	0.05

Contaminant	Fresh Water
Parathion	0.004
VOC	
1,1,1-trichloroethane	270
tetrachloroethene	70
1,1,2-trichloroethylene	330
1,1-Dichloroethene	700
1,2-dichlorobenzene	160
1,3-dichlorobenzene	260
1,4-dichlorobenzene	60
carbon tetrachloride	240
Vinyl Chloride	100
Chloroform	770
Monochlorobenzene	55
Herbicides	
2,4,5-T	36
2,4-D [(2,4-Dichlorophenoxy) acetic acid]	280
Atrazine	13
Glyphosate	320
MCPA	1.4
Simazine	3.2
PCB	
Arochlor 1242	0.6
Arochlor 1254	0.03

Notes: Where the contaminant does not have a % LOP, the 'unknown' LOP has been adopted
a: 99% LOP adopted for bioaccumulative contaminants
b: adjusted based on average hardness of 62 mg $CaCO_3$/L

The DGV for the protection of aquatic ecosystems derived from HEPA (2020) are in Table 14.

Table 14: Groundwater Investigation Levels for Protection of Aquatic Ecosystems (µg/L)

Contaminant / LOP	Fresh Water DGV
PFOS 95% LOP	0.13
PFOA 95% LOP	220
PFOS 99% LOP	0.00023
PFOA 99% LOP	19

E3.3 Health Screening Levels for Vapour Intrusion

The HSL to evaluate potential vapour intrusion risks derived from NEPC (2013) are in Table 15

Table 15: Groundwater Health Screening Levels for Vapour Intrusion (µg/L)

Contaminant	HSL-A&B	Solubility Limit
SAND	**2 m to <4 m**	**-**
Benzene	800	59 000
Toluene	NL	61 000
Ethylbenzene	NL	3900
Xylenes	NL	21 000
Naphthalene	NL	170
TRH F1	1000	9000
TRH F2	1000	3000
CLAY	**2 m to <4 m**	**-**
Benzene	5000	59 000
Toluene	NL	61 000
Ethylbenzene	NL	3900
Xylenes	NL	21 000
Naphthalene	NL	170
TRH F1	NL	9000
TRH F2	NL	3000

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour that is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, 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, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

E3.4 Groundwater Investigation Levels for Recreational Water

The GV for recreational water derived from NHMRC (2008) are in Table 16.

Table 16: Groundwater Investigation Levels for Protection of Recreational Waters (µg/L)

Contaminant	Guideline Value
`Metals	
Arsenic	100
Cadmium	20
Chromium (total)	500
Copper	20000
Lead	100
Mercury (inorganic)	10
Nickel	200
BTEX	
Benzene	10
Toluene	8000
Ethylbenzene	3000
Total xylenes	6000
PAH	
Benzo(a)pyrene	0.1
OCP	
DDT	90
Heptachlor	3
Lindane	100
OPP	
Azinphos methyl (Guthion)	300
Bromophos-ethyl	100
Chlorpyriphos	100
Diazinon	40
Dichlorvos	50
Dimethoate	70
Ethion	40
Fenitrothion	70

Contaminant	Guideline Value
Malathion	700
Parathion	200
VOC	
tetrachloroethene	500
1,1-Dichloroethene	300
1,2-dichlorobenzene	15000
1,2-dichloroethane	30
1,4-dichlorobenzene	400
carbon tetrachloride	30
1,2-dibromoethane	10
hexachlorobutadiene	7
Bromomethane	10
Monochlorobenzene	3000
Styrene (vinylbenzene)	300
PFAS	
PFOA	10
Herbicides	
2,4,5-T	1000
2,4-D [(2,4-Dichlorophenoxy) acetic acid]	300
Atrazine	200
Fenoprop	100
Glyphosate	10000
Hexazinone	4000
MCPA	400
Simazine	200

E4.0 References

ANZECC. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australia and New Zealand Environment and Conservation Council.

ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Canberra, ACT: Australian and New Zealand Governments and Australian state and territory governments.

CRC CARE. (2011). *Health screening levels for petroleum hydrocarbons in soil and groundwater.* Parts 1 to 3, Technical Report No. 10: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

HEPA. (2020). *PFAS National Environmental Management Plan (NEMP).* Version 2.0: Heads of EPAs Australia and New Zealand and Australian Government Department of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NHMRC. (2008). *Guidelines for Managing Risks In Recreational Water.*

NHMRC, NRMMC. (2016). *Australian Drinking Water Guidelines 6 2011, Version 3.2.* Canberra: National Health and Medical Research Council, National Resource Management Ministerial Council.

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Appendix F

Field Work Methodology

Appendix F
Field Work Methodology
20-22 MacPherson Street, Warriewood

F1.0 Guidelines

The following key guidelines were consulted for the field work methodology:

- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013).
- HEPA *PFAS National Environmental Management Plan (NEMP)* (HEPA, 2020).

F2.0 Soil Sampling

Soil sampling is carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures comprise:

- Collect soil samples directly from the solid flight auger / hand auger;
- Transfer samples in laboratory-prepared glass jars with Teflon lined lids by hand, capping immediately and minimising headspace within the sample jar;
- Transfer samples in laboratory-prepared container (specific for PFAS) by hand, capping immediately and minimising headspace within the sample jar;
- Collect replicate samples in zip-lock bags for PID screening;
- Collect ~500 ml samples for FA and AF analysis;
- Collect ~40 g to 50 g samples in zip-lock bags for asbestos (presence / absence) analysis;
- Collect ~250 g samples in zip-lock bags for acid sulphate soil analysis;
- Wear a new disposable nitrile glove for each sample point thereby minimising potential for cross-contamination;
- Collect 10% replicate samples for QC purposes;
- Label sample containers with individual and unique identification details, including project number, sample location and sample depth (where applicable);
- Place samples into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain of custody documentation.

Reference was made to HEPA (2020) for requirements specific to PFAS.

F2.1 Field Testing

Field testing is carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures comprise:

PID Field Test

- Calibrate the PID with isobutylene gas at 100 ppm and with fresh air prior to commencement of each successive day's field work;
- Allow the headspace in the PID zip-lock bag samples to equilibrate; and
- Screen using the PID.

F3.0 Groundwater Sampling

F3.1 Monitoring Well Installation

Monitoring wells were constructed using class 18 uPVC machine slotted screen and blank sections with screw threaded joints. The screened section of each well was backfilled with a washed sand filter pack to approximately 0.5 m above the screened interval. Each well was completed with a hydrated bentonite plug of at least 0.5 m thick and then compacted drill cuttings to the surface, finished as a with lockable steel monument set in a concrete plinth.

F3.2 Monitoring Well Development

Groundwater monitoring wells were developed as soon as practicable following well installation. The purpose of well development was to remove sediments and / or drilling fluid introduced to the well during drilling and to facilitate connection of the monitoring well to the aquifer. The wells were developed by pumping / bailing to remove a minimum of five well volumes, or until dry.

F3.3 Groundwater Sampling

Groundwater sampling is carried out in accordance with DP standard operating procedures. Groundwater samples are collected using a low flow peristaltic pump via the micro-purge (minimal drawdown) method. The sampling method is described as follows:

- Measure the static water level using an electronic interface probe and record the thickness of any LNAPL (if encountered);
- Decontaminate the interface probe and cable between monitoring wells by rinsing in a diluted Liquinox solution and then rinsing in demineralised water;
- Lower the well-dedicated tubing into the well then clamped at a level estimated to be 1 m below the top of the water column (provided the depth of the pump is within the screened section) or to the approximate mid-point of the well screen;
- Set the pump at the lowest rate possible to minimise drawdown of the water column;

- Measure physical parameters by continuously passing the purged water through a flow cell; and
- Following stabilisation of the field parameters, collect samples in laboratory-prepared bottles minimising headspace within the sample bottle and cap immediately.

Decontaminate the interface probe and pump between monitoring wells by rinsing in a diluted Liquinox solution and then rinsing in demineralised water.

The general groundwater sample handling and management procedures comprise:

- Collect 10% replicate samples for QC purposes;
- Label sample containers with individual and unique identification details, including project number and sample location;
- Place the sample jars into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain of custody documentation.

F4.0 Surface Water Sampling

Surface water sampling was carried out in accordance with DP standard operating procedures. Sample collection was completed using a telescopic pole and decontaminated sample container. A new pair of disposable nitrile gloves was worn at each sample site to minimise potential for cross-contamination.

The sampling method is described as follows:

- Where possible, the sampling point was a reasonable distance from the edge;
- Immersion of the sample container to at least 0.2 m below the surface (where possible), with the opening pointing directly down to maintain a volume of air in the container, thereby avoiding the collection of any surface films;
- Once under the surface of the water, the mouth of the sample container was directed up stream so that gloved hands, sample container and/or sample collection device were downstream of the sample being collected;
- Use of sample location specific laboratory-prepared glass bottles without preservatives;
- The water samples were decanted into laboratory-prepared bottles, minimising headspace within the sample bottle and capped immediately. The sample location specific laboratory-prepared glass bottle was used as the sample container for the last sample from that location;
- Any excess water was disposed downstream of the sampling;
- Labelling of sample containers with individual and unique identification details, including project number and sample location;
- Placement of the sample jars into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain of custody documentation.

F5.0 References

HEPA. (2020). *PFAS National Environmental Management Plan (NEMP).* Version 2.0: Heads of EPAs Australia and New Zealand and Australian Government Department of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

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Appendix G

Borehole Logs

BOREHOLE LOG

CLIENT: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 8.2 AHD
EASTING: 341691
NORTHING: 6271481
DIP/AZIMUTH: 90°/--

BORE No: MW101
PROJECT No: 207253.01
DATE: 31/8/2021
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
8	0.12	CONCRETE SLAB: 2-20mm aggregate			0.12				Gatic cover Concrete
	0.2	FILL/Gravelly Silty SAND: fine to coarse, dark brown, trace plastic, brick fragments, wire and wood, moist		E	0.2				
		FILL/Sandy CLAY: low plasticity, dark brown, with silt, fine to coarse sand, trace fine to medium gravel, wire, wood, glass, metal sheeting and asbestos cement fragment**, w~PL		D**	0.4	ACM-01	'Sample ACM-01', fibre cement fragment		Bentonite 0.0-0.5m
				E	0.5				Blank pipe 0.0-1.0m
	1			E	0.9				
7	1.2	Sandy CLAY CL: low plasticity, dark brown, sandy clay with fine to medium sand and fine to medium gravel, w>PL, soft to firm, alluvial		E	1.0				
					1.4				
				E	1.5				
				S			0,1,1 N = 2		
	2			E	1.95				
6	2.0	SAND SP: medium, brown and dark grey, trace silt, wet, alluvial			2.0				
				E	2.4				Gravel 0.5-4.0m
	2.6				2.5				Machine slotted PVC screen 1.0-4.0m
		Silty CLAY CI: medium plasticity, dark brown, with sand, trace rootlets, w>PL, alluvial		E	2.9				
	3				3.0				
5		Below 3.1m: grey, with wood fragments		E	3.4				
					3.5				
				E	3.9				
4	4.0	Bore discontinued at 4.0m - Target depth reached			4.0				End cap

RIG: Multidrill **DRILLER:** Traccess **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Diatube Coring 0-0.12m, Spiral Flight Auger (TC-bit) to 4.0m

WATER OBSERVATIONS: Groundwater observed at 1.5m whilst augering. Groundwater recorded in groundwater well at 1.4m bgl on 8/09/2021.

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56. ** asbestos confirmed by laboratory analysis (Sample ACM-01, from 0.4m)

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 8.2 AHD
EASTING: 341707
NORTHING: 6271456
DIP/AZIMUTH: 90°/--

BORE No: HA102
PROJECT No: 207253.01
DATE: 8/9/2021
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
	0.1	CONCRETE SLAB		E	0.0				
	0.13	ROADBASE GRAVEL: medium to coarse, dark grey, with sand			0.13				
	0.35	FILL/Sandy CLAY: low plasticity, pale brown and red, fine to medium sand, trace fine to medium gravel including ironstone, w~PL							
		FILL/Silty CLAY: medium plasticity, dark grey, w~PL, slightly 'grease' odour		E*	0.5 0.6				
	0.8	Sandy CLAY CL: low plasticity, pale grey, fine sand, trace rootlets, w~PL-w>PL, alluvial		E	0.9				
	1.0	Bore discontinued at 1.0m - Target depth reached			1.0				

RIG: Hand Tools **DRILLER:** AS **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Hand Auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56. *Field replicate BD1/20210908 from 0.5-0.6m

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 7.7 AHD
EASTING: 341742
NORTHING: 6271443
DIP/AZIMUTH: 90°/--

BORE No: MW103
PROJECT No: 207253.01
DATE: 31/8/2021
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
	0.14	CONCRETE SLAB: 2-20mm aggregate							Gatic cover Concrete
		FILL/Sandy CLAY: low plasticity, brown, with fine to medium gravel, fine to coarse sand, w~Pl		E	0.14 0.2				
	0.3	FILL/SAND: medium, brown, trace fine gravel, moist		E	0.4 0.5				Backfill 0.0-0.5m
		Between 0.6-0.8m: with clay nodules		S			3,3,4 N = 7		Bentonite 0.5-1.0m Blank pipe 0.0-1.5m
	1			E	0.95 1.0				
	1.3	SAND: SP medium, pale brown and pale grey, moist, alluvial		E	1.4 1.5				
		At 1.5m: medium dense		S			2,2,3 N = 5		
	2	Below 2.0m: wet		E	1.95 2.0			▼	
				E	2.4 2.5				Gravel 1.0-4.0m
				E	2.9 3.0				Machine slotted PVC screen 1.5-4.0m
	3.5	Sandy CLAY CL-CI: low to medium plasticity, pale grey, medium sand, w>PL, alluvial		E	3.4 3.5				
	4			E	3.9 4.0				End cap
	4.0	Bore discontinued at 4.0m - Target depth reached							

RIG: Multidrill **DRILLER:** Traccess **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Diatube Coring 0-0.14m, Spiral Flight Auger (TC-bit) to 4.0m

WATER OBSERVATIONS: Groundwater observed at 2.0m whilst augering. Groundwater recorded in groundwater well at 2.2m bgl on 8/09/2021.

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56.

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 8.0 AHD
EASTING: 341714
NORTHING: 6271438
DIP/AZIMUTH: 90°/--

BORE No: HA104
PROJECT No: 207253.01
DATE: 1/9/2021
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
8	0.0	FILL/Gravelly SAND: fine to coarse, brown, fine to coarse gravel, trace clay and terracotta fragment, dry		E	0.0				
					0.1				
	0.2	FILL/Sandy CLAY: low to medium plasticity, grey, medium sand, trace fine gravel, w~PL							
				E*	0.4				
					0.5				
	0.8	FILL/CLAY: medium plasticity, grey, trace fine sand, w~PL, possibly natural							
7	1				1.0				1
				E					
	1.2	Bore discontinued at 1.2m - Hand auger refusal on clay			1.2				
6	2								2
5	3								3
4	4								4

RIG: Hand Tools **DRILLER:** AS **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Hand Auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56. *Field replicate BD4/20210901 from 0.4-0.5m

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 9.7 AHD
EASTING: 341636
NORTHING: 6271466
DIP/AZIMUTH: 90°/--

BORE No: HA105
PROJECT No: 207253.01
DATE: 1/9/2021
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
	0.01	GRAVEL: medium, subrounded to subangular		E	0.01				
		FILL/Clayey SAND: fine to coarse, grey, with medium angular gravel, trace roots, wet			0.1				
	0.4	FILL/Sandy CLAY: low plasticity, grey, medium sand, trace roots, w~PL, possibly natural		E*	0.4 0.5				
	0.6	CLAY CI: medium plasticity, grey, trace fine sand and roots, w~PL, alluvial							
				E	0.9				
	1.0	Bore discontinued at 1.0m - Target depth reached			1.0				

RIG: Hand Tools **DRILLER:** AS **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Hand Auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56. *Field replicate BD5/20210901 from 0.4-0.5m

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 8.3 AHD
EASTING: 341689
NORTHING: 6271428
DIP/AZIMUTH: 90°/--

BORE No: BH106
PROJECT No: 207253.01
DATE: 31/8/2021
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
	0.14	CONCRETE SLAB: 2-20mm aggregate							
		FILL/Sandy CLAY: low plasticity, dark grey, with silt, trace terracotta and brick, w~PL		E	0.14 0.25				
	0.35	SAND SP: medium, pale grey, moist, alluvial		E	0.5 0.6				
				E	0.9				
	1.0	Bore discontinued at 1.0m - Target depth reached			1.0				

RIG: Multidrill **DRILLER:** Traccess **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Diatube Coring 0-0.14m, Spiral Flight Auger (TC-bit) to 1.0m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56.

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 7.5 AHD
EASTING: 341736
NORTHING: 6271391
DIP/AZIMUTH: 90°/--

BORE No: HA107
PROJECT No: 207253.01
DATE: 1/9/2021
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
7	0.0	FILL/CLAY: low to medium plasticity, brown, with fine to coarse sand and fine gravel (to 0.2m depth), w~PL		E	0.0				
					0.1				
				E	0.4				
					0.5				
	0.8	Sandy CLAY CI: medium plasticity, grey, medium sand, w~PL, alluvial		E	0.9				
6	1.0	Bore discontinued at 1.0m - Hand auger refusal on clay			1.0				
5									
4									
3									

RIG: Hand Tools **DRILLER:** AS **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Hand Auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56.

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 7.9 AHD
EASTING: 341708
NORTHING: 6271374
DIP/AZIMUTH: 90°/--

BORE No: HA108
PROJECT No: 207253.01
DATE: 1/9/2021
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
7	0.0	FILL/Silty CLAY: medium plasticity, brown, trace fine to medium sand, w~PL with fine gravel to 0.1m depth		E	0.0 - 0.1				
	0.4	Clayey SAND SP: medium, pale grey, moist, alluvial		E	0.4 - 0.5				
	0.6	SAND SP: medium, pale grey, moist, alluvial		E	0.9				
6	1.0	Bore discontinued at 1.0m - Target depth reached			1.0				
5									
4									
3									

RIG: Hand Tools **DRILLER:** AS **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Hand Auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56.

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 9.3 AHD
EASTING: 341652
NORTHING: 6271400
DIP/AZIMUTH: 90°/--

BORE No: BH109
PROJECT No: 207253.01
DATE: 31/8/2021
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
	0.02	ASPHALTIC CONCRETE		E	0.02				
		FILL/Silty SAND: fine to coarse, brown, trace fine to medium igneous gravel and asphalt, dry			0.1				
9	0.3	SAND SP: medium, grey, moist, alluvial, possibly fill							
		Below 0.35m: pale grey		E*	0.4				
					0.5				
	0.7	SAND SP: medium, dark brown, trace silt, moist to wet, alluvial							
		Below 0.7m: wet		E	0.9				
8	1				1.0				1
				E	1.4				
					1.5				
	1.6	SAND SP: medium, pale grey, wet, alluvial						▼	
				E	1.9				
	2 2.0	Bore discontinued at 2.0m - Target depth reached			2.0				2
7	3								3
6	4								4
5									

RIG: Multidrill **DRILLER:** Traccess **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Spiral Flight Auger (TC-bit) 0.0-2.0m

WATER OBSERVATIONS: Groundwater observed at 1.7m whilst augering

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56. *Field replicate BD1/20210831 from 0.4-0.5m

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 10.4 AHD
EASTING: 341617
NORTHING: 6271416
DIP/AZIMUTH: 90°/--

BORE No: HA110
PROJECT No: 207253.01
DATE: 8/9/2021
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
10	0.13	CONCRETE SLAB			0.13				
		FILL/SAND: medium, dark grey, trace medium rounded gravel (marble), moist		E	0.2				
				E	0.4				
	0.5	SAND SP: medium, pale grey, moist, alluvial			0.5				
				E	0.9				
9	1.0	Bore discontinued at 1.0m - Target depth reached			1.0				
8									
7									
6									

RIG: Hand Tools **DRILLER:** AS **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Hand Auger

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56.

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 10.9 AHD
EASTING: 341600
NORTHING: 6271397
DIP/AZIMUTH: 90°/--

BORE No: MW111
PROJECT No: 207253.01
DATE: 31/8/2021
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
10	0.07	ASPHALTIC CONCRETE		E	0.07				Gatic cover Concrete
		FILL/Clayey SAND: fine to coarse, dark brown, with silt and fine to medium gravel, trace possible ash, moist			0.15				
	0.3	SAND SP: medium, grey and pale grey, dry to moist, alluvial		E*	0.4 0.5				
	0.7	SAND SP: medium, brown and pale grey, trace fine gravel and silt, moist, very loose, alluvial		E	0.9 1.0				Backfill 0.0-1.5m
1				S			1,1,2 N = 3		Blank pipe 0.0-2.5m
	1.5	Clayey SAND SP: medium, pale grey and orange, moist, loose, alluvial		E	1.45 1.5				Bentonite 1.5-2.0m
9				E	1.9 2.0				
2				S			3,3,4 N = 7		
				E	2.45 2.5				
8		Below 2.9m: wet		E	2.9 3.0			▼	
3	3.1	Sandy CLAY CL-CI: low to medium plasticity, pale grey, medium sand, w~PL to w>PL, alluvial		E	3.4 3.5				Gravel 2.0-5.0m
7				E	3.9 4.0				Machine slotted PVC screen 2.5-5.0m
4	4.2	Clayey SAND SP: medium, pale grey, wet, alluvial		E	4.4 4.5				
6				E	4.9				
5	5.0	Bore discontinued at 5.0m - Target depth reached			5.0				End cap

RIG: Multidrill **DRILLER:** Traccess **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Diatube Coring 0-0.07m, Spiral Flight Auger (TC-bit) to 5.0m

WATER OBSERVATIONS: Groundwater observed at 3.0m whilst augering. Groundwater recorded in groundwater well at 2.4m bgl on 8/09/2021.

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56. *Field replicate BD2/20210831 from 0.4-0.5m

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 10.0 AHD
EASTING: 341628
NORTHING: 6271380
DIP/AZIMUTH: 90°/--

BORE No: HA112
PROJECT No: 207253.01
DATE: 8/9/2021
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
10	0.12	CONCRETE							
		FILL/Sandy SILT: orange, fine to medium grained, poorly graded with clay, ironstone gravel and igneous gravel, moist		E*	0.13 0.23				
	0.5	FILL/SAND: fine to medium, dark grey, poorly graded, with igneous gravel, moist (possibly natural)		E	0.5 0.6				
	0.65	SAND SP: fine to medium, grey, poorly graded, moist, alluvial		E	0.9				
9	1 1.0	Bore discontinued at 1.0m - Target depth reached			1.0				1
8	2								2
7	3								3
6	4								4

RIG: Hand Tools **DRILLER:** AS **LOGGED:** ZW **CASING:** Uncased

TYPE OF BORING: Diatube Coring 0.0-0.12m, Hand Auger to 1.0m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56. *Field replicate BD2/20210908 from 0.13-0.23m

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 9.0 AHD
EASTING: 341655
NORTHING: 6271372
DIP/AZIMUTH: 90°/--

BORE No: BH113
PROJECT No: 207253.01
DATE: 31/8/2021
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
9	0.05	CONCRETE SLAB: 2-20mm aggregate		E	0.05				
		FILL/Gravelly SAND: fine to coarse, dark brown and grey, fine to medium igneous gravel, trace roots and possible ash, moist			0.15				
	0.3	FILL/SAND: medium, dark brown and grey, moist		E	0.4				
					0.5				
	0.65	SAND SP: medium, grey and pale grey, moist, alluvial							
8	1			E	0.9				1
					1.0				
		Below 1.2m: dark brown, moist to wet							
				E	1.4				
					1.5			▼	
	1.6	Clayey SAND SP: medium, pale grey, wet, alluvial							
7	2			E	1.9				2
	2.0	Bore discontinued at 2.0m - Target depth reached			2.0				
6	3								3
5	4								4

RIG: Multidrill **DRILLER:** Traccess **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Concrete coring 0.0-0.05m, Spiral Flight Auger (TC-bit) to 2.0m

WATER OBSERVATIONS: Groundwater observed at 1.6m whilst augering

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56.

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 9.1 AHD
EASTING: 341660
NORTHING: 6271340
DIP/AZIMUTH: 90°/--

BORE No: BH114
PROJECT No: 207253.01
DATE: 31/8/2021
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
	0.04	ASPHALTIC CONCRETE		E*	0.05				
		FILL/SAND: fine to coarse, brown, with fine to coarse igneous gravel, dry			0.15				
	0.3	SAND SP: medium, brown, pale brown and pale grey, trace fine gravel, dry to moist, alluvial, possibly fill		E	0.4				
		Below 0.6m: dark brown			0.5				
	0.8	SAND SP: medium, grey and pale grey, moist, alluvial		E	0.9				
	1				1.0				1
		Below 1.2m: brown, moist to wet		E	1.4				
	1.5	Bore discontinued at 1.5m - Target depth reached			1.5				
	2								2
	3								3
	4								4

RIG: Multidrill **DRILLER:** Traccess **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Spiral Flight Auger (TC-bit) 0.0-1.5m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56. *Field replicate BD3/20210831 from 0.05-0.15m

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: BMN Properties Pty Ltd T/A Baz Family Trust
PROJECT: Due Dilligence
LOCATION: 20-22 Macpherson Street, Warriewood

SURFACE LEVEL: 8.7 AHD
EASTING: 341678
NORTHING: 6271323
DIP/AZIMUTH: 90°/--

BORE No: BH115
PROJECT No: 207253.01
DATE: 31/8/2021
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
	0.05	ASPHALTIC CONCRETE		E	0.05				
		FILL/SAND: fine to coarse, brown and dark brown, trace fine to medium igneous and sandstone gravel, dry			0.15				
	0.3	FILL/SAND: fine to coarse, dark brown, with silt, trace roots, moist		E	0.4				
					0.5				
8	0.8	SAND SP: medium, grey, moist, alluvial		E	0.9				
	1				1.0				1
		Below 1.2m: dark brown, trace silt		E	1.4				
					1.5			▼	
7	1.6	SAND SP: medium, pale grey, wet, alluvial		E	1.9				
	2				2.0				2
	2.2	Sandy CLAY CL-CI: low to medium plasticity, brown, medium sand, w>PL, alluvial		E	2.4				
6					2.5				
	2.8	CLAY CI-CH: medium to high plasticity, grey, trace fine to medium sand, w>PL, alluvial		E	2.9				
	3	Bore discontinued at 3.0m - Target depth reached			3.0				3
5	4								4
4									

RIG: Multidrill **DRILLER:** Traccess **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Spiral Flight Auger (TC-bit) 0.0-3.0m

WATER OBSERVATIONS: Groundwater observed at 1.6m whilst augering

REMARKS: Location coordinates and levels provided by Craig & Rhodes to MGA2020 Zone 56.

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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Sampling Methods

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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

Douglas Partners

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

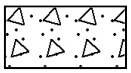
Symbols & Abbreviations

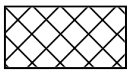
Graphic Symbols for Soil and Rock

General

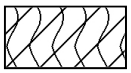

Asphalt

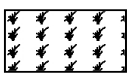

Road base

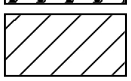

Concrete


Filling

Soils


Topsoil

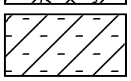

Peat


Clay


Silty clay

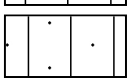

Sandy clay

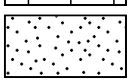

Gravelly clay

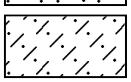

Shaly clay

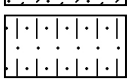

Silt


Clayey silt


Sandy silt

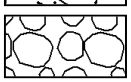

Sand


Clayey sand


Silty sand


Gravel

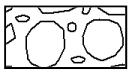

Sandy gravel


Cobbles, boulders

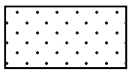

Talus

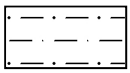
Sedimentary Rocks

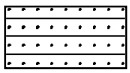

Boulder conglomerate

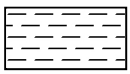

Conglomerate


Conglomeratic sandstone

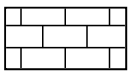

Sandstone


Siltstone

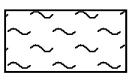

Laminite

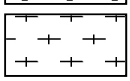

Mudstone, claystone, shale

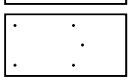

Coal


Limestone

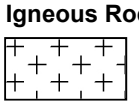
Metamorphic Rocks

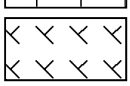

Slate, phyllite, schist

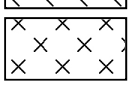

Gneiss

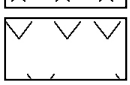

Quartzite

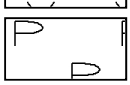
Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

Appendix H

Groundwater Field Sheets

Douglas Partners
Geotechnics | Environment | Groundwater

Groundwater (GW) Field Sheet

Project and Bore Installation Details	MW101					
Project Name / Site Location	Warriewood, 20-22 Macpherson Street				Project Number	207253.02
Well Construction Details	Well ID	MW101	Drilling Method		Hole Diameter (m)~	
	Well Depth (m bgl)		Screened (m bgl)		Stick Up (m)	
Survey Information	Easting		Northing		Elevation RL	
GW Level During Drilling		m bgl				
Contaminants/Comments						

Well Development Details					
Date / Time / Weather Conditions				Purged By	
Purge Method / Equipment					
Product observed / Thickness		mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-purge)		m bgl	Observed Well Depth		m bgl
Height of Water Column (H)		m bgl	Estimated Bore Volume*		L
GW Level (post-purge)		m bgl	Total Volume Purged**		L
Appearance/Comments					

Sampling Details					
Date / Time / Weather Conditions	4.11.22 / 9:40 / Overcast			Sampled By	TH
Sampling Method / Equipment	Peri Pump, LDPE + Silicon tubing, 45 um inline filter				
WQM Model	YSI ProDSS		WQM Calibration Date	25.5.22	
Product observed / Thickness	0	mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-micropurge)	1.20	m bgl	Observed Well Depth	3.92	m bgl
Height of Water Column	~~2.35~~ 2.72	m bgl	Estimated Bore Volume*	15	L
GW Level (post sample)	2.35	m bgl	Total Volume of Micro-Purged	10	L

Water Quality Parameters

Time	Cumulative Volume (L)	Temp (°C)	DO (mg/L)#	EC (µS or mS/cm)	pH	Redox (mV)	Turbidity^
Stabilisation Target (3 readings)		0.2	+/- 10%	+/- 5%	+/- 0.1	+/- 10 mV	+/- 10%
9:40	2	18.3	5.8	272.0	3.65	106.4	77
9:42	4	18.4	2.6	266.9	3.71	106.6	48
9:44	6	18.5	1.6	266.6	3.51	102.7	146
9:46	8	18.7	1.0	268.6	3.4	100.4	169
9:48	10	18.7	0.9	266.5	3.37	100.4	219
Notes:	# Considered stabilised if three DO values are less than 0.5 mg/L			^ Considered stabilised if three Turbidity values are less than 5 NTU			

Sample Details						
Sampling Depth (rationale)	3	m bgl,	Middle of water column			
Sample Observations (e.g. colour, sediment, sheen, odour)	Pale brown, no odour					
Sample ID	MW101					
QAQC Samples	Replicate		Triplicate		Other	
Sample Containers Quantity / Preservation / Filtration	Amber glass	1	Plastic		PFAS (no teflon)	1
	Metals (F/UF) (HNO3)	2	Phenols/COD/NH3 (H2SO4)		Vials (HCl)	
	Ferrous/Ferric Iron (HCl)		Cyanides/Chromium (NaOH)		Other	
Comments	pH probe appeared faulty					

*Estimated Well Volume = H * F	Std. Drilling Diameter (m)~	NMLC (0.075)	HQ (0.096)	PQ (0.1226)	SFA (0.125)	HFA (0.194)
**Purge Target: min. 3 well volumes	Factor (F):	2.8	3.7	5.2	5.4	11.1

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Geotechnics / Environment / Groundwater

Groundwater (GW) Field Sheet

Project and Bore Installation Details	MW103					
Project Name / Site Location	Warriewood, 20-22 Macpherson St				Project Number	207213.02
Well Construction Details	Well ID	MW103	Drilling Method		Hole Diameter (m)~	
	Well Depth (m bgl)		Screened (m bgl)		Stick Up (m)	
Survey Information	Easting		Northing		Elevation RL	
GW Level During Drilling		m bgl				
Contaminants/Comments						

Well Development Details					
Date / Time / Weather Conditions				Purged By	
Purge Method / Equipment					
Product observed / Thickness		mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-purge)		m bgl	Observed Well Depth		m bgl
Height of Water Column (H)		m bgl	Estimated Bore Volume*		L
GW Level (post-purge)		m bgl	Total Volume Purged**		L
Appearance/Comments					

Sampling Details					
Date / Time / Weather Conditions	11.12.22 (8:50 / Overcast			Sampled By	TG
Sampling Method / Equipment	Peri pump, LDPE + Silicon tubing, HT Mon inline filter				
WQM Model	YSI ProDSS		WQM Calibration Date	25.5.22	
Product observed / Thickness	0	mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-micropurge)	2.15	m bgl	Observed Well Depth	3.95	m bgl
Height of Water Column	1.8	m bgl	Estimated Bore Volume*	10	L
GW Level (post sample)	2.27	m bgl	Total Volume of Micro-Purged	18	L

Water Quality Parameters

Time	Cumulative Volume (L)	Temp (°C)	DO (mg/L)#	EC (µS or mS/cm)	pH	Redox (mV)	Turbidity^
Stabilisation Target (3 readings)		0.2	+/- 10%	+/- 5%	+/- 0.1	+/- 10 mV	+/- 10%
8:56	2	16.5	10.5	307.3	15.19	123	235
8:58	4	16.4	3.3	252.7	14.32	121.6	279
9:00	6	16.4	2.0	301.0	14.36	121	480
9:02	8	16.3	1.2	249.8	14.30	119.8	768
9:05	10	16.5	9.3	253.1	6.25	131.4	51
9:17	12	16.3	2.7	250.7	4.91	130.4	80
9:19	14	16.3	1.3	249.9	4.66	131.6	160
9:21	16	16.3	0.6	249.4	4.66	132.5	313
9:23	18	16.3	0.2	249.1	4.75	132.0	451
Notes:	# Considered stabilised if three DO values are less than 0.5 mg/L			^ Considered stabilised if three Turbidity values are less than 5 NTU			

Sample Details						
Sampling Depth (rationale)	3	m bgl,	Middle of water column			
Sample Observations (e.g. colour, sediment, sheen, odour)	Pale brown, no odour					
Sample ID	MW103					
QAQC Samples	Replicate		Triplicate		Other	
Sample Containers Quantity / Preservation / Filtration	Amber glass	1	Plastic		PFAS (no teflon)	1
	Metals (F/UF) (HNO3)	2	Phenols/COD/NH3 (H2SO4)		Vials (HCl)	
	Ferrous/Ferric Iron (HCl)		Cyanides/Chromium (NaOH)		Other	
Comments						

*Estimated Well Volume = H * F	Std. Drilling Diameter (m)~	NMLC (0.075)	HQ (0.096)	PQ (0.1226)	SFA (0.125)	HFA (0.194)
**Purge Target: min. 3 well volumes	Factor (F):	2.8	3.7	5.2	5.4	11.1

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Groundwater (GW) Field Sheet

Project and Bore Installation Details	MW 111					
Project Name / Site Location	Warriewood, 20-22 Macpherson Street				Project Number	207253.02
Well Construction Details	Well ID MW111		Drilling Method		Hole Diameter (m)~	
	Well Depth (m bgl)		Screened (m bgl)		Stick Up (m)	
Survey Information	Easting		Northing		Elevation RL	
GW Level During Drilling		m bgl				
Contaminants/Comments						

Well Development Details					
Date / Time / Weather Conditions				Purged By	
Purge Method / Equipment					
Product observed / Thickness		mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-purge)		m bgl	Observed Well Depth		m bgl
Height of Water Column (H)		m bgl	Estimated Bore Volume*		L
GW Level (post-purge)		m bgl	Total Volume Purged**		L
Appearance/Comments					

Sampling Details				
Date / Time / Weather Conditions	4.11.22 / 18:15 / Overcast		Sampled By	TG
Sampling Method / Equipment	Peri Pump, LDPE tubing + Silicon tubing, 45µm inline filter			
WQM Model	YSI Pro DSS	WQM Calibration Date	25.5.22	
Product observed / Thickness	0 mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-micropurge)	1.78 m bgl	Observed Well Depth	5.4	m bgl
Height of Water Column	3.62 m bgl	Estimated Bore Volume*	20	L
GW Level (post sample)	1.97 m bgl	Total Volume of Micro-Purged	10	L

Water Quality Parameters

Time	Cumulative Volume (L)	Temp (°C)	DO (mg/L)#	EC (µS or mS/cm)	pH	Redox (mV)	Turbidity^
Stabilisation Target (3 readings)		0.2	+/- 10%	+/- 5%	+/- 0.1	+/- 10 mV	+/- 10%
8:15	2	20.1	6.2%	268.7	6.88	201.5	443
8:17	4	20.1	6.3 ~~6.34~~	267.0	11.3	212.5	790
8:19	6	20.1	5.3%	294.3	11.47	217.3	600
8:21	8	20.1	4.7	266.4	11.22	220.9	720
8:23	10	20.1	3.9%	266.3	11.05	223.5	600
Notes:	# Considered stabilised if three DO values are less than 0.5 mg/L			^ Considered stabilised if three Turbidity values are less than 5 NTU			

Sample Details						
Sampling Depth (rationale)	3	m bgl,	Middle of water column			
Sample Observations (e.g. colour, sediment, sheen, odour)	Clear, colorless, no odour					
Sample ID	MW 111					
QAQC Samples	Replicate		Triplicate		Other	
Sample Containers Quantity / Preservation / Filtration	Amber glass	1	Plastic		PFAS (no teflon)	1
	Metals (F/UF) (HNO3)	2	Phenols/COD/NH3 (H2SO4)		Vials (HCl)	
	Ferrous/Ferric Iron (HCl)		Cyanides/Chromium (NaOH)		Other	
Comments	pH probe appeared faulty					

*Estimated Well Volume = H * F	Std. Drilling Diameter (m)~	NMLC (0.075)	HQ (0.096)	PQ (0.1226)	SFA (0.125)	HFA (0.194)
**Purge Target: min. 3 well volumes	Factor (F):	2.8	3.7	5.2	5.4	11.1

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Surface Water Samples.

Sample SW1 - Taken approximately 90 m to the ~~East~~ NW of the site boundary in Narrabeen Creek (shown on map). Sampled using grab method with telescopic sampler.
2x Metals (F & UF), 1x amber glass, 1x plastic & 1x PFAS.
Sample, colourless & odourless

Sample SW2 - Taken approximately 3 metres to the East of the site boundary in Narrabeen Creek (shown on drawing).
Sampled using grab method with telescopic sampler.
2x Metals (F & UF), 1x amber glass, 1x plastic & 1x PFAS.
Sample - colourless & odourless.

Comps By / /	Checked By / /	Approved By / /

LOCALITY MAP

Notes:
1. Basemap from metromap.com (dated 06/12/2020)
2. Site Boundary and test locations shown are approximate only

Legend

- Site Boundary
- Borehole location (current investigation)
  - BH= borehole (drill rig)
  - MW= borehole/ groundwater monitoring well
  - HA= borehole (hand auger)
- Previous Borehole Location (2004)
- Previous CPT Location (2004)

0 25 50 75 m

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CLIENT:	BMN Properties Pty Ltd T/A Baz Family Trust		
OFFICE:	Sydney	DRAWN BY:	NLE
SCALE:	1:1000 @ A3	DATE:	20.09.2021

TITLE: **SAMPLE LOCATIONS**
Due Diligence Investigation
20-22 MacPherson St, Warriewood

N

PROJECT No:	207253.01
DRAWING No:	1
REVISION:	0

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Groundwater Field Sheet

Project and Bore Installation Details	
Bore / Standpipe ID:	103
Project Name:	Warriewood Due Diligence
Project Number:	207253.01
Site Location:	
Bore GPS Co-ord:	
Installation Date:	
GW Level (during drilling):	m bgl
Well Depth:	m bgl
Screened Interval:	m bgl
Contaminants/Comments:	

Bore Development Details	
Date/Time:	01/09/21 07:45
Purged By:	AS
GW Level (pre-purge):	2.35 m bgl
Observed Well Depth:	4.0 m bgl
PSH observed:	Yes / (No) (interface / (visual)). Thickness if observed:
Estimated Bore Volume:	~12 L
Total Volume Purged:	50 (target: no drill mud, min 3 well vol. or dry)
GW Level (post-purge):	2.40 m bgl
Equipment:	water whistle. PFAS free twister pump, bailer

Micropurge and Sampling Details	
Date/Time:	
Sampled By:	
Weather Conditions:	
GW Level (pre-purge):	m bgl
Observed Well Depth:	m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Estimated Bore Volume:	L
GW Level (post sample):	m bgl
Total Volume Purged:	L
Equipment:	

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	***0.1° C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	m bgl,	
Sample Appearance (e.g. colour, siltiness, odour):		
Sample ID:		
QA/QC Samples:		
Sampling Containers and filtration:		
Comments / Observations:		

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Groundwater Field Sheet

Project and Bore Installation Details

Bore / Standpipe ID:	101
Project Name:	Warriewood Due Diligence
Project Number:	207253.01
Site Location:	
Bore GPS Co-ord:	
Installation Date:	
GW Level (during drilling):	m bgl
Well Depth:	m bgl
Screened Interval:	m bgl
Contaminants/Comments:	

Bore Development Details

Date/Time:	01109121 08:45
Purged By:	AS
GW Level (pre-purge):	1.7 m bgl
Observed Well Depth:	4 m bgl
PSH observed:	Yes / (No) (interface / (visual)). Thickness if observed:
Estimated Bore Volume:	17 L
Total Volume Purged:	~15 (target: no drill mud, min 3 well vol. or dry) (well dry)
GW Level (post-purge):	dry m bgl
Equipment:	water whistle, PFAS free pump, bailer

Micropurge and Sampling Details

Date/Time:	
Sampled By:	
Weather Conditions:	
GW Level (pre-purge):	m bgl
Observed Well Depth:	m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Estimated Bore Volume:	L
GW Level (post sample):	m bgl
Total Volume Purged:	L
Equipment:	

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	***0.1° C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	m bgl,	
Sample Appearance (e.g. colour, siltiness, odour):		
Sample ID:		
QA/QC Samples:		
Sampling Containers and filtration:		
Comments / Observations:		

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Groundwater Field Sheet

Project and Bore Installation Details	
Bore / Standpipe ID:	111
Project Name:	Warriewood Due Diligence
Project Number:	207253.01
Site Location:	
Bore GPS Co-ord:	
Installation Date:	
GW Level (during drilling):	m bgl
Well Depth:	m bgl
Screened Interval:	m bgl
Contaminants/Comments:	

Bore Development Details	
Date/Time:	01/04/21 09:30
Purged By:	AS
GW Level (pre-purge):	2.52 m bgl
Observed Well Depth:	5 m bgl
PSH observed:	Yes / (No) (interface / (visual)). Thickness if observed:
Estimated Bore Volume:	18 L
Total Volume Purged:	~ 25 (target: no drill mud, min 3 well vol. or dry) well dry ; slow recharging
GW Level (post-purge):	dry m bgl
Equipment:	water whistle. PFAS free twister pump. bailer

Micropurge and Sampling Details	
Date/Time:	
Sampled By:	
Weather Conditions:	
GW Level (pre-purge):	m bgl
Observed Well Depth:	m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Estimated Bore Volume:	L
GW Level (post sample):	m bgl
Total Volume Purged:	L
Equipment:	

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	***0.1° C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):		m bgl,	
Sample Appearance (e.g. colour, siltiness, odour):			
Sample ID:			
QA/QC Samples:			
Sampling Containers and filtration:			
Comments / Observations:			

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Groundwater Field Sheet

Bore Volume = casing volume + filter pack volume
= $\pi h_c d_c^2/4 + n(\pi h_f d_f^2/4 - \pi h_f d_c^2/4)$
Where: $\pi = 3.14$
n = porosity (0.3 for most filter pack material)
h_c = height of water column
d_c = diameter of annulus
h_f = length of filter pack
d_c = diameter of casing
Bore Vol Normally: 7.2*h

Project and Bore Installation Details	
Bore / Standpipe ID:	BH103
Project Name:	
Project Number:	207253.01
Site Location:	
Bore GPS Co-ord:	
Installation Date:	
GW Level (during drilling):	- m bgl
Well Depth:	m bgl
Screened Interval:	m bgl
Contaminants/Comments:	-

Bore Development Details	
Date/Time:	
Purged By:	
GW Level (pre-purge):	m bgl
GW Level (post-purge):	m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Observed Well Depth:	m bgl
Estimated Bore Volume:	L
Total Volume Purged:	(target: no drill mud, min 3 well vol. or dry)
Equipment:	

Micropurge and Sampling Details	
Date/Time:	8/9/21
Sampled By:	AS
Weather Conditions:	clear, warm
GW Level (pre-purge):	2.17 m bgl
GW Level (post sample):	2.30 m bgl
PSH observed:	Yes / No (interface / visual). Thickness if observed:
Observed Well Depth:	4.15 m bgl
Estimated Bore Volume:	14.2 L
Total Volume Purged:	~10 L
Equipment:	peripump, interface metre, YSI

Water Quality Parameters (TDS)

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Turbidity	Redox (mV)
Stabilisation Criteria (3 readings)	**0.1°C**	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10%**	**+/- 10 mV**
10:48	15.6	2.63	276.6	5.17	217	144.9
10:49	15.5	0.52	270.9	5.14	214	139.7
10:50	15.5	0.25	267.8	5.13	354	137.7
10:51	15.5	0.15	269.0	5.13	260	136.6
10:52	15.5	0.09	267.3	5.12	230	137.3
10:53	15.5	0.05	270.6	5.12	213	136.4
10:54	15.5	0.03	270.3	5.12	200	131.0
10:55	15.5	0.01	270.1	5.12	177	135.4
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	3.5 m bgl,
Sample Appearance (e.g. colour, siltiness, odour):	brown, silty, odourless pale brown
Sample ID:	BH103
QA/QC Samples:	-
Sampling Containers and filtration:	4x 500mL amber 4x vials 1x microbes 2x 250mL ~~unfiltered~~ 1x metals (filtered) unpreserved
Comments / Observations:	

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BH101 - GW Sampling Sheet AS

- 08/09/21 09:00
- GW level (prepurge): 1.44m
  GW level (post purge):
  well depth: 3.85
  est vol: 17
  vol purged: ~5
- No PAH observed
- equipment: peri pump, int metre YSI

Water Quality Parameters

Time	Temp °C	DO (mg/L)	EC (µs)	pH	TDS	Redox
9:19	16.1	4.25	394.9	5.84	303	50.8
9:20	16.6	0.99	351.6	5.86	271	32.9
9:21	16.6	0.39	346.4	5.84	266	-22.1
9:22	16.7	0.25	338.8	5.83	261	-58.6
9:23	16.7	0.17	335.9	5.83	260	-72.3
9:24	16.6	0.12	335.9	5.84	260	-72.9
9:25	16.6	0.09	336.6	5.85	261	-74

- containers same as BH103
- sampling depth 2.5m then 3.8m (well ran dry)
- sample appearance: pale brown - pale yellow, sulfuric odour

*

- QA/QC - BD1/20210908 *

Comps By / / | Checked By / / | Approved By / /

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- BH111 - GW Sampling Sheet AS
- 08/09/21 11:30
- GW level (pre purge): 2.44
  GW level (post purge) 2.60
  well depth: 5.15
  est volume: ~19.5L
  vol purged: ~10L
- No PAH observed
- Equipment: peripump. YSI. int metre

Water Quality Parameters

Time	Temp °C	DO (mg/L)	EC (µS)	pH	TDS	Redox
11.30	19.9	2.82	327	4.92	234	213
11.31	19.9	2.10	316.5	4.91	231	217
11.32	19.9	1.89	319.1	4.89	230	223.5
11.33	19.8	2.07	317.7	4.89	229	226.2
11.34	19.9	2.04	316.9	4.89	228.3	229.1
11.35	19.8	2.0	316.6	4.9	229	230

- containers: Same as BH203
- sample depth: 3.5m
- sample appearance: pale grey, odorless.

Comps By / /	Checked By / /	Approved By / /

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Groundwater (GW) Field Sheet

Project and Bore Installation Details	MW101					
Project Name / Site Location	Warriewood, 20-22 Macpherson Street				Project Number	207253.02
Well Construction Details	Well ID	MW101	Drilling Method		Hole Diameter (m)~	
	Well Depth (m bgl)		Screened (m bgl)		Stick Up (m)	
Survey Information	Easting		Northing		Elevation RL	
GW Level During Drilling		m bgl				
Contaminants/Comments						

Well Development Details					
Date / Time / Weather Conditions				Purged By	
Purge Method / Equipment					
Product observed / Thickness		mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-purge)		m bgl	Observed Well Depth		m bgl
Height of Water Column (H)		m bgl	Estimated Bore Volume*		L
GW Level (post-purge)		m bgl	Total Volume Purged**		L
Appearance/Comments					

Sampling Details					
Date / Time / Weather Conditions	4.11.22 / 9:40 / Overcast			Sampled By	TH
Sampling Method / Equipment	Peri Pump, LDPE + Silicon tubing, 45 um inline filter				
WQM Model	YSI ProDSS		WQM Calibration Date	25.5.22	
Product observed / Thickness	0	mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-micropurge)	1.20	m bgl	Observed Well Depth	3.92	m bgl
Height of Water Column	~~2.35~~ 2.72	m bgl	Estimated Bore Volume*	15	L
GW Level (post sample)	2.35	m bgl	Total Volume of Micro-Purged	10	L

Water Quality Parameters

Time	Cumulative Volume (L)	Temp (°C)	DO (mg/L)#	EC (µS or mS/cm)	pH	Redox (mV)	Turbidity^
Stabilisation Target (3 readings)		0.2	+/- 10%	+/- 5%	+/- 0.1	+/- 10 mV	+/- 10%
9:40	2	18.3	5.8	272.0	3.65	106.4	77
9:42	4	18.4	2.6	266.9	3.71	106.6	48
9:44	6	18.5	1.6	266.6	3.51	102.7	146
9:46	8	18.7	1.0	268.6	3.4	100.4	169
9:48	10	18.7	0.9	266.5	3.37	100.4	219
Notes:	# Considered stabilised if three DO values are less than 0.5 mg/L			^ Considered stabilised if three Turbidity values are less than 5 NTU			

Sample Details						
Sampling Depth (rationale)	3	m bgl,	Middle of water column			
Sample Observations (e.g. colour, sediment, sheen, odour)	Pale brown, no odour					
Sample ID	MW101					
QAQC Samples	Replicate		Triplicate		Other	
Sample Containers Quantity / Preservation / Filtration	Amber glass	1	Plastic		PFAS (no teflon)	1
	Metals (F/UF) (HNO3)	2	Phenols/COD/NH3 (H2SO4)		Vials (HCl)	
	Ferrous/Ferric Iron (HCl)		Cyanides/Chromium (NaOH)		Other	
Comments	pH probe appeared faulty					

*Estimated Well Volume = H * F	Std. Drilling Diameter (m)~	NMLC (0.075)	HQ (0.096)	PQ (0.1226)	SFA (0.125)	HFA (0.194)
**Purge Target: min. 3 well volumes	Factor (F):	2.8	3.7	5.2	5.4	11.1

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Groundwater (GW) Field Sheet

Project and Bore Installation Details	MW103					
Project Name / Site Location	Warriewood, 20-22 Macpherson St				Project Number	207213.02
Well Construction Details	Well ID	MW103	Drilling Method		Hole Diameter (m)~	
	Well Depth (m bgl)		Screened (m bgl)		Stick Up (m)	
Survey Information	Easting		Northing		Elevation RL	
GW Level During Drilling		m bgl				
Contaminants/Comments						

Well Development Details					
Date / Time / Weather Conditions				Purged By	
Purge Method / Equipment					
Product observed / Thickness		mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-purge)		m bgl	Observed Well Depth		m bgl
Height of Water Column (H)		m bgl	Estimated Bore Volume*		L
GW Level (post-purge)		m bgl	Total Volume Purged**		L
Appearance/Comments					

Sampling Details					
Date / Time / Weather Conditions	11.12.22 (8:50 / Overcast			Sampled By	TG
Sampling Method / Equipment	Peri pump, LDPE + Silicon tubing, HT Mon inline filter				
WQM Model	YSI ProDSS		WQM Calibration Date	25.5.22	
Product observed / Thickness	0	mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-micropurge)	2.15	m bgl	Observed Well Depth	3.95	m bgl
Height of Water Column	1.8	m bgl	Estimated Bore Volume*	10	L
GW Level (post sample)	2.27	m bgl	Total Volume of Micro-Purged	18	L

Water Quality Parameters

Time	Cumulative Volume (L)	Temp (°C)	DO (mg/L)#	EC (µS or mS/cm)	pH	Redox (mV)	Turbidity^
Stabilisation Target (3 readings)		0.2	+/- 10%	+/- 5%	+/- 0.1	+/- 10 mV	+/- 10%
8:56	2	16.5	10.5	307.3	15.19	123	235
8:58	4	16.4	3.3	252.7	14.32	121.6	279
9:00	6	16.4	2.0	301.0	14.36	121	480
9:02	8	16.3	1.2	249.8	14.30	119.8	768
9:05	10	16.5	9.3	253.1	6.25	131.4	51
9:17	12	16.3	2.7	250.7	4.91	130.4	80
9:19	14	16.3	1.3	249.9	4.66	131.6	160
9:21	16	16.3	0.6	249.4	4.66	132.5	313
9:23	18	16.3	0.2	249.1	4.75	132.0	451
Notes:	# Considered stabilised if three DO values are less than 0.5 mg/L			^ Considered stabilised if three Turbidity values are less than 5 NTU			

Sample Details						
Sampling Depth (rationale)	3	m bgl,	Middle of water column			
Sample Observations (e.g. colour, sediment, sheen, odour)	Pale brown, no odour					
Sample ID	MW103					
QAQC Samples	Replicate		Triplicate		Other	
Sample Containers Quantity / Preservation / Filtration	Amber glass	1	Plastic		PFAS (no teflon)	1
	Metals (F/UF) (HNO3)	2	Phenols/COD/NH3 (H2SO4)		Vials (HCl)	
	Ferrous/Ferric Iron (HCl)		Cyanides/Chromium (NaOH)		Other	
Comments						

*Estimated Well Volume = H * F	Std. Drilling Diameter (m)~	NMLC (0.075)	HQ (0.096)	PQ (0.1226)	SFA (0.125)	HFA (0.194)
**Purge Target: min. 3 well volumes	Factor (F):	2.8	3.7	5.2	5.4	11.1

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Groundwater (GW) Field Sheet

Project and Bore Installation Details	MW 111					
Project Name / Site Location	Warriewood, 20-22 Macpherson Street				Project Number	207253.02
Well Construction Details	Well ID MW111		Drilling Method		Hole Diameter (m)~	
	Well Depth (m bgl)		Screened (m bgl)		Stick Up (m)	
Survey Information	Easting		Northing		Elevation RL	
GW Level During Drilling		m bgl				
Contaminants/Comments						

Well Development Details					
Date / Time / Weather Conditions				Purged By	
Purge Method / Equipment					
Product observed / Thickness		mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-purge)		m bgl	Observed Well Depth		m bgl
Height of Water Column (H)		m bgl	Estimated Bore Volume*		L
GW Level (post-purge)		m bgl	Total Volume Purged**		L
Appearance/Comments					

Sampling Details				
Date / Time / Weather Conditions	4.11.22 / 18:15 / Overcast		Sampled By	TG
Sampling Method / Equipment	Peri Pump, LDPE tubing + Silicon tubing, 45µm inline filter			
WQM Model	YSI Pro DSS	WQM Calibration Date	25.5.22	
Product observed / Thickness	0 mm	Confirmed with Bailer? (Y / N)		
GW Level (pre-micropurge)	1.78 m bgl	Observed Well Depth	5.4	m bgl
Height of Water Column	3.62 m bgl	Estimated Bore Volume*	20	L
GW Level (post sample)	1.97 m bgl	Total Volume of Micro-Purged	10	L

Water Quality Parameters

Time	Cumulative Volume (L)	Temp (°C)	DO (mg/L)#	EC (µS or mS/cm)	pH	Redox (mV)	Turbidity^
Stabilisation Target (3 readings)		0.2	+/- 10%	+/- 5%	+/- 0.1	+/- 10 mV	+/- 10%
8:15	2	20.1	6.2%	268.7	6.88	201.5	443
8:17	4	20.1	6.3 ~~6.34~~	267.0	11.3	212.5	790
8:19	6	20.1	5.3%	294.3	11.47	217.3	600
8:21	8	20.1	4.7	266.4	11.22	220.9	720
8:23	10	20.1	3.9%	266.3	11.05	223.5	600
Notes:	# Considered stabilised if three DO values are less than 0.5 mg/L			^ Considered stabilised if three Turbidity values are less than 5 NTU			

Sample Details						
Sampling Depth (rationale)	3	m bgl,	Middle of water column			
Sample Observations (e.g. colour, sediment, sheen, odour)	Clear, colorless, no odour					
Sample ID	MW 111					
QAQC Samples	Replicate		Triplicate		Other	
Sample Containers Quantity / Preservation / Filtration	Amber glass	1	Plastic		PFAS (no teflon)	1
	Metals (F/UF) (HNO3)	2	Phenols/COD/NH3 (H2SO4)		Vials (HCl)	
	Ferrous/Ferric Iron (HCl)		Cyanides/Chromium (NaOH)		Other	
Comments	pH probe appeared faulty					

*Estimated Well Volume = H * F	Std. Drilling Diameter (m)~	NMLC (0.075)	HQ (0.096)	PQ (0.1226)	SFA (0.125)	HFA (0.194)
**Purge Target: min. 3 well volumes	Factor (F):	2.8	3.7	5.2	5.4	11.1

Appendix I

Laboratory Results Tables

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Table 1: Summary of Laboratory Results - Soils

			Metals									TRH						BTEX				PAH			
			Arsenic	Cadmium	TotalChromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	Manganese	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	TotalXylenes	Naphthalene[b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAH
		PQL	4	0.4	1	1	1	0.1	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	Sample 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	mg/kg
DP,2021																									
MW101	0.12 - 0.2 m	31/08/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW101	0.4 - 0.5 m	31/08/21	**8**	**0.5**	**16**	**19**	**81**	<0.1	**6**	**360**	**76**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.05**	<0.5	**0.05**
			100 100	20 -	100 690	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
ACM-01	0.4 m	31/08/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW101	1.4 - 1.5 m	31/08/21	<4	<0.4	**9**	**5**	**12**	<0.1	**2**	**98**	**16**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 690	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	90 180	NL -	- 1300	- 5600	1 65	NL 105	NL 125	310 45	NL 170	- 0.7	3 -	300 -
HA102	0.13 - 0.2 m	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA102	0.5 - 0.6 m	08/09/21	<4	<0.4	**8**	**1**	**12**	<0.1	**1**	**5**	**9**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 690	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
HA102	0.9 - 1 m	08/09/21	<4	<0.4	**3**	<1	**6**	<0.1	<1	**1**	**4**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 690	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
MW103	0.4 - 0.5 m	31/08/21	<4	<0.4	**3**	<1	**4**	<0.1	<1	**1**	<1	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
HA104	0 - 0.1 m	01/09/21	**5**	<0.4	**11**	**25**	**30**	<0.1	**8**	**51**	**120**	<25	<50	<25	<50	**370**	**190**	<0.2	<0.5	<1	<1	<1	**1.6**	**2.3**	**23**
			100 100	20 -	100 320	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
HA104	0.3 - 0.6 m	01/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA104	0.4 - 0.5 m	01/09/21	<4	<0.4	**8**	<1	**11**	<0.1	**1**	**3**	**3**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 690	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
BD4/20210901[a]	0.4 - 0.5 m	01/09/21	<4	<0.4	**7**	**1**	**11**	<0.1	**2**	**5**	**5**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 690	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
HA104	1 - 1.2 m	01/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA105	0.01 - 0.1 m	01/09/21	<4	<0.4	**11**	**17**	**30**	<0.1	**8**	**82**	**82**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**	<0.5	**0.78**
			100 100	20 -	100 320	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
HA105	0.4 - 0.5 m	01/09/21	**11**	<0.4	**11**	**19**	**57**	<0.1	**4**	**56**	**97**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 690	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
BH106	0.14 - 0.25 m	31/08/21	**11**	<0.4	**11**	**15**	**76**	<0.1	**10**	**210**	**97**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 690	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
HA107	0 - 0.1 m	01/09/21	**7**	<0.4	**5**	**9**	**30**	<0.1	**2**	**28**	**49**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 690	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
HA108	0 - 0.1 m	01/09/21	**5**	<0.4	**4**	**12**	**34**	<0.1	**5**	**63**	**59**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 690	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
HA108	0.9 - 1 m	01/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH109	0.02 - 0.1 m	31/08/21	<4	<0.4	**19**	**37**	**4**	<0.1	**70**	**49**	**340**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
BH109	0.4 - 0.5 m	31/08/21	<4	<0.4	<1	**2**	**1**	<0.1	<1	**11**	**6**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
BD1/20210831[a]	0.4 - 0.5 m	31/08/21	<5	<1	<2	<5	<5	<0.1	<2	**7**	-	<10	<50	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	- -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
HA110	0.13 - 0.2 m	08/09/21	<4	<0.4	**5**	**24**	**48**	<0.1	**1**	**28**	**55**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.06**	<0.5	**0.06**
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
HA110	0.4 - 0.5 m	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW111	0.07 - 0.15 m	31/08/21	<4	<0.4	**14**	**37**	**20**	**0.2**	**16**	**66**	**140**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**	<0.5	**1**
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
HA112	0.13 - 0.23 m	08/09/21	**5**	<0.4	**44**	**9**	**9**	<0.1	**1**	**7**	**13**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.1**	<0.5	**1.5**
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
BH113	0.05 - 0.15 m	31/08/21	**91**	<0.4	**7**	**20**	**24**	<0.1	**24**	**41**	**220**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.06**	<0.5	**0.66**
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
BH114	0.4 - 0.5 m	31/08/21	<4	<0.4	**4**	**3**	**5**	<0.1	<1	**4**	**18**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
BH115	0.4 - 0.5 m	31/08/21	**5**	<0.4	**6**	**17**	**55**	<0.1	**4**	**44**	**79**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.09**	<0.5	**0.4**
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
DP,2004a																									
BH1	0.5 m	24/09/2021	<3	<0.5	**5**	**12**	**11**	<0.05	**6**	**32**	-	- -	- -	- -	- -	- -	- -	<0.5	<0.5	<0.5	<1.5	<0.1	**2.4**	-	**19**
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
BH2	0.2 m	24/09/2021	<3	<0.5	**1**	**11**	**26**	<0.05	**0.8**	**46**	-	- -	- -	- -	- -	- -	- -	<0.5	<0.5	<0.5	<1.5	<0.1	**0.08**	-	**0.58**
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
BH2	1.0 m	24/09/2021	<3	<0.5	**6**	**0.5**	**5**	<0.05	**2**	**0.7**	-	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
			100 100	20 -	100 410	6000 190	300 1100	40 -	400 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -

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Table 1: Summary of Laboratory Results - Soils

			Metals									TRH						BTEX				PAH			
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	Manganese	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 PAH
BH3	0.5 m	24/09/2021	**12**	**0.9**	**4**	**2**	**10**	<0.05	**1**	**7**	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<1.5	<0.1	<0.05	-	<PQL
			100 100	20 -	100 410	6000 190	300 1100	40 -	300 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	30 105	3 170	- 0.7	3 -	300 -
BH3	3.0 m	24/09/2021	<3	<0.5	**4**	<0.5	**4**	<0.05	**0.6**	<0.5	**-**	-	-	-	-	-	-	-	-	-	-		**-**	-	**-**
			100 100	20 -	100 410	6000 190	300 1100	40 -	300 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	30 105	3 170	- 0.7	3 -	300 -
BH4	0.5 m	24/09/2021	<3	<0.5	**4**	**21**	**28**	**0.06**	**3**	**47**	**-**	-	-	-	-	-	-	<0.5	<0.5	<0.5	<1.5	<0.1	<0.05	-	<PQL
			100 100	20 -	100 410	6000 190	300 1100	40 -	300 130	7400 440	3800 -	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	30 105	3 170	- 0.7	3 -	300 -

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, refer to the lab report **Blue** = DC exceedance **Red** = EGV-indirect exceedance HSL 0-<1 Exceedance

Bold = Lab detections - = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable NL = Non limiting AD = Asbestos detected NAD = No Asbestos detected

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level ML = Management Limit DC = Direct Contact HSL

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Reported naphthalene laboratory result obtained from BTEXN suite

c EIL criteria applies to DDT only

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

SAC based on generic land use thresholds for Residential A with garden/accessible soil

HIL HIL A Residential (Low density) (NEPC, 2013)

HSL HSL A/B Residential / Low - High Density (vapour intrusion) (NEPC, 2013)

DC Direct contact HSL A Residential (Low density) (direct contact) (CRC CARE, 2011)

EIL/ESL Urban Residential and Public Open Space (NEPC, 2013)

ML Residential, Parkland and Public Open Space (NEPC, 2013)

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Table 2: Summary of Laboratory Results - Soils - Continued

			Phenol	OCP									OPP		PCB	Herbicides									PFAS				Asbestos	
			Phenol	DDT+DDE+DDD [c]	Endrin	Hexachlorobenzene	Heptachlor	Aldrin + Dieldrin	Methoxychlor	Total Chlordane	Total Endosulfan	Other analysed OCP	Chlorpyriphos	Other analysed OPP	Total PCB	Glyphosate	2,4-D	2,4,5-T	MCPA	MCPB	MCPP	Picloram	Atrazine	Other analysed Herbicides	Total Positive PFAS	PFOS + PFHxS	PFOS	PFOA	Total Asbestos	FA and AF Estimation
		PQL	5	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.05	0.05	0.1	0.05	0.1	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5-2	0.0001	0.0001	0.0001	0.0001		<0.001
Sample ID	Depth	Sample 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	mg/kg	mg/kg	mg/kg	mg/kg	-	%(w/w)
DP, 2021																														
MW101	0.12 - 0.2 m	31/08/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	<0.001
			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
MW101	0.4 - 0.5 m	31/08/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	Detected	0.0209
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
ACM-01	0.4 m	31/08/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Detected	-
			- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
MW101	1.4 - 1.5 m	31/08/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	Detected	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
HA102	0.13 - 0.2 m	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	<0.001
			- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
HA102	0.5 - 0.6 m	08/09/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
HA102	0.9 - 1 m	08/09/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
MW103	0.4 - 0.5 m	31/08/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<PQL	-	-	-	-	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	900 -	600 -	600 -	600 -	600 -	4500 -	320 -	- -	- -	- -	- -	- -		
HA104	0 - 0.1 m	01/09/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	Detected	0.0022
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
HA104	0.3 - 0.6 m	01/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	<0.001
			- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
HA104	0.4 - 0.5 m	01/09/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	**0.003**	**0.003**	**0.0029**	<0.0001	-	-
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.01 -	- 1	0.1 10		
BD4/20210901[a]	1 - 1.2 m	01/09/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
HA104	1 - 1.2 m	01/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-
			- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.01 -	- 1	0.1 10		
HA105	0.01 - 0.1 m	01/09/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
HA105	0.4 - 0.5 m	01/09/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	<100	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<PQL	-	-	-	-	NAD	-
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	900 -	600 -	600 -	600 -	600 -	4500 -	320 -	- -	- -	- -	- -	- -		
BH106	0.14 - 0.25 m	31/08/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
HA107	0 - 0.1 m	01/09/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
HA108	0 - 0.1 m	01/09/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	<100	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<PQL	<0.0001	<0.0001	<0.0001	<0.0001	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	900 -	600 -	600 -	600 -	600 -	4500 -	320 -	- -	- -	0.01 -	- 1	0.1 10		
HA108	0.9 - 1 m	01/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-
			- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.01 -	- 1	0.1 10		
BH109	0.02 - 0.1 m	31/08/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	**0.0005**	**0.0005**	**0.0005**	<0.0001	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.01 -	- 1	0.1 10		
BH109	0.4 - 0.5 m	31/08/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
BD1/20210831[a]	0.4 - 0.5 m	31/08/21	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<PQL	<0.05	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			- -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
HA110	0.13 - 0.2 m	08/09/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.01 -	- 1	0.1 10		
HA110	0.4 - 0.5 m	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-
			- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.01 -	- 1	0.1 10		
MW111	0.07 - 0.15 m	31/08/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
HA112	0.13 - 0.23 m	08/09/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
BH113	0.05 - 0.15 m	31/08/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	**0.0013**	**0.0011**	**0.0011**	**0.0002**	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	0.01 -	- 1	0.1 10		
BH114	0.4 - 0.5 m	31/08/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
BH115	0.4 - 0.5 m	31/08/21	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	<0.001
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		

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Table 2: Summary of Laboratory Results - Soils - Continued

			Phenol	OCP									OPP		PCB	Herbicides									PFAS				Asbestos	
			Phenol	DDT+DDE+DDD [c]	Endrin	Hexachlorobenzene	Heptachlor	Aldrin + Dieldrin	Methoxychlor	Total Chlordane	Total Endosulfan	Other analysed OCP	Chlorpyriphos	Other analysed OPP	Total PCB	Glyphosate	2,4-D	2,4,5-T	MCPA	MCPB	MCPP	Picloram	Atrazine	Other analysed Herbicides	Total Positive PFAS	PFOS + PFHxS	PFOS	PFOA	Total Asbestos	FA and AF Estimation
DP, 2004a																														
BH1	0.5 m	24/09/2021	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.4	<PQL	<0.2	<PQL	<PQL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
BH2	0.2 m	24/09/2021	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<PQL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
BH2	1.0 m	24/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
BH3	0.5 m	24/09/2021	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<PQL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
BH3	3.0 m	24/09/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
BH4	0.5 m	24/09/2021	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<PQL	<0.1	<PQL	<PQL	-	-	-	-	-	-	-	-	-	-	-	-	-	Detected	-
			100 -	240 180	10 -	10 -	6 -	6 -	300 -	50 -	270 -	- -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		

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, refer to the lab report **Blue** = DC exceedance **Red** = EGV-indirect exceedance HSL 0-<1 Exceedan

Bold = Lab detections - = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable NL = Non limiting AD = Asbestos detected NAD = No Asbesto

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level ML = Management Limit DC = Direct Contact HSL

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Reported naphthalene laboratory result obtained from BTEXN suite

c EIL criteria applies to DDT only

d HIL for pentachlorophenol used as a screening HIL for total phenols

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

SAC based on generic land use thresholds for Residential A with garden/accessible soil

HIL	HIL A Residential (Low density) (NEPC, 2013)
HSL	HSL A/B Residential / Low - High Density (vapour intrusion) (NEPC, 2013)
DC	Direct contact HSL A Residential (Low density) (direct contact) (CRC CARE, 2011)
EIL/ESL	Urban Residential and Public Open Space (NEPC, 2013)
ML	Residential, Parkland and Public Open Space (NEPC, 2013)

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Table 2: Summary of Laboratory Results for Waste Classification

			Metals							TRH		BTEX				PAH			Phenols	OCP		OPP	PCB	Herbicides	Asbestos		PFAS			
			Arsenic	Cadmium	Total Chromium	Lead	Mercury (inorganic)	Nickel	TCLP Nickel	TRH C6 - C9	C10 - C36 recoverable hydrocarbons	Benzene	Toluene	Ethylbenzene	Xylenes (total)	Benzo(a)pyrene (BaP)	TCLP Benzo(a)pyrene (BaP)	Total PAH	Phenol	Total Endosulfan	Total Analysed OCP	Total Analysed OPP	Total PCB	Analysed Herbicides	Total Asbestos	FA and AF Estimation	PFOA	TCLP PFOA	PFOS+PFHxS	TCLP PFOS+PFHxS
		PQL	4	0.4	1	1	0.1	1	0.02	25	50	0.2	0.5	1	3	0.05	0.001	0.05	5	0.05	0.1	0.1	0.1		0.001	<0.001	0.0001	0.00001	0.0001	0.00001
Sample ID	Depth	Sample 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/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	%(w/w)	mg/kg	mg/L	mg/kg	mg/L
Waste Classification Criteria [f]																														
CT1			100	20	100	100	4	40	-	650	10000	10	288	600	1000	0.8	-	200	288	60	<50	4	<50	NC	nil	nil	-	-	-	-
SCC1/TCLP1			-	-	-	-	-	1050	2	-	-	-	-	-	-	10	0.04	-	-	-	-	-	-	-	-	-	18	0.5	1.8	0.05
Laboratory Results - DP, 2021																														
MW101	0.12 - 0.2 m	31/08/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	-	-
MW101	0.4 - 0.5 m	31/08/21	**8**	**0.5**	**16**	**81**	<0.1	**6**	-	<25	<50	<0.2	<0.5	<1	<3	**0.05**	-	**0.05**	<5	-	<0.1	<0.1	<0.1	-	Detected	Detected	-	-	-	-
ACM-01	0.4 m	31/08/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Detected	-	-	-	-	-
MW101	1.4 - 1.5 m	31/08/21	<4	<0.4	**9**	**12**	<0.1	**2**	-	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	-	Detected	NAD	-	-	-	-
HA102	0.13 - 0.2 m	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	-	-
HA102	0.5 - 0.6 m	08/09/21	<4	<0.4	**8**	**12**	<0.1	**1**	-	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	-	NAD	NAD	-	-	-	-
HA102	0.9 - 1 m	08/09/21	<4	<0.4	**3**	**6**	<0.1	<1	-	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
MW103	0.4 - 0.5 m	31/08/21	<4	<0.4	**3**	**4**	<0.1	<1	-	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	<PQL	NAD	NAD	-	-	-	-
HA104	0 - 0.1 m	01/09/21	**5**	<0.4	**11**	**30**	<0.1	**8**	-	<25	**450**	<0.2	<0.5	<1	<3	**1.6**	<0.001	**23**	<5	-	<0.1	<0.1	<0.1	-	Detected	Detected	-	-	-	-
HA104	0.3 - 0.6 m	01/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	-	-
HA104	0.4 - 0.5 m	01/09/21	<4	<0.4	**8**	**11**	<0.1	**1**	-	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	-	-	-	<0.0001	<0.00001	**0.003**	<0.00001
BD4/20210901	0.4 - 0.5 m	01/09/21	<4	<0.4	**7**	**11**	<0.1	**2**	-	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
HA104	1 - 1.2 m	01/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	<0.0001	-
HA105	0.01 - 0.1 m	01/09/21	<4	<0.4	**11**	**30**	<0.1	**8**	-	<25	<50	<0.2	<0.5	<1	<3	**0.1**	-	**0.78**	<5	-	<0.1	<0.1	<0.1	-	NAD	NAD	-	-	-	-
HA105	0.4 - 0.5 m	01/09/21	**11**	<0.4	**11**	**57**	<0.1	**4**	-	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	<PQL	NAD	-	-	-	-	-
BH106	0.14 - 0.25 m	31/08/21	**11**	<0.4	**11**	**76**	<0.1	**10**	-	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	-	NAD	NAD	-	-	-	-
HA107	0 - 0.1 m	01/09/21	**7**	<0.4	**5**	**30**	<0.1	**2**	-	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	-	NAD	NAD	-	-	-	-
HA108	0 - 0.1 m	01/09/21	**5**	<0.4	**4**	**34**	<0.1	**5**	-	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	<PQL	NAD	NAD	<0.0001	-	<0.0001	-
HA108	0.9 - 1 m	01/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	<0.0001	-
BH109	0.02 - 0.1 m	31/08/21	<4	<0.4	**19**	**4**	<0.1	**70**	**0.07**	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	-	NAD	NAD	<0.0001	<0.00001	**0.0005**	<0.00001
BH109	0.4 - 0.5 m	31/08/21	<4	<0.4	<1	**1**	<0.1	<1	-	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	-	NAD	NAD	-	-	-	-
BD1/20210831	0.4 - 0.5 m	31/08/21	<5	<1	<2	<5	<0.1	<2	-	<10	<50	<0.2	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.05	<0.05	<0.05	<0.1	-	-	-	-	-	-	-
HA110	0.13 - 0.2 m	08/09/21	<4	<0.4	**5**	**48**	<0.1	**1**	-	<25	<50	<0.2	<0.5	<1	<3	**0.06**	-	**0.06**	<5	-	<0.1	<0.1	<0.1	-	NAD	NAD	<0.0001	-	<0.0001	-
HA110	0.4 - 0.5 m	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	-	<0.0001	-
MW111	0.07 - 0.15 m	31/08/21	<4	<0.4	**14**	**20**	**0.2**	**16**	-	<25	<50	<0.2	<0.5	<1	<3	**0.1**	-	**1**	<5	-	<0.1	<0.1	<0.1	-	NAD	NAD	-	-	-	-
HA112	0.13 - 0.23 m	08/09/21	**5**	<0.4	**44**	**9**	<0.1	**1**	-	<25	<50	<0.2	<0.5	<1	<3	**0.1**	-	**1.5**	<5	-	<0.1	<0.1	<0.1	-	NAD	NAD	-	-	-	-
BH113	0.05 - 0.15 m	31/08/21	**91**	<0.4	**7**	**24**	<0.1	**24**	-	<25	<50	<0.2	<0.5	<1	<3	**0.06**	-	**0.66**	<5	-	<0.1	<0.1	<0.1	-	NAD	NAD	**0.0002**	<0.00001	**0.0011**	0.00001
BH114	0.4 - 0.5 m	31/08/21	<4	<0.4	**4**	**5**	<0.1	<1	-	<25	<50	<0.2	<0.5	<1	<3	<0.05	-	<0.05	<5	-	<0.1	<0.1	<0.1	-	NAD	NAD	-	-	-	-
BH115	0.4 - 0.5 m	31/08/21	**5**	<0.4	**6**	**55**	<0.1	**4**	-	<25	<50	<0.2	<0.5	<1	<3	**0.09**	-	**0.4**	<5	-	<0.1	<0.1	<0.1	-	NAD	NAD	-	-	-	-
Laboratory Results - DP, 2004a																														
BH1	0.5 m	24/09/2021	<3	<0.5	**5**	**11**	<0.05	**6**	-	<20	**191**	<0.5	<0.5	<0.5	<1.5	**2.4**	-	**19**	<0.5	<0.4	<PQL	<PQL	<PQL	-	-	-	-	-	-	-
BH2	0.2 m	24/09/2021	<3	<0.5	**1**	**26**	<0.05	**0.8**	-	<20	<120	<0.5	<0.5	<0.5	<1.5	**0.08**	-	0.58	-	<0.2	<PQL	<PQL	<PQL	-	-	-	-	-	-	-
BH2	1.0 m	24/09/2021	<3	<0.5	**6**	**5**	<0.05	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	0.5 m	24/09/2021	**12**	**0.9**	**4**	**10**	<0.05	**1**	-	<20	<120	<0.5	<0.5	<0.5	<1.5	<0.05	-	<PQL	-	<0.2	<PQL	<PQL	<PQL	-	-	-	-	-	-	-
BH3	3.0 m	24/09/2021	<3	<0.5	**4**	**4**	<0.05	**0.6**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	0.5 m	24/09/2021	<3	<0.5	**4**	**28**	**0.06**	**3**	-	<20	<120	<0.5	<0.5	<0.5	<1.5	<0.05	-	<PQL	<0.5	<0.2	<PQL	<PQL	<PQL	-	Detected	-	-	-	-	-

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

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Total chromium used as initial screen for chromium(VI).

c Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)

d Criteria for scheduled chemicals used as an initial screen

e Criteria for Chlorpyrifos used as initial screen

f All criteria are in the same units as the reported results

PQL Practical quantitation limit

\- Not tested, No criteria or Not applicable

Assessment Criteria:

NSW EPA, 2014, Waste Classification Guidelines Part 1

CT1 Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste

SCC1 Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste

TCLP1 Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste

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Table 3: Acid Sulfate Soil Results

Sample			Screening Tests				S_{Cr} Suite Laboratory Results							Soil Description
Location	Depth	Date Sampled	pH_F	pH_{FOX}	pH_{FOX} minus pH_F	Reaction	pH_{KCl}	Chromium Reducible Sulphur (S_{Cr})	Total Actual Acidity (s-TAA)	Net Acid Soluble Sulfur ($s\text{-}S_{NAS}$)	Net Acidity	Net Acidity (excluding ANC)	Liming Rate (excluding ANC)	
	(m)		pH units	pH units	pH units	-	pH units	(%w/w S)	(%w/w S)	(%w/w S)	(%w/w S)	moles H+/T	kg CaCO3/T	
Investigation Levels														
ASSMAC (1998)														
Screening Indicators				<3.5	≤ -1									
1 to 1,000 tonnes, Coarse Texture								0.03	0.03		0.03	18		
1 to 1,000 tonnes, Medium Texture								0.06	0.06		0.06	36		
1 to 1,000 tonnes, Fine Texture								0.1	0.1		0.1	62		
>1,000 tonnes, Any Texture								0.03	0.03		0.03	18		
EPA (2014)														
PASS Requirement			≥5.5*											
Laboratory Results - DP, 2021														
MW101	0.9-1	31/08/21	6.7	**2.8**	**-3.9**	M	5.8	0.02	0.01	-	0.030	**19**	1.4	Brown sandy clay fill
MW101	1.4-1.5	31/08/21	6.5	**2.0**	**-4.5**	V	-	-	-	-	-	-	-	Brown sandy clay
MW101	1.9-2	31/08/21	6.4	**1.8**	**-4.6**	X	4.8	**0.12**	**0.04**	-	**0.15**	**94**	7.1	Brown sandy clay
MW101	2.4-2.5	31/08/21	5.9	**2.6**	**-3.3**	M	-	-	-	-	-	-	-	Brown and grey sand
MW101	2.9-3	31/08/21	5.9	**2.8**	**-3.1**	M	-	-	-	-	-	-	-	Brown silty clay
MW101	3.4-3.5	31/08/21	5.5	**3.0**	**-2.5**	M	-	-	-	-	-	-	-	Brown silty clay
MW101	3.9-4	31/08/21	5.4	**2.5**	**-2.9**	M	-	-	-	-	-	-	-	Brown silty clay
MW103	1.4-1.5	31/08/21	4.5	3.5	**-1**	M	-	-	-	-	-	-	-	Brown and grey sand
MW103	1.9-2	31/08/21	5.5	4.0	**-1.5**	M	-	-	-	-	-	-	-	Brown and grey sand
MW103	2.4-2.5	31/08/21	5.5	4.0	**-1.5**	L	-	-	-	-	-	-	-	Brown and grey sand
MW103	2.9-3	31/08/21	5.4	**2.5**	**-2.9**	M	-	-	-	-	-	-	-	Brown and grey sand
MW103	3.4-3.5	31/08/21	5.2	**1.6**	**-3.6**	M	4.0	**0.08**	**0.06**	0.005	**0.14**	**90**	6.8	Brown and grey sand
MW103	3.9-4	31/08/21	6.0	**3.4**	**-2.6**	V	-	-	-	-	-	-	-	Grey sandy clay
MW111	0.9-1	31/08/21	5.8	4.3	**-1.5**	M	-	-	-	-	-	-	-	Brown and grey sand
MW111	1.4-1.5	31/08/21	5.2	4.2	**-1**	M	-	-	-	-	-	-	-	Brown and grey sand
MW111	1.9-2	31/08/21	5.1	4.5	**-0.6**	L	-	-	-	-	-	-	-	Grey and orange clayey sand
MW111	2.4-2.5	31/08/21	4.6	3.6	**-1**	L	-	-	-	-	-	-	-	Grey and orange clayey sand
MW111	2.9-3	31/08/21	4.7	3.7	**-1**	L	-	-	-	-	-	-	-	Grey and orange clayey sand
MW111	3.4-3.5	31/08/21	5.2	4.2	**-1**	L	-	-	-	-	-	-	-	Grey sandy clay
MW111	3.9-4	31/08/21	5.2	4.1	**-1.1**	L	-	-	-	-	-	-	-	Grey sandy clay
MW111	4.4-4.5	31/08/21	5.0	4.2	-0.8	L	-	-	-	-	-	-	-	Grey clayey sand
MW111	4.9-5	31/08/21	5.2	4.3	-0.9	L	-	-	-	-	-	-	-	Grey clayey sand
BH115	0.9-1	31/08/21	7.1	5.0	**-2.1**	M	-	-	-	-	-	-	-	Grey sand
BH115	1.4-1.5	31/08/21	5.8	5.0	-0.8	M	-	-	-	-	-	-	-	Grey sand
BH115	1.9-2	31/08/21	5.8	5.0	-0.8	L	-	-	-	-	-	-	-	Grey sand
BH115	2.4-2.5	31/08/21	5.1	**2.3**	**-2.8**	H	-	-	-	-	-	-	-	Brown sandy clay
BH115	2.9-3	31/08/21	4.7	**2.9**	**-1.8**	H	3.5	**0.008**	**0.18**	<0.005	**0.19**	**120**	8.8	Grey clay
Laboratory Results - DP, 2004a														
BH2	0.5	24/09/04	7.7	**3.06**	**-4.64**	M	-	-	-	-	-	-	-	-
BH2	1.5	24/09/04	6.83	4.76	**-2.07**	L-M	-	-	-	-	-	-	-	-
BH2	3	24/09/04	5.64	4.25	**-1.39**	L-M	-	-	-	-	-	-	-	-
BH3	2.6	29/09/04	6.18	4.67	**-1.51**	L-M	-	-	-	-	-	-	-	-
BH3	2.6	29/09/04	6.08	4.37	**-1.71**	L-M	-	-	-	-	-	-	-	-
BH4	0.7	29/09/04	6.32	4.38	**-1.94**	L-M	-	-	-	-	-	-	-	-
BH4	1.5	29/09/04	6.34	5.07	**-1.27**	L-M	-	-	-	-	-	-	-	-
BH4	3	29/09/04	6.23	4.2	**-2.03**	M	-	-	-	-	-	-	-	-

Notes:

* Note some receiving sites requried a pH of greater than 6 when leaving site for acceptance as PASS

Blue line - observed groundwater level

Shaded Exceedance of ASS screening indicator

Red Exceedance of ASS threshold

Reaction Description (after Sullivan et al, 2018)

L Low reaction
M Medium reaction
H High reaction
X Extreme reaction
V 'Volcanic' reaction

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Table 4: Groundwater and Surface Water Results

		ANIONS AND CATIONS		Hardness	Dissolved METALS								Total METALS							
		Calcium	Magnesium		Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (Inorganic)	Nickel	Zinc	**Arsenic**	**Cadmium**	**Total Chromium**	**Copper**	**Lead**	**Mercury (Inorganic)**	**Nickel**	**Zinc**
	PQL	500	500		1	0.1	1	1	1	0.05	1	1	1	0.1	1	1	1	0.05	1	1
Sample ID	Sample Date	µg/L	µg/L		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
NHMRC (2012) Recreation					100	20	500	20000	100	10	200		100	20	500	20000	100	10	200	
NEPC (2013) HSL 4-8m																				
ANZG (2018) 95% LOP Fresh					**13/24**	0.2	1	1.4	3.4	0.06	11	8	**13/24**	0.2	1	1.4	3.4	0.06	11	8
Hardness modfified Trigger Value												15								15
HEPA (2018) 95% LOP Fresh																				
HEPA (2018) 99% LOP Fresh																				
Current Results																				
MW101	04/11/22	-	-	-	**4**	<0.1	<1	**1**	<1	<0.05	<1	**4**	**12**	**0.2**	**7**	**14**	**24**	<0.05	**4**	**250**
MW101	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW103	04/11/22	-	-	-	**1**	<0.1	<1	**4**	<1	<0.05	<1	**4**	**2**	<0.1	<1	<1	<1	<0.05	**1**	**6**
MW103	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW111	04/11/22	-	-	-	<1	<0.1	<1	**1**	<1	<0.05	<1	**2**	<1	<0.1	<1	<1	<1	<0.05	<1	**7**
MW111	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW1	04/11/22	**22000**	**7500**	-	<1	<0.1	<1	**4**	<1	<0.05	<1	**14**	<1	<0.1	<1	**2**	**1**	<0.05	<1	**15**
SW1	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	04/11/22	**23000**	**7700**	-	<1	<0.1	<1	**2**	<1	<0.05	<1	**13**	<1	<0.1	<1	**2**	<1	<0.05	**2**	**16**
SW2	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Previous Results																				
BH101	08/09/21	**17000**	**7100**	71	**3**	<0.1	<1	<1	<1	<0.05	<1	**32**	-	-	-	-	-	-	-	-
BD1/20210908	08/09/21	-	-	-	**2**	<0.1	<1	<1	<1	<0.05	<1	**27**	-	-	-	-	-	-	-	-
BH103	08/09/21	**6100**	**9400**	54	**4**	<0.1	<1	<1	<1	<0.05	<1	**36**	-	-	-	-	-	-	-	-
BH111	08/09/21	**6400**	**11000**	61	<1	<0.1	<1	<1	<1	<0.05	**1**	**23**	-	-	-	-	-	-	-	-

Notes:

*	QA/QC replicate of sample listed directly below the primary sample
PQL	Practical quantitation limit
-	No criterion / not defined / not tested / not applicable
	Shaded cell is exceedance of guideline value
	Where one or more guideline value is exceeded, the cell is shaded to the colour of the highest guideline value exceeded
	NEPC (2013) National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013), health screening level Sand 4-8m
	NHMRC (2008) Guidelines for Managing Risk in Recreational Water
	ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, orange text is 'unknown' level of protection
	NEPC (2013) National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013), health screening level Sand 4-8m
	ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 95% level of protection of species for Fresh aquatic ecosystems [NB: 99% level of protection adopted for bioaccumulative chemicals]
	HEPA (2018) PFAS National Environmental Management Plan, 99% level of protection for Fresh aquatic ecosystems
	NHMRC (2008) Guidelines for Managing Risk in Recreational Water
	ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, orange text is 'unknown' level of protection

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Table 4: Groundwater and Surface W

		TRH				BTEX						PAH													
		F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	**Benzene**	**Toluene**	**Ethylbenzene**	**o-Xylene**	**m+p-Xylene**	**Total Xylenes**	Acenaphthene	Acenaphthylene	**Anthracene**	Benzo(a)anthracene	Benzo(a)pyrene (BaP)	Naphthalene	Benzo(b,j+k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	Pyrene
	PQL	10	50	100	100	1	1	1	1	2	1	0.1	0.1		0.1	0.1	1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sample ID	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
NHMRC (2012) Recreation						10	8000	3000			6000					0.1										
NEPC (2013) HSL 4-8m		1000	1000			800	NL				NL						NL									
ANZG (2018) 95% LOP Fresh						950	180	80						**0.01**		0.1	16					**1**			**0.6**	
Hardness modfified Trigger Value																										
HEPA (2018) 95% LOP Fresh																										
HEPA (2018) 99% LOP Fresh																										
Current Results																										
MW101	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW101	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW103	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW103	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW111	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW111	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW1	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW1	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Previous Results																										
BH101	08/09/21	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<0.1	<0.1	**<0.1**	<0.1	<0.1	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BD1/20210908	08/09/21	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<0.1	<0.1	**<0.1**	<0.1	<0.1	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH103	08/09/21	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<0.1	<0.1	**<0.1**	<0.1	<0.1	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH111	08/09/21	<10	<50	<100	<100	<1	<1	<1	<1	<2	<1	<0.1	<0.1	**<0.1**	<0.1	<0.1	<1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Notes:

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Table 4: Groundwater and Surface W

		OCP																		
		Aldrin	alpha-BHC	alpha-chlordane	beta-BHC	DDE	DDT	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan Sulphate	Endrin	gamma-Chlordane	Heptachlor	Hexachlorobenzene	Lindane	Methoxychlor	DDD	Total Analysed OCP
	PQL	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Sample ID	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
NHMRC (2012) Recreation							90								3		100			
NEPC (2013) HSL 4-8m																				
ANZG (2018) 95% LOP Fresh		**0.001**		**0.03**			0.006		**0.01**	**0.03**	**0.03**			**0.03**	0.01	**0.05**	0.2	0.005		
Hardness modfified Trigger Value																				
HEPA (2018) 95% LOP Fresh																				
HEPA (2018) 99% LOP Fresh																				
Current Results																				
MW101	04/11/22	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MW101	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW103	04/11/22	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MW103	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW111	04/11/22	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
MW111	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW1	04/11/22	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
SW1	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	04/11/22	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
SW2	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Previous Results																				
BH101	08/09/21	<0.001	<0.001	<0.001	<0.001	**0.002**	**0.004**	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.002**	**0.008**
BD1/20210908	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH103	08/09/21	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
BH111	08/09/21	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Notes:

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Table 4: Groundwater and Surface W

		OPP														Glyphosphate	PCB							
		Azinphos methyl (Guthion)	Bromophos-ethyl	Chlorpyriphos	Chlorpyriphos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Ronnel (fenchlorphos)	Fenitrothion	Malathion	Parathion	Parathion-methyl	Total Analysed OPP		Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Aroclor 1260	Total Analysed PCB
	PQL	0.02	0.2	0.009	0.2	0.01	0.2	0.15	0.2	0.2	0.2	0.05	0.004	0.2	0.004	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Sample ID	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
NHMRC (2012) Recreation		300	100	100		40	50	70	40		70	700	200	7										
NEPC (2013) HSL 4-8m																								
ANZG (2018) 95% LOP Fresh		0.02		0.00004		0.01		0.15			0.2	0.05	0.004							**0.6**		**0.03**		
Hardness modfified Trigger Value																								
HEPA (2018) 95% LOP Fresh																								
HEPA (2018) 99% LOP Fresh																								
Current Results																								
MW101	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW101	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW103	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW103	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW111	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW111	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW1	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW1	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Previous Results																								
BH101	08/09/21	<0.02	<0.2	<0.009	<0.2	<0.01	<0.2	<0.15	<0.2	<0.2	<0.2	<0.05	<0.004	<0.2	<0.004	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BD1/20210908	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH103	08/09/21	<0.02	<0.2	<0.009	<0.2	<0.01	<0.2	<0.15	<0.2	<0.2	<0.2	<0.05	<0.004	<0.2	<0.004	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BH111	08/09/21	<0.02	<0.2	<0.009	<0.2	<0.01	<0.2	<0.15	<0.2	<0.2	<0.2	<0.05	<0.004	<0.2	<0.004	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:

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Table 4: Groundwater and Surface W

		HERBICIDES										VOC													
		2,4,5-T	2,4-D [(2,4-Dichlorophenoxy) acetic acid]	Atrazine	Fenoprop	Glyphosate	Hexazinone	Ioxynil	MCPA	Simazine	Total Analysed Herbicides	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	tetrachloroethene	1,1,2-trichloroethane	1,1,2-trichloroethylene	1,1-dichloroethane	1,1-Dichloroethene	1,1-dichloropropene	1,2,3-trichlorobenzene	1,2,3-trichloropropane	1,2,4-trichlorobenzene	1,2,4-trimethyl benzene	1,2-dibromo-3-chloropropane	1,2-dichlorobenzene
	PQL	0.5	0.5	2	0.5	10	2	1	0.5	2	0.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sample ID	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
NHMRC (2012) Recreation		1000	300	200	100	10000	4000		400	200					500				300						15000
NEPC (2013) HSL 4-8m																									
ANZG (2018) 95% LOP Fresh		36	280	13		320			1.4	3.2			270		70		330		700						160
Hardness modfified Trigger Value																									
HEPA (2018) 95% LOP Fresh																									
HEPA (2018) 99% LOP Fresh																									
Current Results																									
MW101	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW101	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW103	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW103	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW111	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW111	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW1	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW1	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Previous Results																									
BH101	08/09/21	<0.5	<0.5	<2	<0.5	<10	<2	<1	<0.5	<2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BD1/20210908	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH103	08/09/21	<0.5	<0.5	<2	<0.5	<10	<2	<1	<0.5	<2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BH111	08/09/21	<0.5	<0.5	<2	<0.5	<10	<2	<1	<0.5	<2	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Notes:

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Table 4: Groundwater and Surface V

		VOC																							
		1,2-dichloroethane	1,2-dichloropropane	1,3,5-trimethyl benzene	1,3-dichlorobenzene	1,3-dichloropropane	1,4-dichlorobenzene	2,2-dichloropropane	2-chlorotoluene	4-chlorotoluene	4-isopropyl toluene	Bromobenzene	bromochloromethane	bromodichloromethane	bromoform	carbon tetrachloride	Chloroethane	Vinyl Chloride	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	isopropylbenzene (cumene)	Cyclohexane	dibromochloromethane	dibromomethane
	PQL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10	1	10	1	1	1	1	1	1
Sample ID	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
NHMRC (2012) Recreation		30					400									30		3								
NEPC (2013) HSL 4-8m																										
ANZG (2018) 95% LOP Fresh					260		60									240		100	**770**							
Hardness modfified Trigger Value																										
HEPA (2018) 95% LOP Fresh																										
HEPA (2018) 99% LOP Fresh																										
Current Results																										
MW101	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW101	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW103	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW103	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW111	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW111	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW1	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW1	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SW2	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Previous Results																										
BH101	08/09/21	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<1	<10	<1	<1	<1	<1	<1	<1
BD1/20210908	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH103	08/09/21	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<1	<10	<1	<1	<1	<1	<1	<1
BH111	08/09/21	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<1	<10	<1	<1	<1	<1	<1	<1

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Table 4: Groundwater and Surface V

		VOC														PFAS										
		Dichlorodifluoromethane	1,2-dibromoethane	hexachlorobutadiene	Bromomethane	Monochlorobenzene	n-butyl benzene	n-propyl benzene	sec-butyl benzene	Styrene (vinylbenzene)	tert-butyl benzene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichlorofluoromethane	VOLATILE ORGANIC COMPOUNDS	10:2 FTS	4:2 FTS	6:2 FTS	8:2 FTS	EtPerfluorooctanesulfamid oacetic acid	MePerfluorooctanesulfamid oacetic acid	N-Et perfluorooctanesulfonamid oethanol	N-Ethyl perfluorooctanesulfonamide	N-Me perfluorooctanesulfonamid oethanol	N-Methyl perfluorooctane sulfonamide	Perfluorobutanesulfonic acid
	PQL	10	1	1	10	1	1	1	1	1	1	1	1	10	1	0.02	0.01	0.01	0.02	0.02	0.02	0.5	0.1	0.05	0.05	0.01
Sample ID	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
NHMRC (2012) Recreation			10	7	10	3000				300																
NEPC (2013) HSL 4-8m																										
ANZG (2018) 95% LOP Fresh						55																				
Hardness modfified Trigger Value																										
HEPA (2018) 95% LOP Fresh																										
HEPA (2018) 99% LOP Fresh																										
Current Results																										
MW101	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.01	<0.01	<0.02	<0.02	<0.02	<0.5	<0.1	<0.05	<0.05	<0.01
MW101	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.001	0.003	<0.0004	<0.002	<0.002	<0.5	<0.1	<0.05	<0.05	0.002
MW103	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.01	<0.01	<0.02	<0.02	<0.02	<0.5	<0.1	<0.05	<0.05	<0.01
MW103	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.001	0.0004	<0.0004	<0.002	<0.002	<0.5	<0.1	<0.05	<0.05	0.002
MW111	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.01	<0.01	<0.02	<0.02	<0.02	<0.5	<0.1	<0.05	<0.05	<0.01
MW111	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.001	0.002	<0.0004	<0.002	<0.002	<0.5	<0.1	<0.05	<0.05	0.004
SW1	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.01	<0.01	<0.02	<0.02	<0.02	<0.5	<0.1	<0.05	<0.05	<0.01
SW1	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.002	<0.5	<0.1	<0.05	<0.05	0.005
SW2	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.01	<0.01	<0.02	<0.02	<0.02	<0.5	<0.1	<0.05	<0.05	<0.01
SW2	04/11/22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.002	<0.5	<0.1	<0.05	<0.05	**0.0047**
Previous Results																										
BH101	08/09/21	<10	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	-	-	**0.0008**	<0.0004	-	-	-	-	-	-	-
BD1/20210908	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-
BH103	08/09/21	<10	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	-	-	<0.0004	<0.0004	-	-	-	-	-	-	-
BH111	08/09/21	<10	<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	-	-	**0.0005**	<0.0004	-	-	-	-	-	-	-

Notes:

*	QA/QC replicate of sample listed directly below
PQL	Practical quantitation limit
-	No criterion / not defined / not tested / not applic
	Shaded cell is exceedance of guideline value
	Where one or more guideline value is exceeded
	NEPC (2013) National Environment Protection
	NHMRC (2008) Guidelines for Managing Risk i
	ANZG (2018) Australian and New Zealand Guic
	NEPC (2013) National Environment Protection
	ANZG (2018) Australian and New Zealand Guic
	HEPA (2018) PFAS National Environmental Ma
	NHMRC (2008) Guidelines for Managing Risk i
	ANZG (2018) Australian and New Zealand Guic

Douglas Partners
Geotechnics / Environment / Groundwate

Table 4: Groundwater and Surface V

		PFAS																
		Perfluorobutanoic acid	Perfluorodecanesulfonic acid	Perfluorodecanoic acid	Perfluorododecanoic acid	Perfluoroheptanoic acid	Perfluorohexanoic acid	Perfluorononanoic acid	Perfluorooctane sulfonamide	Perfluoropentanesulfonic acid	Perfluoropentanoic acid	Perfluorotetradecanoic acid	Perfluorotridecanoic acid	Perfluoroundecanoic acid	PFHxS	PFOA	PFOS	PFAS
	PQL	0.02	0.02	0.02	0.05	0.01	0.01	0.01	0.1	0.01	0.02	0.5	0.1	0.02	0.01	0.01	0.01	0.01
Sample ID	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
NHMRC (2012) Recreation																10		
NEPC (2013) HSL 4-8m																		
ANZG (2018) 95% LOP Fresh																		
Hardness modfified Trigger Value																		
HEPA (2018) 95% LOP Fresh																220	0.13	
HEPA (2018) 99% LOP Fresh																19	0.00023	
Current Results																		
MW101	04/11/22	<0.02	<0.02	<0.02	<0.05	<0.01	<0.01	<0.01	<0.1	<0.01	<0.02	<0.5	<0.1	<0.02	<0.01	<0.01	<0.01	<0.01
MW101	04/11/22	<0.02	<0.002	<0.002	<0.005	0.001	0.0042	<0.001	<0.01	<0.001	0.006	<0.05	<0.01	<0.002	**0.0045**	0.0025	**0.0024**	0.026
MW103	04/11/22	<0.02	<0.02	<0.02	<0.05	<0.01	<0.01	<0.01	<0.1	<0.01	<0.02	<0.5	<0.1	<0.02	**0.01**	<0.01	<0.01	**0.01**
MW103	04/11/22	<0.02	<0.002	<0.002	<0.005	0.002	0.002	<0.001	<0.01	<0.001	0.004	<0.05	<0.01	<0.002	**0.0059**	0.0045	**0.0021**	**0.023**
MW111	04/11/22	<0.02	<0.02	<0.02	<0.05	<0.01	<0.01	<0.01	<0.1	<0.01	<0.02	<0.5	<0.1	<0.02	**0.02**	**0.01**	<0.01	**0.03**
MW111	04/11/22	<0.02	<0.002	<0.002	<0.005	0.0042	0.0044	<0.001	<0.01	0.002	0.006	<0.05	<0.01	<0.002	**0.012**	**0.01**	**0.0058**	**0.05**
SW1	04/11/22	<0.02	<0.02	<0.02	<0.05	<0.01	<0.01	<0.01	<0.1	<0.01	<0.02	<0.5	<0.1	<0.02	**0.02**	<0.01	<0.01	**0.02**
SW1	04/11/22	<0.02	<0.002	<0.002	<0.005	0.003	0.0063	<0.001	<0.01	0.001	0.01	<0.05	<0.01	<0.002	**0.019**	0.0082	**0.0089**	**0.061**
SW2	04/11/22	<0.02	<0.02	<0.02	<0.05	<0.01	<0.01	<0.01	<0.1	<0.01	<0.02	<0.5	<0.1	<0.02	**0.02**	**0.01**	<0.01	**0.03**
SW2	04/11/22	<0.02	<0.002	<0.002	<0.005	**0.004**	**0.0071**	<0.001	<0.01	**0.001**	**0.01**	<0.05	<0.01	<0.002	**0.018**	**0.0084**	**0.0084**	**0.061**
Previous Results																		
BH101	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.0058**	**0.003**	**0.002**	**0.012**
BD1/20210908	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH103	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.0072**	**0.0056**	**0.0025**	**0.016**
BH111	08/09/21	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.006**	**0.0035**	**0.002**	**0.013**

Notes:

*	QA/QC replicate of sample listed directly below
PQL	Practical quantitation limit
-	No criterion / not defined / not tested / not appli
	Shaded cell is exceedance of guideline value
	Where one or more guideline value is exceede
	NEPC (2013) National Environment Protection
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	ANZG (2018) Australian and New Zealand Guic
	NEPC (2013) National Environment Protection
	ANZG (2018) Australian and New Zealand Guic
	HEPA (2018) PFAS National Environmental Ma
	NHMRC (2008) Guidelines for Managing Risk i
	ANZG (2018) Australian and New Zealand Guic

1	**UCL Statistics for TRH F3**											
2												
3	User Selected Options											
4	Date/Time of Computation	ProUCL 5.128/09/2021 12:24:44 PM										
5	From File	WorkSheet.xls										
6	Full Precision	OFF										
7	Confidence Coefficient	95%										
8	Number of Bootstrap Operations	2000										
9												
10												
11	**C0**											
12												
13	**General Statistics**											
14	Total Number of Observations	11					Number of Distinct Observations	2				
15							Number of Missing Observations	0				
16	Minimum	100					Mean	124.5				
17	Maximum	370					Median	100				
18	SD	81.41					Std. Error of Mean	24.55				
19	Coefficient of Variation	0.654					Skewness	3.317				
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic	0.345					**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value	0.85					Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic	0.528					**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value	0.251					Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL	169					95% Adjusted-CLT UCL (Chen-1995)	191.1				
31							95% Modified-t UCL (Johnson-1978)	173.1				
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic	3.718					**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value	0.731					Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic	0.538					**Kolmogorov-Smirnov Gamma GOF Test**					
37	5% K-S Critical Value	0.256					Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)	5.133					k star (bias corrected MLE)	3.794				
42	Theta hat (MLE)	24.26					Theta star (bias corrected MLE)	32.83				
43	nu hat (MLE)	112.9					nu star (bias corrected)	83.46				
44	MLE Mean (bias corrected)	124.5					MLE Sd (bias corrected)	63.94				
45							Approximate Chi Square Value (0.05)	63.41				
46	Adjusted Level of Significance	0.0278					Adjusted Chi Square Value	60.56				
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))	163.9					95% Adjusted Gamma UCL (use when n<50)	171.6				
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic	0.345					**Shapiro Wilk Lognormal GOF Test**					
53	5% Shapiro Wilk Critical Value	0.85					Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic	0.528					**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value	0.251					Data Not Lognormal at 5% Significance Level					

56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59						Minimum of Logged Data	4.605			Mean of logged Data	4.724	
60						Maximum of Logged Data	5.914			SD of logged Data	0.394	
61												
62	**Assuming Lognormal Distribution**											
63						95% H-UCL	157.2			90% Chebyshev (MVUE) UCL	164.5	
64						95% Chebyshev (MVUE) UCL	184.3			97.5% Chebyshev (MVUE) UCL	211.8	
65						99% Chebyshev (MVUE) UCL	265.8					
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71						95% CLT UCL	164.9			95% Jackknife UCL	N/A	
72						95% Standard Bootstrap UCL	N/A			95% Bootstrap-t UCL	N/A	
73						95% Hall's Bootstrap UCL	N/A			95% Percentile Bootstrap UCL	N/A	
74						95% BCA Bootstrap UCL	N/A					
75						90% Chebyshev(Mean, Sd) UCL	198.2			95% Chebyshev(Mean, Sd) UCL	231.5	
76						97.5% Chebyshev(Mean, Sd) UCL	277.8			99% Chebyshev(Mean, Sd) UCL	368.8	
77												
78	**Suggested UCL to Use**											
79						95% Student's-t UCL	169			or 95% Modified-t UCL	173.1	
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												

Appendix J

Laboratory Chain of Custody, Sample Receipt Advice
and Certificate of Analysis Documentation

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 309798

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**207253.02, Warriewood**
Number of Samples	5 Water
Date samples received	02/11/2022
Date completed instructions received	02/11/2022

Analysis Details

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

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

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

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

Report Details

Date results requested by	11/11/2022
Date of Issue	09/11/2022

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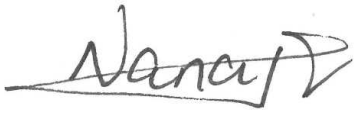
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Giovanni Agosti, Group Technical Manager
Josh Williams, Organics and LC Supervisor
Loren Bardwell, Development Chemist
Phalak Inthakesone, Organics Development Manager, Sydney
Priya Samarawickrama, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

Organochlorine Pesticides in Water						
Our Reference		309798-1	309798-2	309798-3	309798-4	309798-5
Your Reference	UNITS	MW101	MW103	MW111	SW1	SW2
Date Sampled		04/11/2022	04/11/2022	04/11/2022	04/11/2022	04/11/2022
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	08/11/2022	08/11/2022	08/11/2022	08/11/2022	08/11/2022
Date analysed	-	08/11/2022	08/11/2022	08/11/2022	08/11/2022	08/11/2022
alpha-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
HCB	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
beta-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
gamma-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Heptachlor	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
delta-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Aldrin	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Heptachlor Epoxide	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
gamma-Chlordane	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
alpha-Chlordane	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan I	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
pp-DDE	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Dieldrin	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan II	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
pp-DDD	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin Aldehyde	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
pp-DDT	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan Sulphate	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Methoxychlor	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Surrogate TCMX	%	87	82	86	79	81

HM in water - dissolved						
Our Reference		309798-1	309798-2	309798-3	309798-4	309798-5
Your Reference	UNITS	MW101	MW103	MW111	SW1	SW2
Date Sampled		04/11/2022	04/11/2022	04/11/2022	04/11/2022	04/11/2022
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	07/11/2022	07/11/2022	07/11/2022	07/11/2022	07/11/2022
Date analysed	-	07/11/2022	07/11/2022	07/11/2022	07/11/2022	07/11/2022
Arsenic-Dissolved	µg/L	4	1	<1	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1	<1
Copper-Dissolved	µg/L	1	4	1	4	2
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	<1	<1	<1	<1	<1
Zinc-Dissolved	µg/L	4	4	2	14	13

HM in water - total						
Our Reference		309798-1	309798-2	309798-3	309798-4	309798-5
Your Reference	UNITS	MW101	MW103	MW111	SW1	SW2
Date Sampled		04/11/2022	04/11/2022	04/11/2022	04/11/2022	04/11/2022
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	07/11/2022	07/11/2022	07/11/2022	07/11/2022	07/11/2022
Date analysed	-	07/11/2022	07/11/2022	07/11/2022	07/11/2022	07/11/2022
Arsenic-Total	µg/L	12	2	<1	<1	<1
Cadmium-Total	µg/L	0.2	<0.1	<0.1	<0.1	<0.1
Chromium-Total	µg/L	7	<1	<1	<1	<1
Copper-Total	µg/L	14	<1	<1	2	2
Lead-Total	µg/L	24	<1	<1	1	<1
Mercury-Total	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Total	µg/L	4	1	<1	<1	2
Zinc-Total	µg/L	250	6	7	15	16

Cations in water Dissolved			
Our Reference		309798-4	309798-5
Your Reference	UNITS	SW1	SW2
Date Sampled		04/11/2022	04/11/2022
Type of sample		Water	Water
Date digested	-	07/11/2022	07/11/2022
Date analysed	-	07/11/2022	07/11/2022
Calcium - Dissolved	mg/L	22	23
Magnesium - Dissolved	mg/L	7.5	7.7
Hardness	mgCaCO 3 /L	86	89

Miscellaneous Inorganics						
Our Reference		309798-1	309798-2	309798-3	309798-4	309798-5
Your Reference	UNITS	MW101	MW103	MW111	SW1	SW2
Date Sampled		04/11/2022	04/11/2022	04/11/2022	04/11/2022	04/11/2022
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	04/11/2022	04/11/2022	04/11/2022	04/11/2022	04/11/2022
Date analysed	-	04/11/2022	04/11/2022	04/11/2022	04/11/2022	04/11/2022
pH	pH Units	6.4	5.5	5.2	6.7	6.8

PFAS in Waters Extended						
Our Reference		309798-1	309798-2	309798-3	309798-4	309798-5
Your Reference	UNITS	MW101	MW103	MW111	SW1	SW2
Date Sampled		04/11/2022	04/11/2022	04/11/2022	04/11/2022	04/11/2022
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	06/11/2022	06/11/2022	06/11/2022	06/11/2022	06/11/2022
Date analysed	-	06/11/2022	06/11/2022	06/11/2022	06/11/2022	06/11/2022
Perfluorobutanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoropentanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01	0.01	0.02	0.02	0.02
Perfluoroheptanesulfonic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecanesulfonic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorobutanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluoroheptanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorooctanoic acid PFOA	µg/L	<0.01	<0.01	0.01	<0.01	0.01
Perfluorononanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Perfluorotridecanoic acid	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluorotetradecanoic acid	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4:2 FTS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
6:2 FTS	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
8:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
10:2 FTS	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonamide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	100	101	100	102	100
Surrogate $^{13}C_2$ *PFOA*	%	96	95	96	96	95
Extracted ISTD $^{13}C_3$ *PFBS*	%	100	97	98	97	96
Extracted ISTD $^{18}O_2$ *PFHxS*	%	101	103	99	100	101
Extracted ISTD $^{13}C_4$ *PFOS*	%	101	101	102	100	103
Extracted ISTD $^{13}C_4$ *PFBA*	%	98	97	99	93	92

PFAS in Waters Extended						
Our Reference		309798-1	309798-2	309798-3	309798-4	309798-5
Your Reference	UNITS	MW101	MW103	MW111	SW1	SW2
Date Sampled		04/11/2022	04/11/2022	04/11/2022	04/11/2022	04/11/2022
Type of sample		Water	Water	Water	Water	Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	97	97	97	97	97
Extracted ISTD $^{13}C_2$ *PFHxA*	%	106	101	100	101	97
Extracted ISTD $^{13}C_4$ *PFHpA*	%	98	101	98	99	95
Extracted ISTD $^{13}C_4$ *PFOA*	%	108	108	106	106	110
Extracted ISTD $^{13}C_5$ *PFNA*	%	111	109	112	111	110
Extracted ISTD $^{13}C_2$ *PFDA*	%	106	107	111	107	104
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	114	120	108	114	112
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	103	109	106	112	112
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	80	81	76	79	82
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	121	116	111	116	115
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	101	101	102	102	103
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	115	113	113	119	120
Extracted ISTD $^{13}C_8$ *FOSA*	%	97	102	99	98	99
Extracted ISTD d_3 *N MeFOSA*	%	98	101	96	98	101
Extracted ISTD d_5 *N EtFOSA*	%	104	106	102	101	102
Extracted ISTD d_7 *N MeFOSE*	%	96	99	96	97	102
Extracted ISTD d_9 *N EtFOSE*	%	98	102	95	97	94
Extracted ISTD d_3 *N MeFOSAA*	%	111	114	116	114	115
Extracted ISTD d_5 *N EtFOSAA*	%	106	107	108	111	111
Total Positive PFHxS & PFOS	µg/L	<0.01	0.01	0.02	0.02	0.02
Total Positive PFOA & PFOS	µg/L	<0.01	<0.01	0.01	<0.01	0.01
Total Positive PFAS	µg/L	<0.01	0.01	0.03	0.02	0.03

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: Organochlorine Pesticides in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			08/11/2022	[NT]	[NT]	[NT]	[NT]	08/11/2022	[NT]
Date analysed	-			08/11/2022	[NT]	[NT]	[NT]	[NT]	08/11/2022	[NT]
alpha-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	100	[NT]
HCB	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	99	[NT]
gamma-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	81	[NT]
delta-BHC	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	93	[NT]
Heptachlor Epoxide	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	96	[NT]
gamma-Chlordane	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-Chlordane	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	90	[NT]
Dieldrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	96	[NT]
Endrin	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	76	[NT]
Endosulfan II	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	82	[NT]
Endrin Aldehyde	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	96	[NT]
Methoxychlor	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	75	[NT]	[NT]	[NT]	[NT]	93	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W5	309798-2
Date prepared	-			07/11/2022	1	07/11/2022	07/11/2022		07/11/2022	07/11/2022
Date analysed	-			07/11/2022	1	07/11/2022	07/11/2022		07/11/2022	07/11/2022
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	4	3	29	97	104
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	98	103
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	95	99
Copper-Dissolved	µg/L	1	Metals-022	<1	1	1	1	0	101	105
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	101	104
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	93	97
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	99	103
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	4	4	0	99	105

QUALITY CONTROL: HM in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	309798-2
Date prepared	-			07/11/2022	1	07/11/2022	07/11/2022		07/11/2022	07/11/2022
Date analysed	-			07/11/2022	1	07/11/2022	07/11/2022		07/11/2022	07/11/2022
Arsenic-Total	µg/L	1	Metals-022	<1	1	12	11	9	103	94
Cadmium-Total	µg/L	0.1	Metals-022	<0.1	1	0.2	0.2	0	101	94
Chromium-Total	µg/L	1	Metals-022	<1	1	7	6	15	99	90
Copper-Total	µg/L	1	Metals-022	<1	1	14	14	0	105	93
Lead-Total	µg/L	1	Metals-022	<1	1	24	23	4	103	94
Mercury-Total	µg/L	0.05	Metals-021	<0.05	1	<0.05	[NT]		90	[NT]
Nickel-Total	µg/L	1	Metals-022	<1	1	4	4	0	103	91
Zinc-Total	µg/L	1	Metals-022	<1	1	250	250	0	104	89

QUALITY CONTROL: HM in water - total						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	309798-4
Date prepared	-			[NT]	3	07/11/2022	07/11/2022		[NT]	07/11/2022
Date analysed	-			[NT]	3	07/11/2022	07/11/2022		[NT]	07/11/2022
Arsenic-Total	µg/L	1	Metals-022	[NT]	3	<1	[NT]		[NT]	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	[NT]	3	<0.1	[NT]		[NT]	[NT]
Chromium-Total	µg/L	1	Metals-022	[NT]	3	<1	[NT]		[NT]	[NT]
Copper-Total	µg/L	1	Metals-022	[NT]	3	<1	[NT]		[NT]	[NT]
Lead-Total	µg/L	1	Metals-022	[NT]	3	<1	[NT]		[NT]	[NT]
Mercury-Total	µg/L	0.05	Metals-021	[NT]	3	<0.05	<0.05	0	[NT]	93
Nickel-Total	µg/L	1	Metals-022	[NT]	3	<1	[NT]		[NT]	[NT]
Zinc-Total	µg/L	1	Metals-022	[NT]	3	7	[NT]		[NT]	[NT]

QUALITY CONTROL: Cations in water Dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			07/11/2022	[NT]	[NT]	[NT]	[NT]	07/11/2022	[NT]
Date analysed	-			07/11/2022	[NT]	[NT]	[NT]	[NT]	07/11/2022	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	99	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			04/11/2022	[NT]	[NT]	[NT]	[NT]	04/11/2022	[NT]
Date analysed	-			04/11/2022	[NT]	[NT]	[NT]	[NT]	04/11/2022	[NT]
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: PFAS in Waters Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			06/11/2022	[NT]	[NT]	[NT]	[NT]	06/11/2022	[NT]
Date analysed	-			06/11/2022	[NT]	[NT]	[NT]	[NT]	06/11/2022	[NT]
Perfluorobutanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	103	[NT]
Perfluoropentanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	105	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	107	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	107	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	103	[NT]
Perfluorodecanesulfonic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	91	[NT]
Perfluorobutanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	107	[NT]
Perfluoropentanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	106	[NT]
Perfluorohexanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	110	[NT]
Perfluoroheptanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	112	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	104	[NT]
Perfluorononanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	98	[NT]
Perfluorodecanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	98	[NT]
Perfluoroundecanoic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	97	[NT]
Perfluorododecanoic acid	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	98	[NT]
Perfluorotridecanoic acid	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Perfluorotetradecanoic acid	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	114	[NT]
4:2 FTS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	103	[NT]
6:2 FTS	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	110	[NT]
8:2 FTS	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	112	[NT]
10:2 FTS	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	128	[NT]
Perfluorooctane sulfonamide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	113	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	103	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	124	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	123	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	111	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.02	Org-029	<0.02	[NT]	[NT]	[NT]	[NT]	104	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	103	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	91	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	97	[NT]	[NT]	[NT]	[NT]	93	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	97	[NT]	[NT]	[NT]	[NT]	96	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	97	[NT]	[NT]	[NT]	[NT]	94	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	97	[NT]	[NT]	[NT]	[NT]	92	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	96	[NT]	[NT]	[NT]	[NT]	92	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	101	[NT]	[NT]	[NT]	[NT]	102	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	109	[NT]	[NT]	[NT]	[NT]	104	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	106	[NT]	[NT]	[NT]	[NT]	103	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	108	[NT]	[NT]	[NT]	[NT]	108	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	105	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	81	[NT]	[NT]	[NT]	[NT]	77	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	108	[NT]	[NT]	[NT]	[NT]	105	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	102	[NT]	[NT]	[NT]	[NT]	98	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	120	[NT]	[NT]	[NT]	[NT]	105	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	94	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	92	[NT]	[NT]	[NT]	[NT]	92	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	97	[NT]	[NT]	[NT]	[NT]	92	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	94	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: PFAS in Waters Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	95	[NT]	[NT]	[NT]	[NT]	91	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	110	[NT]	[NT]	[NT]	[NT]	105	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	118	[NT]	[NT]	[NT]	[NT]	107	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

TRACE METALS: In theory the total metal content should be higher than the dissolved metal content. However, in some samples this is not the case. The sample has been re-analysed for both Total and Dissolved metals and results have been confirmed.

COC 4/11 11:41

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	207253.02	**Suburb:**	Warriewood	**To:**	Envirolab Services
Project Manager:	Nerilee Edwards	**Order Number:**		**Sampler:**	TG
Email:	Nerilee.Edwards@douglaspartners.com.au; tom.graham@douglaspartners.com.au			**Attn:**	Sample Receipt
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day				(02) 9910 6200 samplereceipt@envirolab.com.au
Prior Storage:	☐ Fridge ☐ Freezer ☑ Esky ☐ Shelf	**Do samples contain 'potential' HBM?**	☑ No ☐ Yes	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water M - Material	Container Type: G - glass P - plastic	Analytes: Metals (Total)	Metals (Filtrable)	OCP	PFAS	Hardness	pH						Notes/ Preservation/ Additional Requirements
1	MW101			4/11/22	W	G+P	X	X	X	X		X						
2	MW103			4/11/22	W	G+P	X	X	X	X		X						
3	MW111			4/11/22	W	G+P	X	X	X	X		X						
4	SW1			4/11/22	W	G+P	X	X	X	X	X	X						
5	SW2			4/11/22	W	G+P	X	X	X	X	X	X						

ENVIROLAB GROUP

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

Job No: 209798
Date Received: 04/11/22
Time Received: 1205
Received By: CH
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Metals to analyse:

Number of samples in container:	5	**Transported to laboratory by:**	TG
Send results to:	Douglas Partners Pty Ltd		
Address:	96 Hermitage Road, West Ryde NSW 211	**Phone:**	(02) 9809 0666
Relinquished by:	TG	**Date:**	4/11/2022
		Signed:	TG

LAB RECEIPT

Lab Ref. No:	
Received by:	Chrystine.
Date & Time:	04/11/22 1205
Signed:	

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	Nerilee Edwards

Sample Login Details

Your reference	207253.02, Warriewood
Envirolab Reference	309798
Date Sample Received	02/11/2022
Date Instructions Received	02/11/2022
Date Results Expected to be Reported	11/11/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	5 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	14
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
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	Organochlorine Pesticides in Water	HM in water - dissolved	HM in water - total	Cations in water Dissolved	pH	PFAS in Waters Extended
MW101	✓	✓	✓		✓	✓
MW103	✓	✓	✓		✓	✓
MW111	✓	✓	✓		✓	✓
SW1	✓	✓	✓	✓	✓	✓
SW2	✓	✓	✓	✓	✓	✓

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 309798-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**207253.02, Warriewood**
Number of Samples	additional analysis
Date samples received	02/11/2022
Date completed instructions received	24/11/2022

Analysis Details

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

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

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

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

Report Details

Date results requested by	01/12/2022
Date of Issue	30/11/2022

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

Results Approved By
Alexander Mitchell Maclean, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

PFAS in Waters Trace Extended						
Our Reference		309798-A-1	309798-A-2	309798-A-3	309798-A-4	309798-A-5
Your Reference	UNITS	MW101	MW103	MW111	SW1	SW2
Date Sampled		04/11/2022	04/11/2022	04/11/2022	04/11/2022	04/11/2022
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	29/11/2022	29/11/2022	29/11/2022	29/11/2022	29/11/2022
Date analysed	-	29/11/2022	29/11/2022	29/11/2022	29/11/2022	29/11/2022
Perfluorobutanesulfonic acid	µg/L	0.002	0.002	0.004	0.0050	0.0047
Perfluoropentanesulfonic acid	µg/L	<0.001	<0.001	0.002	0.001	0.001
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0045	0.0059	0.012	0.019	0.018
Perfluoroheptanesulfonic acid	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonic acid PFOS	µg/L	0.0024	0.0021	0.0058	0.0089	0.0084
Perfluorodecanesulfonic acid	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentanoic acid	µg/L	0.006	0.004	0.006	0.01	0.01
Perfluorohexanoic acid	µg/L	0.0042	0.002	0.0044	0.0063	0.0071
Perfluoroheptanoic acid	µg/L	0.001	0.002	0.0042	0.003	0.004
Perfluorooctanoic acid PFOA	µg/L	0.0025	0.0045	0.010	0.0082	0.0084
Perfluorononanoic acid	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	µg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	µg/L	0.003	0.0004	0.002	<0.0004	<0.0004
8:2 FTS	µg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfon amide	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Surrogate $^{13}C_8$ *PFOS*	%	98	99	101	103	101
Surrogate $^{13}C_2$ *PFOA*	%	128	125	120	126	124
Extracted ISTD $^{13}C_3$ *PFBS*	%	66	70	73	66	70
Extracted ISTD $^{18}O_2$ *PFHxS*	%	92	98	100	98	100
Extracted ISTD $^{13}C_4$ *PFOS*	%	76	82	83	81	83
Extracted ISTD $^{13}C_4$ *PFBA*	%	#	#	#	#	#

PFAS in Waters Trace Extended						
Our Reference		309798-A-1	309798-A-2	309798-A-3	309798-A-4	309798-A-5
Your Reference	UNITS	MW101	MW103	MW111	SW1	SW2
Date Sampled		04/11/2022	04/11/2022	04/11/2022	04/11/2022	04/11/2022
Type of sample		Water	Water	Water	Water	Water
Extracted ISTD $^{13}C_3$ *PFPeA*	%	43	43	54	39	36
Extracted ISTD $^{13}C_2$ *PFHxA*	%	89	91	102	82	79
Extracted ISTD $^{13}C_4$ *PFHpA*	%	103	111	114	108	106
Extracted ISTD $^{13}C_4$ *PFOA*	%	79	89	94	87	89
Extracted ISTD $^{13}C_5$ *PFNA*	%	73	94	99	95	98
Extracted ISTD $^{13}C_2$ *PFDA*	%	93	98	106	111	112
Extracted ISTD $^{13}C_2$ *PFUnDA*	%	48	83	91	103	105
Extracted ISTD $^{13}C_2$ *PFDoDA*	%	60	73	80	85	90
Extracted ISTD $^{13}C_2$ *PFTeDA*	%	67	91	95	103	114
Extracted ISTD $^{13}C_2$ *4:2FTS*	%	126	126	133	118	111
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	149	166	159	169	175
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	119	117	107	139	148
Extracted ISTD $^{13}C_8$ *FOSA*	%	41	62	61	68	71
Extracted ISTD d_3 *N MeFOSA*	%	98	101	96	98	101
Extracted ISTD d_5 *N EtFOSA*	%	104	106	102	101	102
Extracted ISTD d_7 *N MeFOSE*	%	96	99	96	97	102
Extracted ISTD d_9 *N EtFOSE*	%	98	102	95	97	94
Extracted ISTD d_3 *N MeFOSAA*	%	67	95	89	122	124
Extracted ISTD d_5 *N EtFOSAA*	%	34	82	71	104	109
Total Positive PFHxS & PFOS	µg/L	0.0069	0.0080	0.018	0.028	0.027
Total Positive PFOS & PFOA	µg/L	0.0049	0.0066	0.016	0.017	0.017
Total Positive PFAS	µg/L	0.026	0.023	0.050	0.062	0.064

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: PFAS in Waters Trace Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			29/11/2022	[NT]	[NT]	[NT]	[NT]	29/11/2022	[NT]
Date analysed	-			29/11/2022	[NT]	[NT]	[NT]	[NT]	29/11/2022	[NT]
Perfluorobutanesulfonic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	109	[NT]
Perfluoropentanesulfonic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	106	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	105	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	112	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	94	[NT]
Perfluorodecanesulfonic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	78	[NT]
Perfluorobutanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	99	[NT]
Perfluoropentanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	93	[NT]
Perfluorohexanoic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	89	[NT]
Perfluoroheptanoic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	102	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	92	[NT]
Perfluorononanoic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	88	[NT]
Perfluorodecanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	94	[NT]
Perfluoroundecanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	84	[NT]
Perfluorododecanoic acid	µg/L	0.005	Org-029	<0.005	[NT]	[NT]	[NT]	[NT]	100	[NT]
Perfluorotridecanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	88	[NT]
Perfluorotetradecanoic acid	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	91	[NT]
4:2 FTS	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	102	[NT]
6:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	95	[NT]
8:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	99	[NT]
10:2 FTS	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	124	[NT]
Perfluorooctane sulfonamide	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	101	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	103	[NT]
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	124	[NT]
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	[NT]	[NT]	[NT]	[NT]	123	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	98	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	104	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	98	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	110	[NT]	[NT]	[NT]	[NT]	107	[NT]

QUALITY CONTROL: PFAS in Waters Trace Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD $^{13}C_3$ *PFBS*	%		Org-029	74	[NT]	[NT]	[NT]	[NT]	72	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	88	[NT]	[NT]	[NT]	[NT]	82	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	84	[NT]	[NT]	[NT]	[NT]	84	[NT]
Extracted ISTD $^{13}C_4$ *PFBA*	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD $^{13}C_3$ *PFPeA*	%		Org-029	80	[NT]	[NT]	[NT]	[NT]	80	[NT]
Extracted ISTD $^{13}C_2$ *PFHxA*	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	98	[NT]
Extracted ISTD $^{13}C_4$ *PFHpA*	%		Org-029	93	[NT]	[NT]	[NT]	[NT]	92	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	101	[NT]
Extracted ISTD $^{13}C_5$ *PFNA*	%		Org-029	109	[NT]	[NT]	[NT]	[NT]	107	[NT]
Extracted ISTD $^{13}C_2$ *PFDA*	%		Org-029	89	[NT]	[NT]	[NT]	[NT]	88	[NT]
Extracted ISTD $^{13}C_2$ *PFUnDA*	%		Org-029	88	[NT]	[NT]	[NT]	[NT]	87	[NT]
Extracted ISTD $^{13}C_2$ *PFDoDA*	%		Org-029	77	[NT]	[NT]	[NT]	[NT]	80	[NT]
Extracted ISTD $^{13}C_2$ *PFTeDA*	%		Org-029	68	[NT]	[NT]	[NT]	[NT]	73	[NT]
Extracted ISTD $^{13}C_2$ *4:2FTS*	%		Org-029	119	[NT]	[NT]	[NT]	[NT]	117	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	132	[NT]	[NT]	[NT]	[NT]	129	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	117	[NT]	[NT]	[NT]	[NT]	98	[NT]
Extracted ISTD $^{13}C_8$ *FOSA*	%		Org-029	62	[NT]	[NT]	[NT]	[NT]	58	[NT]
Extracted ISTD d_3 *N MeFOSA*	%		Org-029	92	[NT]	[NT]	[NT]	[NT]	92	[NT]
Extracted ISTD d_5 *N EtFOSA*	%		Org-029	97	[NT]	[NT]	[NT]	[NT]	92	[NT]
Extracted ISTD d_7 *N MeFOSE*	%		Org-029	94	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: PFAS in Waters Trace Extended					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Extracted ISTD d_9 *N EtFOSE*	%		Org-029	95	[NT]	[NT]	[NT]	[NT]	91	[NT]
Extracted ISTD d_3 *N MeFOSAA*	%		Org-029	86	[NT]	[NT]	[NT]	[NT]	76	[NT]
Extracted ISTD d_5 *N EtFOSAA*	%		Org-029	83	[NT]	[NT]	[NT]	[NT]	76	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

Ming To

From: Aileen Hie
Sent: Thursday, 24 November 2022 1:00 PM
To: Ming To
Subject: FW: Results for Registration 309798 207253.02, Warriewood

Categories: Additional

Ref: 309798 A
TAT: Standard.
Due: 01/12/2022
MT.

A job, just trace PFAS

From: Nerilee Edwards <Nerilee.Edwards@douglaspartners.com.au>
Sent: Thursday, 24 November 2022 12:59 PM
To: Aileen Hie <AHie@envirolab.com.au>
Subject: RE: Results for Registration 309798 207253.02, Warriewood

Yes please

Nerilee Edwards | Senior Associate / Environmental Scientist
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: +61 414 769 011 | E: Nerilee.Edwards@douglaspartners.com.au

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

From: Aileen Hie <AHie@envirolab.com.au>
Sent: Thursday, 24 November 2022 12:55 PM
To: Nerilee Edwards <Nerilee.Edwards@douglaspartners.com.au>
Subject: RE: Results for Registration 309798 207253.02, Warriewood

Hi Nerilee

1-5

PFAS ok for trace. Do you want it logged in for testing?

Kind Regards,

Aileen Hie | Customer Service Supervisor | Envirolab Services
(Monday to Friday 10am to 6pm)

Great Science. Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200
E AHie@envirolab.com.au | W www.envirolab.com.au

Follow us on: LinkedIn | Facebook | Twitter

Samples will be analysed per our T&C's. 309798A

From: Nerilee Edwards <Nerilee.Edwards@douglaspartners.com.au>
Sent: Thursday, 24 November 2022 12:48 PM
To: Aileen Hie <AHie@envirolab.com.au>
Subject: RE: Results for Registration 309798 207253.02, Warriewood

thanks

Nerilee Edwards | Senior Associate / Environmental Scientist
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: +61 414 769 011 | E: Nerilee.Edwards@douglaspartners.com.au

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

From: Aileen Hie <AHie@envirolab.com.au>
Sent: Thursday, 24 November 2022 12:24 PM
To: Nerilee Edwards <Nerilee.Edwards@douglaspartners.com.au>; Samplereceipt <Samplereceipt@envirolab.com.au>
Cc: Kurt Plambeck <kurt.plambeck@douglaspartners.com.au>
Subject: RE: Results for Registration 309798 207253.02, Warriewood

Hi Nerilee

We can't do trace OCP as there's not enough sample left. PFAS should be ok but I'm just getting the lab to check the volume left in the PFAS bottle.

Kind Regards,

Aileen Hie | Customer Service Supervisor | Envirolab Services
(Monday to Friday 10am to 6pm)

Great Science. Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200
E AHie@envirolab.com.au | W www.envirolab.com.au

Follow us on: LinkedIn | Facebook | Twitter

Samples will be analysed per our T&C's. 309798-A

From: Nerilee Edwards <Nerilee.Edwards@douglaspartners.com.au>
Sent: Thursday, 24 November 2022 12:05 PM
To: Samplereceipt <Samplereceipt@envirolab.com.au>
Cc: Kurt Plambeck <kurt.plambeck@douglaspartners.com.au>
Subject: FW: Results for Registration 309798 207253.02, Warriewood

Hi Aileen,

Is it too late to get these tested for trace level OCP & PFAS?

ta

Nerilee Edwards | Senior Associate / Environmental Scientist
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: +61 414 769 011 | E: Nerilee.Edwards@douglaspartners.com.au

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

From: Nancy Zhang <NZhang@envirolab.com.au>
Sent: Wednesday, 9 November 2022 6:00 PM
To: Nerilee Edwards <Nerilee.Edwards@douglaspartners.com.au>; Tom Graham <Tom.Graham@douglaspartners.com.au>
Subject: Results for Registration 309798 207253.02, Warriewood

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC/paperwork received from you
ESDAT Extracts
an Excel or .csv file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:
customerservice@envirolab.com.au

How did we do? Send Feedback

Kind Regards,

COC 4/11 11:41

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	207253.02	**Suburb:**	Warriewood	**To:**	Envirolab Services
Project Manager:	Nerilee Edwards	**Order Number:**		**Sampler:**	TG
Email:	Nerilee.Edwards@douglaspartners.com.au; tom.graham@douglaspartners.com.au			**Attn:**	Sample Receipt
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day				(02) 9910 6200 samplereceipt@envirolab.com.au
Prior Storage:	☐ Fridge ☐ Freezer ☑ Esky ☐ Shelf	**Do samples contain 'potential' HBM?**	☑ No ☐ Yes	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water M - Material	Container Type: G - glass P - plastic	Analytes: Metals (Total)	Metals (Filtrable)	OCP	PFAS	Hardness	pH						Notes/ Preservation/ Additional Requirements
1	MW101			4/11/22	W	G+P	X	X	X	X		X						
2	MW103			4/11/22	W	G+P	X	X	X	X		X						
3	MW111			4/11/22	W	G+P	X	X	X	X		X						
4	SW1			4/11/22	W	G+P	X	X	X	X	X	X						
5	SW2			4/11/22	W	G+P	X	X	X	X	X	X						

ENVIROLAB GROUP

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

Job No: 209798
Date Received: 04/11/22
Time Received: 1205
Received By: CH
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Metals to analyse:

Number of samples in container:	5	**Transported to laboratory by:**	TG
Send results to:	Douglas Partners Pty Ltd		
Address:	96 Hermitage Road, West Ryde NSW 211	**Phone:**	(02) 9809 0666
Relinquished by:	TG	**Date:**	4/11/2022
		Signed:	TG

LAB RECEIPT

Lab Ref. No:	
Received by:	Chrystine.
Date & Time:	04/11/22 1205
Signed:	

1 October 2004

TEST REPORT

Douglas Partners Pty Ltd
96 Hermitage Road
WEST RYDE
NSW 2114

Your Reference: 37273, Warriewood
Report Number: 31963

Attention: Nerilee Edwards

Dear Nerilee
The following samples were received from you on the date indicated.

Samples:	Qty.	23 Soils, 1 Water
Date of Receipt of Samples:		24/09/04
Date of Receipt of Instructions:		24/09/04
Date Preliminary Report Faxed:		Not Issued

These samples were analysed in accordance with your written instructions.
A copy of the instructions is attached with the analytical report.

The results and associated quality control are contained in the following pages of this report. Unless otherwise stated, solid samples are expressed on a dry weight basis (moisture has been supplied for your information only), air and liquid samples as received.

Should you have any queries regarding this report please contact the undersigned.

For sample 31963-6 Chrysotile Asbestos detected found as a 2mm fibre bundle loose in the soil.

Yours faithfully
SGS ENVIRONMENTAL SERVICES

Tania Notaras
Manager – Sydney

SGS Australia Pty Ltd
ABN 44 000 964 278
Environmental Services Botany Industrial Park Gate 3, Denison Street, Matraville 2036 NSW Australia
t +61 (0)2 9666 1426 f +61 (0)2 9666 1364 url www.sgs.com

SGS Ref	Sample ID	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
---	---	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
31963-1	1/0.5	<3	<0.5	5	12	11	<0.05	6	32
31963-2	2/0.2	<3	<0.5	1	11	26	<0.05	0.8	46
31963-3	2/1.0	<3	<0.5	6	0.5	5	<0.05	2	0.7
31963-4	3/0.5	12	0.9	4	2	10	<0.05	1	7
31963-5	3/3.0	<3	<0.5	4	<0.5	4	<0.05	0.6	<0.5
31963-6	4/0.5	<3	<0.5	4	21	28	0.06	3	47
31963-7	5/0.3	4	<0.5	7	31	17	<0.05	1	5
31963-8	5/1.5	<3	<0.5	1	<0.5	<2	<0.05	0.3	<0.5
31963-9	6/0.5	<3	<0.5	1	4	9	<0.05	0.7	93
31963-10	7/0.5	6	<0.5	6	36	31	<0.05	2	48
31963-11	8/0.3	<3	<0.5	2	0.7	4	<0.05	0.4	1
31963-12	9/0.1-0.5	<3	<0.5	6	7	12	<0.05	3	86
31963-13	10/0.2	8	<0.5	9	23	34	0.08	6	170
31963-14	10/1.5	<3	<0.5	2	<0.5	2	<0.05	1	3
31963-15	11/0.5	3	<0.5	1	<0.5	2	<0.05	0.6	0.7
31963-16	12/0.5	<3	<0.5	3	<0.5	4	<0.05	0.5	2
31963-17	13/0.4	4	<0.5	6	4	39	<0.05	0.5	26
31963-18	14/0.1	<3	<0.5	3	2	5	<0.05	0.9	7
31963-19	15/0-0.5	12	<0.5	8	14	26	<0.05	3	45
31963-20	15/3.0	3	<0.5	12	8	16	<0.05	4	0.8
31963-21	Z3	<3	<0.5	7	14	12	<0.05	7	37
31963-22	Z8	<3	<0.5	3	<0.5	4	<0.05	0.5	2
31963-24	9/1.5	9	0.5	6	21	37	<0.05	3	240

SGS Ref	Sample ID	TRH C6 - C9 P&T	TRH C10 - C14	TRH C15 - C28	TRH C29 - C36	Benzene	Toluene	Ethylbenzene	Total Xylenes	Surrogate
---	---	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
31963-1	1/0.5	<20	<20	89	82	<0.50	<0.50	<0.50	<1.5	80
31963-2	2/0.2	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	89
31963-4	3/0.5	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	76
31963-6	4/0.5	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	82
31963-8	5/1.5	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	80
31963-9	6/0.5	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	78
31963-10	7/0.5	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	78
31963-11	8/0.3	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	75
31963-13	10/0.2	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	87
31963-15	11/0.5	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	70
31963-16	12/0.5	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	82
31963-17	13/0.4	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	88
31963-18	14/0.1	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	77
31963-19	15/0-0.5	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	72
31963-24	9/1.5	<20	<20	<50	<50	<0.50	<0.50	<0.50	<1.5	80

SGS Ref	Sample ID	HCB	alpha-BHC	gamma-BHC(Lindane)	Heptachlor	Aldrin	beta-BHC	delta-BHC	Heptachlor Epoxide	o,p'-DDE	alpha-Endosulfan	trans-Chlordane	cis-Chlordane	trans-Nonachlor	p,p'-DDE	Dieldrin
---	---	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
31963-1	1/0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
31963-2	2/0.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
31963-4	3/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
31963-6	4/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
31963-8	5/1.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
31963-9	6/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
31963-10	7/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.70	<0.10
31963-11	8/0.3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
31963-13	10/0.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
31963-15	11/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
31963-16	12/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
31963-17	13/0.4	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
31963-18	14/0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
31963-19	15/0-0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
31963-24	9/1.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

SGS Ref	Sample ID	Endrin	o,p'-DDD	o,p'-DDT	beta-Endosulfan	p,p'-DDD	p,p'-DDT	Endosulfan Sulphate	Endrin Aldehyde	Methoxychlor	Endrin Ketone	Surrogate
---	---	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
31963-1	1/0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	97
31963-2	2/0.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	109
31963-4	3/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	88
31963-6	4/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	98
31963-8	5/1.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	88
31963-9	6/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	81
31963-10	7/0.5	<0.10	<0.10	0.20	<0.10	1.3	<0.10	<0.10	<0.10	<0.10	<0.10	102
31963-11	8/0.3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	100
31963-13	10/0.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	109
31963-15	11/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	101
31963-16	12/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	103
31963-17	13/0.4	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	106
31963-18	14/0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	105
31963-19	15/0-0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	110
31963-24	9/1.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	107

SGS Ref	Sample ID	Chlorpyrifos	Fenitrothion	Bromofos Ethyl	Ethion	Surrogate
---	---	mg/kg	mg/kg	mg/kg	mg/kg	%
31963-1	1/0.5	<0.2	<0.2	<0.2	<0.2	97
31963-2	2/0.2	<0.10	<0.10	<0.10	<0.10	109
31963-4	3/0.5	<0.10	<0.10	<0.10	<0.10	88
31963-6	4/0.5	<0.10	<0.10	<0.10	<0.10	98
31963-8	5/1.5	<0.10	<0.10	<0.10	<0.10	88
31963-9	6/0.5	<0.10	<0.10	<0.10	<0.10	81
31963-10	7/0.5	<0.10	<0.10	<0.10	<0.10	102
31963-11	8/0.3	<0.10	<0.10	<0.10	<0.10	100
31963-13	10/0.2	<0.10	<0.10	<0.10	<0.10	109
31963-15	11/0.5	<0.10	<0.10	<0.10	<0.10	101
31963-16	12/0.5	<0.10	<0.10	<0.10	<0.10	103
31963-17	13/0.4	<0.10	<0.10	<0.10	<0.10	106
31963-18	14/0.1	<0.10	<0.10	<0.10	<0.10	105
31963-19	15/0-0.5	<0.10	<0.10	<0.10	<0.10	110
31963-24	9/1.5	<0.10	<0.10	<0.10	<0.10	107

SGS Ref	Sample ID	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	Arochlor 1262	Arochlor 1268	Surrogate
---	---	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
31963-1	1/0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	97
31963-2	2/0.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	109
31963-4	3/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	88
31963-6	4/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	98
31963-8	5/1.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	88
31963-9	6/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	81
31963-10	7/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	102
31963-11	8/0.3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	100
31963-13	10/0.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	109
31963-15	11/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	101
31963-16	12/0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	103
31963-17	13/0.4	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	106
31963-18	14/0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	105
31963-19	15/0-0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	110
31963-24	9/1.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	107

SGS Ref	Sample ID	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo[a]anthracene	Chrysene	Benzo[b,k]fluoranthene	Benzo[a]pyrene	Indeno[123-cd]pyrene	Dibenzo[ah]anthracene	Benzo[ghi]perylene
---	---	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
31963-1	1/0.5	<0.1	0.3	<0.1	<0.1	0.1	0.5	2.7	2.6	1.6	1.4	2.8	2.4	2.8	0.2	1.5
31963-2	2/0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.2	0.08	0.1	<0.1	<0.1
31963-4	3/0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
31963-6	4/0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
31963-8	5/1.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
31963-9	6/0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
31963-10	7/0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
31963-11	8/0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
31963-13	10/0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
31963-15	11/0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
31963-16	12/0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
31963-17	13/0.4	<0.1	0.1	<0.1	<0.1	0.2	0.1	0.6	0.6	0.4	0.3	0.5	0.3	0.4	<0.1	0.2
31963-18	14/0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
31963-19	15/0-0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1
31963-24	9/1.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.2	0.1	<0.1	<0.2	0.08	<0.1	<0.1	<0.1

SGS Ref	Sample ID		Total +ve PAH's	Surrogate
---	---		mg/kg	%
31963-1	1/0.5		19	121
31963-2	2/0.2		0.58	121
31963-4	3/0.5		0.00	129
31963-6	4/0.5		0.00	125
31963-8	5/1.5		0.00	126
31963-9	6/0.5		0.00	126
31963-10	7/0.5		0.00	130
31963-11	8/0.3		0.00	120
31963-13	10/0.2		0.00	126
31963-15	11/0.5		0.00	123
31963-16	12/0.5		0.00	126
31963-17	13/0.4		3.7	123
31963-18	14/0.1		0.00	129
31963-19	15/0-0.5		0.00	131
31963-24	9/1.5		0.48	129

SGS Ref	Sample ID	Total Phenolics (as Phenol)
---	---	mg/kg
31963-1	1/0.5	<0.50
31963-6	4/0.5	<0.50
31963-8	5/1.5	<0.50
31963-9	6/0.5	<0.50
31963-10	7/0.5	<0.50
31963-15	11/0.5	<0.50
31963-17	13/0.4	<0.50
31963-19	15/0-0.5	<0.50

SGS Ref	Sample ID	Sample Description	Asbestos ID in soil
---	---		
31963-6	4/0.5	20g Sand, Soil, Rock	Chrysotile asbestos detected
31963-13	10/0.2	20g Sand, Soil, Rock	No asbestos detected
31963-16	12/0.5	20g Sand, Soil	No asbestos detected

Method ID	Methodology Summary
SEM-010	Metals - Determination of various metals by ICP-AES following aqua regia digest.
SEM-005	Mercury - Determination of Mercury by Cold Vapour Generation Atomic Absorption Spectroscopy.
SEO-017	BTEX/TRH C6-C9 - Determination by Purge and Trap Gas Chromatography with Flame Ionisation Detection (FID) and Photo Ionisation Detection (PID). The surrogate spike used is aaa-trifluorotoluene.
SEO-020	TRH - Determination of Total Recoverable Hydrocarbons by gas chromatography following extraction with DCM/Acetone for solids and DCM for liquids.
SEO-005	OC/OP/PCB - Determination of a suite of Organchlorine Pesticides, Chlorinated Organo-phosphorus Pesticides and Polychlorinated Biphenyls (PCB's) by sonication extraction using dichloromethane for waters or acetone / hexane for soils followed by Gas Chromatographic separation with Electron Capture Detection (GC /ECD). The surrogate spike used is 2,4,5,6-Tetrachloro-m-xylene.
SEO-030	PAHs by GC/MS - Determination of Polynuclear Aromatic Hydrocarbons (PAH's) by Gas Chromatography / Mass Spectrometry following extraction with dichloromethane or dichloromethane/acetone. The surrogate spike used is p-Terphenyl-d14.
SEI-065	Total Phenolics - determined colorimetrically following steam stripping of the sample. Based on APHA 20th ED, 5530-D.
SASB-002	Qualitative identification of asbestos type fibres in bulk using Polarised Light Microscopy and Dispersion Staining Techniques. Accreditation does not cover the identification of Synthetic Mineral Fibre.
SEP-001	Air Dry - Cover air drying at 40 C, moisture content at 103 C - 105 C, wet slurrying, compositing and preparation of a 1:5 soil suspension.

QUALITY CONTROL Acid Extractable Metals in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base+Duplicate+%RPD	Spike Sm#	Matrix Spike % Recovery Duplicate+% RPD
Arsenic	mg/kg	3	SEM-010	<3	31963-1	<3 || <3	31963-2	96 || 98 || RPD: 2
Cadmium	mg/kg	0.5	SEM-010	<0.5	31963-1	<0.5 || <0.5	31963-2	104 || 106 || RPD: 2
Chromium	mg/kg	0.5	SEM-010	<0.5	31963-1	5 || 6 || RPD: 18	31963-2	98 || 99 || RPD: 1
Copper	mg/kg	0.5	SEM-010	<0.5	31963-1	12 || 12 || RPD: 0	31963-2	102 || 102 || RPD: 0
Lead	mg/kg	2	SEM-010	<2	31963-1	11 || 11 || RPD: 0	31963-2	98 || 100 || RPD: 2
Mercury	mg/kg	0.05	SEM-005	<0.05	31963-1	<0.05 || <0.05	31963-2	96 || 98 || RPD: 2
Nickel	mg/kg	0.2	SEM-010	<0.2	31963-1	6 || 7 || RPD: 15	31963-2	98 || 100 || RPD: 2
Zinc	mg/kg	0.5	SEM-010	<0.5	31963-1	32 || 34 || RPD: 6	31963-2	100 || 98 || RPD: 2
QUALITY CONTROL TRH/BTEX in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base+Duplicate+%RPD	Spike Sm#	Matrix Spike % Recovery Duplicate+% RPD
TRH C_6 - C_9 P&T	mg/kg	20	SEO-017	<20	31963-11	<20 || <20	31963-17	70 || 64 || RPD: 9
TRH C_{10} - C_{14}	mg/kg	20	SEO-020	<20	31963-11	<20 || <20	31963-17	85 || 86 || RPD: 1
TRH C_{15} - C_{28}	mg/kg	50	SEO-020	<50	31963-11	<50 || <50	31963-17	81 || 80 || RPD: 1
TRH C_{29} - C_{36}	mg/kg	50	SEO-020	<50	31963-11	<50 || <50	31963-17	93 || 93 || RPD: 0
Benzene	mg/kg	0.5	SEO-017	<0.50	31963-11	<0.50 || <0.50	31963-17	72 || 64 || RPD: 12
Toluene	mg/kg	0.5	SEO-017	<0.50	31963-11	<0.50 || <0.50	31963-17	71 || 63 || RPD: 12
Ethylbenzene	mg/kg	0.5	SEO-017	<0.50	31963-11	<0.50 || <0.50	31963-17	67 || 69 || RPD: 3
Total Xylenes	mg/kg	1.5	SEO-017	<1.5	31963-11	<1.5 || <1.5	31963-17	81 || 76 || RPD: 6
Surrogate	%		SEO-017	[NT]	31963-11	75 || 88 || RPD: 16	31963-17	78 || 74 || RPD: 5

QUALITY CONTROL OC Pesticides in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base+Duplicate+% RPD	Spike Sm#	Matrix Spike % Recovery Duplicate+% RPD
HCB	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
alpha-BHC	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
gamma-BHC(Lindane)	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
Heptachlor	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	89 || 74 || RPD: 18
Aldrin	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	89 || 72 || RPD: 21
beta-BHC	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
delta-BHC	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	89 || 89 || RPD: 0
Heptachlor Epoxide	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
o,p'-DDE	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
alpha-Endosulfan	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
trans-Chlordane	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
cis-Chlordane	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
trans-Nonachlor	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
p,p'-DDE	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
Dieldrin	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	91 || 72 || RPD: 23
Endrin	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
o,p'-DDD	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
o,p'-DDT	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
beta-Endosulfan	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
p,p'-DDD	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
p,p'-DDT	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	91 || 88 || RPD: 3
Endosulfan Sulphate	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	94 || 72 || RPD: 27
Endrin Aldehyde	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
Methoxychlor	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]

QUALITY CONTROL OC Pesticides in Soil	**UNITS**	**PQL**	**METHOD**	**Blank**	**Duplicate Sm#**	**Duplicate Base+Duplicate+% RPD**	**Spike Sm#**	**Matrix Spike % Recovery Duplicate+% RPD**
Endrin Ketone	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
Surrogate	%		SEO-005	[NT]	31963-4	88 || 82 || RPD: 7	31963-15	91 || 81 || RPD: 12
QUALITY CONTROL OP Pesticides in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base+Duplicate+%RPD	Spike Sm#	Matrix Spike % Recovery Duplicate+% RPD
Chlorpyrifos	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	93 || 76 || RPD: 20
Fenitrothion	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
Bromofos Ethyl	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
Ethion	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-15	[NT]
Surrogate	%		SEO-005	[NT]	31963-4	88 || 82 || RPD: 7	31963-15	91 || 81 || RPD: 12
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base+Duplicate+%RPD	Spike Sm#	Matrix Spike % Recovery Duplicate+% RPD
Arochlor 1016	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-2	[NT]
Arochlor 1221	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-2	[NT]
Arochlor 1232	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-2	[NT]
Arochlor 1242	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-2	[NT]
Arochlor 1248	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-2	[NT]
Arochlor 1254	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-2	105 || 110 || RPD: 5
Arochlor 1260	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-2	[NT]
Arochlor 1262	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-2	[NT]
Arochlor 1268	mg/kg	0.1	SEO-005	<0.10	31963-4	<0.10 || <0.10	31963-2	[NT]
Surrogate	%		SEO-005	[NT]	31963-4	88 || 82 || RPD: 7	31963-2	83 || 80 || RPD: 4

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base+Duplicate+% RPD	Spike Sm#	Matrix Spike % Recovery Duplicate+% RPD
Naphthalene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	93 || 91 || RPD: 2
Acenaphthylene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	100 || 98 || RPD: 2
Acenaphthene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	93 || 91 || RPD: 2
Fluorene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	[NT]
Phenanthrene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	92 || 92 || RPD: 0
Anthracene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	111 || 112 || RPD: 1
Fluoranthene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	106 || 106 || RPD: 0
Pyrene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	108 || 108 || RPD: 0
Benzo[*a*]anthracene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	[NT]
Chrysene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	[NT]
Benzo[*b,k*]fluoranthene	mg/kg	0.20	SEO-030	<0.2	31963-11	<0.2 || <0.2	31963-16	[NT]
Benzo[*a*]pyrene	mg/kg	0.050	SEO-030	<0.05	31963-11	<0.05 || <0.05	31963-16	113 || 110 || RPD: 3
Indeno[*123-cd*]pyrene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	[NT]
Dibenzo[*ah*]anthracene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	[NT]
Benzo[*ghi*]perylene	mg/kg	0.10	SEO-030	<0.1	31963-11	<0.1 || <0.1	31963-16	[NT]
Total +ve PAH's	mg/kg	0	SEO-030	0.00	31963-11	0.00 || 0.00	31963-16	[NT]
Surrogate	%		SEO-030	[NT]	31963-11	120 || 125 || RPD: 4	31963-16	124 || 129 || RPD: 4

QUALITY CONTROL CN, Phenolics	**UNITS**	**PQL**	**METHOD**	**Blank**	**Duplicate Sm#**	**Duplicate Base+Duplicate+% RPD**	**Spike Sm#**	**Matrix Spike % Recovery Duplicate+% RPD**
Total Phenolics (as Phenol)	mg/kg	0.5	SEI-065	<0.50	31963-17	<0.50 || <0.50	31963-19	89 || 90 || RPD: 1

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base+Duplicate+%RPD
Moisture	%		SEP-001	[NT]	31963-4	13 || 13 || RPD: 0

QUALITY CONTROL Moisture	UNITS	Dup. Sm#	Duplicate Base:Duplicate:%RPD
Moisture	%	31963-11	12 || 12 || RPD: 0

Result Codes

[INS]	:	Insufficient Sample for this test	[HBG]	:	Results not Reported due to High Background Interference
[NR]	:	Not Requested	*	:	Not part of NATA Accreditation
[NT]	:	Not tested	[N/A]	:	Not Applicable

Result Comments

ASBESTOS NB. Even after disintegration of certain bulk samples (vinyl tiles and bituminous type materials), the detection, of fibres may be difficult when using Polarised Light Microscopy and Dispersion Staining Techniques. This may be due to the matrix of the sample (uneven distribution), or fine fibres that are difficult to detect and positively identify.

OC/OP/PCBs in Soil level of reporting for Sample 1 raised due to matrix interference.

Date Organics extraction commenced: 28/09/04

NATA Accreditation No. 4361

Quality Control Protocol

Reagent Blank: Sample free reagents carried through the preparation/extraction/digestion procedure and analysed at the beginning of every sample batch analysis. For larger projects, a reagent blank is prepared and analysed with every 20 samples.

Duplicate: A separate portion of a sample being analysed which is treated the same as the other samples in the batch. A duplicate is prepared at least every 20 samples.

Matrix Spike Duplicates: Sample replicates spiked with identical concentrations of target analyte(s). The spiking occurs during the sample preparation and prior to the extraction/digestion procedure. They are used to document the precision and bias of a method in a given sample matrix. Where there is not enough sample available to prepare a spiked sample, another known soil/sand or water (or Milli-Q water) may be used. A duplicate spiked sample is prepared at least every 20 samples.

Surrogate Spike: Added to all samples requiring analysis for organics (where relevant) prior to extraction. Used to determine the extraction efficiency. They are organic compounds which are similar to the target analyte(s) in chemical composition and behaviour in the analytical process, but which are not normally found in environmental samples.

Internal Standard: Added to all samples requiring analysis for organics (where relevant) after the extraction process; the compounds serve to give a standard of retention time and response, which is invariant from run-to-run with the instruments.

Control Standards: Prepared from a source independent of the calibration standards. At least one control standard is included in each run to confirm calibration validity.

Additional QC Samples: A calibration standard and blank are run after every 20 samples of an instrumental analysis run to assess analytical drift.

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CHAIN OF CUSTODY DESPATCH SHEET

Project Name: Warriewood

Project No: 31213

DP Contact Person: Henlee

Prior Storage: esky / ~~fridge~~ / shelved (circle)

To: SGS Environmental Services
Botany Technical Centre, Orica Industrial Park
Gate 3, Denison Street, MATRAVILLE NSW 2036
Ph: 9666 1426 Fax: 9666 1364
Attn: Attn: Tania Notaras

Sample ID	Sample Type S-soil W-water	Lab ID	Inorganics: TRH 8	Cd	Cr	Cu	Pb	Hg	Zn	Ni	Organics: Total / GS/MS Phenol	BTEX/ TPH	OCs/ OPs/ PCBs	PAHs	asbestos ~~Other~~	TCLP	Notes
1/0.5	S	-1	✓								✓	✓	✓	✓			
2/0.2	↓	-2	✓									✓	✓	✓			
2/1.0		-3	✓														
3/0.5		-4	✓									✓	✓	✓			
3/3.0		-5	✓														
4/0.5		-6	✓								✓	✓	✓	✓	✓		
5/0.2		-7	✓														
5/1.5		-8	✓								✓	✓	✓	✓			
6/0.5		-9	✓								✓	✓	✓	✓			
7/0.5		-10	✓								✓	✓	✓	✓			
8/0.3	✓	-11	✓									✓	✓	✓			
PQL (S)	mg/kg		0.05	1	5	3	5	0.01	5		0.5/*	*	*	*		-	
PQL (W)	mg/L		0.001	0.01	0.05	0.03	0.05	0.0005	0.01		0.05/*	*	*	*		-	

PQL = practical quantitation limit, *As per Laboratory Method Detection Limit

Date relinquished: 24/9/04

Total number of samples in container: 24

Results required by: Standard

Relinquished by: N. Edwards

Signature: [illegible]

SAMPLES RECEIVED
Please sign and date to acknowledge receipt of samples and return by fax

Signature: [illegible]

Date: 24.9.04 Lab Ref: 31963

Send results to:
Douglas Partners Pty Ltd
Address:

Fax:

SGS
Received 24/09/04
By W.G
Time 4:15 am/(pm)
Samples intact (yes)/no
(Ice)/Cooler Pack
Temp (Red) no
Comments: 31963

FPM - ENVID/Form COC 02

Rev November 2003

![Douglas Partners logo] **Douglas Partners**
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CHAIN OF CUSTODY DESPATCH SHEET

Project Name: Wannewood
Project No: 31213
DP Contact Person: Venkes
Prior Storage: esky / ~~fridge~~ / shelved (circle)

To: SGS Environmental Services
Botany Technical Centre, Orica Industrial Park
Gate 3, Denison Street, MATRAVILLE NSW 2036
Ph: 9666 1426 Fax: 9666 1364
Attn: Attn: Tania Notaras

Sample ID	Sample Type S-soil W-water	Lab ID	Inorganics: TLM ~~As~~ 8	Cd	Cr	Cu	Pb	Hg	Zn	Ni	Organics: Total / GS/MS Phenol	BTEX/ TPH	OCs/ OPs/ PCBs	PAHs	asbestos ~~Other~~	TCLP	Notes
9/0-0.5	S	-12	✓									~~✓~~	~~✓~~	~~✓~~			
10/0.2	↓	-13	✓									✓	✓	✓	✓		
10/1.5		-14	✓														
11/0.5		-15	✓								✓	✓	✓	✓			
12/0.5		-16	✓									✓	✓	✓	✓		
13/0.4		-17	✓								✓	✓	✓	✓			
14/0.1		-18	✓									✓	✓	✓			
15/0-0.5		-19	✓								✓	✓	✓	✓			
16/3.0		-20	✓														
Z3		-21	✓														
Z8	↓	-22	✓														
PQL (S)	mg/kg		0.05	1	5	3	5	0.01	5		0.5/*	*	*	*		-	
PQL (W)	mg/L		0.001	0.01	0.05	0.03	0.05	0.0005	0.01		0.05/*	*	*	*		-	

PQL = practical quantitation limit, *As per Laboratory Method Detection Limit

Date relinquished: 24/9/04
Total number of samples in container: 24
Results required by: standard
Relinquished by: N. Edwards
Signature: [signature]

SAMPLES RECEIVED
Please sign and date to acknowledge receipt of samples and return by fax
Signature: WS
Date: 24.9.04 Lab Ref: 31963

Send results to:
Douglas Partners Pty Ltd
Address:

Fax:

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

Project Name: Warriewood
Project No: 31213
DP Contact Person: Venkis
Prior Storage: esky / ~~fridge~~ / shelved (circle)

To: SGS Environmental Services
Botany Technical Centre, Orica Industrial Park
Gate 3, Denison Street, MATRAVILLE NSW 2036
Ph: 9666 1426 Fax: 9666 1364
Attn: Attn: Tania Notaras

Sample ID	Sample Type S-soil W-water	Lab ID	Inorganics: HM ~~AS~~ 8	Cd	Cr	Cu	Pb	Hg	Zn	Ni	Organics: Total / GS/MS Phenol	BTEX/ TPH	OCs/ OPs/ PCBs	PAHs	Other	TCLP	Notes
																	PLS filter 3 lots
GW12	W	-23										✓	✓	✓			
9/1.5	S	-24	✓														
PQL (S)	mg/kg		0.05	1	5	3	5	0.01	5		0.5/*	*	*	*		-	
PQL (W)	mg/L		0.001	0.01	0.05	0.03	0.05	0.0005	0.01		0.05/*	*	*	*		-	

PQL = practical quantitation limit, *As per Laboratory Method Detection Limit

Date relinquished: 24/9/04
Total number of samples in container: 24
Results required by: standard
Relinquished by: N. Edwards
Signature: [signature]

SAMPLES RECEIVED
Please sign and date to acknowledge receipt of samples and return by fax

Signature: [signature]
Date: 24.9.04 Lab Ref: 31963

Send results to:
Douglas Partners Pty Ltd
Address:

Fax:

Rev1/November 2003

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SGS Environmental Services
Botany Industrial Park
Gate 3, Denison St, Matraville NSW 2036
Telephone Number : (61 2) 9666 1426
Fax Number : (61 2) 9666 1364

SAMPLE RECEIPT CONFIRMATION

COMPANY	:	Douglas Partners Pty Ltd	FAX NO.	:	9809 4095
ATTENTION	:	Nerilee Edwards	PAGES	:	1
FROM	:	Aileen Hie	DATE	:	24/09/04

This is to confirm that samples for Project **37273, Warriewood** were received on **24/09/04** the results are expected to be ready on **1/10/04** . Please quote SGS Reference: **31963** when making enquiries regarding this project. Please refer to below which details information about the integrity of the samples and other useful information.

Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples, unless otherwise instructed.

Samples received in good order:	YES
Samples received in correct containers:	YES
Samples received without headspace:	YES
Sufficient quantity supplied:	YES
Upon receipt sample temperature:	Cool
Cooling Method:	Ice
Sample containers provided by:	SGS
Samples Clearly Labelled:	YES
Turnaround time requested:	Standard
Completed documentation received:	YES

Comments:

The signed chain of custody will be returned to you with the original report.

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	207253.01	**Suburb:**	Warriewood	**To:**	*Envirolab Services*
Project Manager:	Nerilee Edwards	**Order Number:**		**Sampler:** A.Spencer	*12 Ashley St, Chatswood NSW 2067*
Email:	Nerilee.Edwards@douglaspartners.com.au			**Attn:**	*Sample Receipt*
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day			**Contact:**	*(02) 9910 6200 samplereceipt@envirolab.com.au*
Prior Storage:	☐ Fridge ☐ Freezer ☑ Esky	**Do samples contain 'potential' HBM?**	☐ No ☑ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)		

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: On hold	Combo 8A (NEPC Asb)	Combo 8A	PFAS (short)	pH, CEC	Asbestos (NEPC)	metals, PAH	Phenoxy Acid Herbicides	Glyphosate Triazine Herbicides	Combo 8		Notes/ Preservation/ Additional Requirements
1	BH104	0	0.1	01/09/21	S	G/P		X										
2	BH104	0.4	0.5	01/09/21	S	G				×						X		
3	BH104	1	1.2	01/09/21	S	G/P	X			×								
4	BH105	0.01	0.1	01/09/21	S	G/P		X										
5	BH105	0.4	0.5	01/09/21	S	G/P			X		X			X	X			
6	BH105	0.9	1	01/09/21	S	G/P	X											
7	BH107	0	0.1	01/09/21	S	G/P		X			X							
8	BH107	0.4	0.5	01/09/21	S	G/P	X											
9	BH107	0.9	1	01/09/21	S	G/P	X											
10	BH108	0	0.1	01/09/21	S	G/P		X		X				X	X			
11	BH108	0.4	0.5	01/09/21	S	G/P	X											
12	BH108	0.9	1	01/09/21	S	G/P				X								
13	BH104	0.3	0.6	01/09/21	S	P						X						
14	BD4/20210901			01/09/21	S	G										X		

Metals to analyse:	HM9 (As, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Zn)	**LAB RECEIPT**	277008
Number of samples in container:	**Transported to laboratory by:**	**Lab Ref. No:**	277008
Send results to:	Douglas Partners Pty Ltd	**Received by:**	CH
Address:	96 Hermitage Road, West Ryde NSW 211 **Phone:** (02) 9809 0666	**Date & Time:**	01/09/2021 14:30
Relinquished by:	**Date:** **Signed:**	**Signed:**	

Upacteed CoC 02/09/2021 ~~13:18~~ 15:06.

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

Project No: 207253.01	**Suburb:** Warriewood		**To:** *Envirolab Services*
Project Manager: Nerilee Edwards	**Order Number:**	**Dispatch date:**	*12 Ashley St, Chatswood NSW 2067*

	Sample ID			Date Sampled	Sample Type	Container Type	Analytes											Notes/ Preservation/ Additional Requirements
	Location / Other ID	Depth From	Depth To		S - soil W - water	G - glass P - plastic	On hold	Combo 8A (NEPC Asb)	Combo 8A	PFAS (short)	pH, CEC	Asbestos (NEPC)	metals, PAH	Phenoxy Acid Herbicides	Glyphosate Triazine Herbicides	Combo 8		277008
15	BD5/20210901			01/09/21	S	G	X											
16	BH104	0.9	1	01/09/21	S	G	X											

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	Nerilee Edwards, Alyssa Spencer

Sample Login Details

Your reference	207253.01, Warriewood
Envirolab Reference	277008
Date Sample Received	01/09/2021
Date Instructions Received	02/09/2021
Date Results Expected to be Reported	09/09/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	16 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	3
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Extra sample received - BH104/0.9-1.0

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
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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	Asbestos ID - soils NEPM	PFAS in Soils Short	Misc Inorg - Soil	CEC	Phenoxy Acid Herbicidesin Soil	Small Community Pesticides	Triazine Herbicides in Soil	On Hold
BH104/0-0.1	✓	✓	✓	✓	✓	✓	✓	✓		✓							
BH104/0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓			✓						
BH104/1-1.2											✓						
BH105/0.01-0.1	✓	✓	✓	✓	✓	✓	✓	✓		✓							
BH105/0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	
BH105/0.9-1.0																	✓
BH107/0-0.1	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓				
BH107/0.4-0.5																	✓
BH107/0.9-1.0																	✓
BH108/0-0.1	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓			✓	✓	✓	
BH108/0.4-0.5																	✓
BH108/0.9-1.0											✓						
BH104/0.3-0.6										✓							
BD4/20210901	✓	✓	✓	✓	✓	✓	✓	✓									
BD5/20210901																	✓
BH104/0.9-1.0																	✓

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

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

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.

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CERTIFICATE OF ANALYSIS 277008

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**207253.01, Warriewood**
Number of Samples	16 Soil
Date samples received	01/09/2021
Date completed instructions received	02/09/2021

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	09/09/2021
Date of Issue	10/09/2021

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

Results Approved By
Alexander Mitchell Maclean, Senior Chemist
Diego Bigolin, Inorganics Supervisor
Dragana Tomas, Senior Chemist
Greta Petzold, Senior Report Coordinator
Hannah Nguyen, Metals Supervisor
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		277008-1	277008-2	277008-4	277008-5	277008-7
Your Reference	UNITS	BH104/0-0.1	BH104/0.4-0.5	BH105/0.01-0.1	BH105/0.4-0.5	BH107/0-0.1
Date Sampled		01/09/2021	01/09/2021	01/09/2021	01/09/2021	01/09/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
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	%	82	104	91	99	109

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		277008-10	277008-14
Your Reference	UNITS	BH108/0-0.1	BD4/20210901
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date extracted	-	03/09/2021	03/09/2021
Date analysed	-	03/09/2021	03/09/2021
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<3	<3
Surrogate aaa-Trifluorotoluene	%	103	105

svTRH (C10-C40) in Soil						
Our Reference		277008-1	277008-2	277008-4	277008-5	277008-7
Your Reference	UNITS	BH104/0-0.1	BH104/0.4-0.5	BH105/0.01-0.1	BH105/0.4-0.5	BH107/0-0.1
Date Sampled		01/09/2021	01/09/2021	01/09/2021	01/09/2021	01/09/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	04/09/2021	04/09/2021	04/09/2021	04/09/2021	04/09/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	230	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	220	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	450	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	370	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	190	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	560	<50	<50	<50	<50
Surrogate o-Terphenyl	%	118	83	92	98	100

svTRH (C10-C40) in Soil			
Our Reference		277008-10	277008-14
Your Reference	UNITS	BH108/0-0.1	BD4/20210901
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date extracted	-	03/09/2021	03/09/2021
Date analysed	-	04/09/2021	04/09/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	92	98

PAHs in Soil						
Our Reference		277008-1	277008-2	277008-4	277008-5	277008-7
Your Reference	UNITS	BH104/0-0.1	BH104/0.4-0.5	BH105/0.01-0.1	BH105/0.4-0.5	BH107/0-0.1
Date Sampled		01/09/2021	01/09/2021	01/09/2021	01/09/2021	01/09/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	07/09/2021	07/09/2021	07/09/2021	07/09/2021	07/09/2021
Naphthalene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.4	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	3.6	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	1.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	4.3	<0.1	0.2	<0.1	<0.1
Pyrene	mg/kg	4.1	<0.1	0.2	<0.1	<0.1
Benzo(a)anthracene	mg/kg	2.2	<0.1	0.1	<0.1	<0.1
Chrysene	mg/kg	1.7	<0.1	0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	1.6	<0.05	0.1	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.9	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.8	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	23	<0.05	0.78	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	2.3	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	2.3	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	2.3	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	108	110	99	105	102

PAHs in Soil			
Our Reference		277008-10	277008-14
Your Reference	UNITS	BH108/0-0.1	BD4/20210901
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date extracted	-	03/09/2021	03/09/2021
Date analysed	-	07/09/2021	07/09/2021
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	107	113

Organochlorine Pesticides in soil						
Our Reference		277008-1	277008-2	277008-4	277008-5	277008-7
Your Reference	UNITS	BH104/0-0.1	BH104/0.4-0.5	BH105/0.01-0.1	BH105/0.4-0.5	BH107/0-0.1
Date Sampled		01/09/2021	01/09/2021	01/09/2021	01/09/2021	01/09/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	07/09/2021	07/09/2021	07/09/2021	07/09/2021	07/09/2021
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	%	108	115	117	125	119

Organochlorine Pesticides in soil			
Our Reference		277008-10	277008-14
Your Reference	UNITS	BH108/0-0.1	BD4/20210901
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date extracted	-	03/09/2021	03/09/2021
Date analysed	-	07/09/2021	07/09/2021
alpha-BHC	mg/kg	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	120	109

Organophosphorus Pesticides in Soil						
Our Reference		277008-1	277008-2	277008-4	277008-5	277008-7
Your Reference	UNITS	BH104/0-0.1	BH104/0.4-0.5	BH105/0.01-0.1	BH105/0.4-0.5	BH107/0-0.1
Date Sampled		01/09/2021	01/09/2021	01/09/2021	01/09/2021	01/09/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	07/09/2021	07/09/2021	07/09/2021	07/09/2021	07/09/2021
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	%	108	115	117	125	119

Organophosphorus Pesticides in Soil			
Our Reference		277008-10	277008-14
Your Reference	UNITS	BH108/0-0.1	BD4/20210901
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date extracted	-	03/09/2021	03/09/2021
Date analysed	-	07/09/2021	07/09/2021
Dichlorvos	mg/kg	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1
Surrogate TCMX	%	120	109

PCBs in Soil						
Our Reference		277008-1	277008-2	277008-4	277008-5	277008-7
Your Reference	UNITS	BH104/0-0.1	BH104/0.4-0.5	BH105/0.01-0.1	BH105/0.4-0.5	BH107/0-0.1
Date Sampled		01/09/2021	01/09/2021	01/09/2021	01/09/2021	01/09/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	07/09/2021	07/09/2021	07/09/2021	07/09/2021	07/09/2021
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	%	108	115	117	125	119

PCBs in Soil			
Our Reference		277008-10	277008-14
Your Reference	UNITS	BH108/0-0.1	BD4/20210901
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date extracted	-	03/09/2021	03/09/2021
Date analysed	-	07/09/2021	07/09/2021
Aroclor 1016	mg/kg	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1
Surrogate TCMX	%	120	109

Acid Extractable metals in soil						
Our Reference		277008-1	277008-2	277008-4	277008-5	277008-7
Your Reference	UNITS	BH104/0-0.1	BH104/0.4-0.5	BH105/0.01-0.1	BH105/0.4-0.5	BH107/0-0.1
Date Sampled		01/09/2021	01/09/2021	01/09/2021	01/09/2021	01/09/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Arsenic	mg/kg	5	<4	<4	11	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	8	11	11	5
Copper	mg/kg	25	<1	17	19	9
Lead	mg/kg	30	11	30	57	30
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	8	1	8	4	2
Zinc	mg/kg	51	3	82	56	28
Manganese	mg/kg	120	3	82	97	49

Acid Extractable metals in soil			
Our Reference		277008-10	277008-14
Your Reference	UNITS	BH108/0-0.1	BD4/20210901
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date prepared	-	03/09/2021	03/09/2021
Date analysed	-	03/09/2021	03/09/2021
Arsenic	mg/kg	5	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	4	7
Copper	mg/kg	12	1
Lead	mg/kg	34	11
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	5	2
Zinc	mg/kg	63	5
Manganese	mg/kg	59	5

Misc Soil - Inorg						
Our Reference		277008-1	277008-2	277008-4	277008-5	277008-7
Your Reference	UNITS	BH104/0-0.1	BH104/0.4-0.5	BH105/0.01-0.1	BH105/0.4-0.5	BH107/0-0.1
Date Sampled		01/09/2021	01/09/2021	01/09/2021	01/09/2021	01/09/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg			
Our Reference		277008-10	277008-14
Your Reference	UNITS	BH108/0-0.1	BD4/20210901
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date prepared	-	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5

Moisture						
Our Reference		277008-1	277008-2	277008-3	277008-4	277008-5
Your Reference	UNITS	BH104/0-0.1	BH104/0.4-0.5	BH104/1-1.2	BH105/0.01-0.1	BH105/0.4-0.5
Date Sampled		01/09/2021	01/09/2021	01/09/2021	01/09/2021	01/09/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Moisture	%	9.9	15	16	21	26

Moisture					
Our Reference		277008-7	277008-10	277008-12	277008-14
Your Reference	UNITS	BH107/0-0.1	BH108/0-0.1	BH108/0.9-1.0	BD4/20210901
Date Sampled		01/09/2021	01/09/2021	01/09/2021	01/09/2021
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Moisture	%	17	20	12	13

Asbestos ID - soils		
Our Reference		277008-5
Your Reference	UNITS	BH105/0.4-0.5
Date Sampled		01/09/2021
Type of sample		Soil
Date analysed	-	09/09/2021
Sample mass tested	g	Approx. 50g
Sample Description	-	Black clayey soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO
Trace Analysis	-	No asbestos detected

Asbestos ID - soils NEPM						
Our Reference		277008-1	277008-4	277008-7	277008-10	277008-13
Your Reference	UNITS	BH104/0-0.1	BH105/0.01-0.1	BH107/0-0.1	BH108/0-0.1	BH104/0.3-0.6
Date Sampled		01/09/2021	01/09/2021	01/09/2021	01/09/2021	01/09/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	09/09/2021	09/09/2021	09/09/2021	09/09/2021	09/09/2021
Sample mass tested	g	476.7	387.34	417.04	539.6	742.26
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	Chrysotile Amosite	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	0.0103	–	–	–	–
FA and AF Estimation*#2	%(w/w)	0.0022	<0.001	<0.001	<0.001	<0.001

PFAS in Soils Short					
Our Reference		277008-2	277008-3	277008-10	277008-12
Your Reference	UNITS	BH104/0.4-0.5	BH104/1-1.2	BH108/0-0.1	BH108/0.9-1.0
Date Sampled		01/09/2021	01/09/2021	01/09/2021	01/09/2021
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Perfluorohexanesulfonic acid - PFHxS	µg/kg	0.2	<0.1	<0.1	<0.1
Perfluorooctanesulfonic acid PFOS	µg/kg	2.9	<0.1	<0.1	<0.1
Perfluorooctanoic acid PFOA	µg/kg	<0.1	<0.1	<0.1	<0.1
6:2 FTS	µg/kg	<0.1	<0.1	<0.1	<0.1
8:2 FTS	µg/kg	<0.2	<0.2	<0.2	<0.2
Surrogate $^{13}C_8$ *PFOS*	%	100	98	98	102
Surrogate $^{13}C_2$ *PFOA*	%	88	84	86	85
Extracted ISTD $^{18}O_2$ *PFHxS*	%	86	83	78	83
Extracted ISTD $^{13}C_4$ *PFOS*	%	98	98	92	95
Extracted ISTD $^{13}C_4$ *PFOA*	%	102	98	93	98
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	103	89	89	88
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	91	84	86	81
Total Positive PFHxS & PFOS	µg/kg	3.0	<0.1	<0.1	<0.1
Total Positive PFOS & PFOA	µg/kg	2.9	<0.1	<0.1	<0.1
Total Positive PFAS	µg/kg	3.0	<0.1	<0.1	<0.1

Misc Inorg - Soil			
Our Reference		277008-5	277008-7
Your Reference	UNITS	BH105/0.4-0.5	BH107/0-0.1
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date prepared	-	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021
pH 1:5 soil:water	pH Units	6.7	5.3

CEC			
Our Reference		277008-5	277008-7
Your Reference	UNITS	BH105/0.4-0.5	BH107/0-0.1
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date prepared	-	07/09/2021	07/09/2021
Date analysed	-	07/09/2021	07/09/2021
Exchangeable Ca	meq/100g	9.4	1.5
Exchangeable K	meq/100g	0.3	0.3
Exchangeable Mg	meq/100g	0.84	0.45
Exchangeable Na	meq/100g	0.12	<0.1
Cation Exchange Capacity	meq/100g	11	2.3

Phenoxy Acid Herbicides in Soil			
Our Reference		277008-5	277008-10
Your Reference	UNITS	BH105/0.4-0.5	BH108/0-0.1
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date extracted	-	07/09/2021	07/09/2021
Date analysed	-	08/09/2021	08/09/2021
Clopyralid	mg/kg	<0.5	<0.5
3,5-Dichlorobenzoic acid	mg/kg	<0.5	<0.5
o-chlorophenoxy acetic acid	mg/kg	<0.5	<0.5
4-CPA	mg/kg	<0.5	<0.5
Dicamba	mg/kg	<0.5	<0.5
MCPP	mg/kg	<0.5	<0.5
MCPA	mg/kg	<0.5	<0.5
Dichlorprop	mg/kg	<0.5	<0.5
2,4-D	mg/kg	<0.5	<0.5
Bromoxynil	mg/kg	<0.5	<0.5
Triclopyr	mg/kg	<0.5	<0.5
2,4,5-TP	mg/kg	<0.5	<0.5
2,4,5-T	mg/kg	<0.5	<0.5
MCPB	mg/kg	<0.5	<0.5
Dinoseb	mg/kg	<1	<1
2,4-DB	mg/kg	<0.5	<0.5
Ioxynil	mg/kg	<1	<1
Picloram	mg/kg	<0.5	<0.5
DCPA (Chlorthal) Diacid	mg/kg	<0.5	<0.5
Acifluorfen	mg/kg	<2	<2
2,4,6-T	mg/kg	<0.5	<0.5
2,6-D	mg/kg	<0.5	<0.5
Surrogate 2.4- DCPA	%	110	100

Small Community Pesticides			
Our Reference		277008-5	277008-10
Your Reference	UNITS	BH105/0.4-0.5	BH108/0-0.1
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date prepared	-	08/09/2021	08/09/2021
Date analysed	-	09/09/2021	09/09/2021
Glyphosate	mg/kg	<100	<100
Surrogate: L-Cysteic Acid	%	#	#

Triazine Herbicides in Soil			
Our Reference		277008-5	277008-10
Your Reference	UNITS	BH105/0.4-0.5	BH108/0-0.1
Date Sampled		01/09/2021	01/09/2021
Type of sample		Soil	Soil
Date extracted	-	03/09/2021	03/09/2021
Date analysed	-	09/09/2021	09/09/2021
Simazine	mg/kg	<0.5	<0.5
Atrazine	mg/kg	<0.5	<0.5
Propazine	mg/kg	<0.5	<0.5
Terbuthylazine	mg/kg	<0.5	<0.5
Metribuzin	mg/kg	<0.5	<0.5
Ametryn	mg/kg	<0.5	<0.5
Prometryn	mg/kg	<0.5	<0.5
Terbutryn	mg/kg	<0.5	<0.5
Cyanazine	mg/kg	<0.5	<0.5
Irgarol	mg/kg	<0.5	<0.5
Hexazinone	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	85	86

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Ext-054	Analysed by MPL Envirolab
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-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.

Method ID	Methodology Summary
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
ORG-029	Glyphosate & AMPA analysis using LC-MSMS.*

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.3 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	277008-2
Date extracted	-			03/09/2021	1	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Date analysed	-			03/09/2021	1	03/09/2021	03/09/2021		03/09/2021	03/09/2021
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	97	101
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	97	101
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	101	104
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	91	94
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	99	103
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	98	102
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	101	104
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	92	1	82	104	24	104	105

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	277008-2
Date extracted	-			03/09/2021	1	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Date analysed	-			04/09/2021	1	04/09/2021	04/09/2021		04/09/2021	04/09/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	126	98
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	230	170	30	128	91
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	220	220	0	119	88
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	126	98
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	370	300	21	128	91
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	190	120	45	119	88
Surrogate o-Terphenyl	%		Org-020	100	1	118	101	16	114	108

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	277008-2
Date extracted	-			03/09/2021	1	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Date analysed	-			07/09/2021	1	07/09/2021	07/09/2021		07/09/2021	07/09/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	99	94
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.3	0	97	92
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	0.4	0.3	29	104	96
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	3.6	3.1	15	109	103
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	1.1	0.9	20	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	4.3	3.8	12	98	98
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	4.1	3.5	16	100	99
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	2.2	2.1	5	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	1.7	1.5	12	78	75
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	2	2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	1.6	1.6	0	106	101
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.9	0.8	12	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	0.8	0.8	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	104	1	108	110	2	99	97

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	277008-2
Date extracted	-			03/09/2021	1	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Date analysed	-			07/09/2021	1	07/09/2021	07/09/2021		07/09/2021	07/09/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	80
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	96
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	127	125
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	91
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	88
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	91
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	96
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	77	75
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	76	76
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	74	130
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	126	1	108	112	4	116	106

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	277008-2
Date extracted	-			03/09/2021	1	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Date analysed	-			07/09/2021	1	07/09/2021	07/09/2021		07/09/2021	07/09/2021
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	81
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	100
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	72	70
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	86
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	91
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	77	75
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	86
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	121	1	108	112	4	116	106

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	277008-2
Date extracted	-			03/09/2021	1	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Date analysed	-			07/09/2021	1	07/09/2021	07/09/2021		07/09/2021	07/09/2021
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	100	100
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	121	1	108	112	4	116	106

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	277008-2
Date prepared	-			03/09/2021	1	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Date analysed	-			03/09/2021	1	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Arsenic	mg/kg	4	Metals-020	<4	1	5	5	0	111	92
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	106	92
Chromium	mg/kg	1	Metals-020	<1	1	11	13	17	109	96
Copper	mg/kg	1	Metals-020	<1	1	25	25	0	106	101
Lead	mg/kg	1	Metals-020	<1	1	30	31	3	109	97
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	106	93
Nickel	mg/kg	1	Metals-020	<1	1	8	11	32	107	94
Zinc	mg/kg	1	Metals-020	<1	1	51	64	23	113	99
Manganese	mg/kg	1	Metals-020	<1	1	120	170	34	108	96

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	277008-2
Date prepared	-			06/09/2021	1	06/09/2021	06/09/2021		06/09/2021	06/09/2021
Date analysed	-			06/09/2021	1	06/09/2021	06/09/2021		06/09/2021	06/09/2021
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	99	99

QUALITY CONTROL: PFAS in Soils Short						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	277008-2
Date prepared	-			03/09/2021	3	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Date analysed	-			03/09/2021	3	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Perfluorohexanesulfonic acid - PFHxS	µg/kg	0.1	Org-029	<0.1	3	<0.1	<0.1	0	97	104
Perfluorooctanesulfonic acid PFOS	µg/kg	0.1	Org-029	<0.1	3	<0.1	<0.1	0	99	99
Perfluorooctanoic acid PFOA	µg/kg	0.1	Org-029	<0.1	3	<0.1	<0.1	0	101	97
6:2 FTS	µg/kg	0.1	Org-029	<0.1	3	<0.1	<0.1	0	107	102
8:2 FTS	µg/kg	0.2	Org-029	<0.2	3	<0.2	<0.2	0	113	110
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	99	3	98	104	6	99	97
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	86	3	84	89	6	89	86
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	89	3	83	83	0	88	90
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	104	3	98	93	5	102	100
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	103	3	98	95	3	100	103
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	92	3	89	87	2	93	100
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	93	3	84	84	0	89	100

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date prepared	-			06/09/2021	[NT]	[NT]	[NT]	[NT]	06/09/2021	[NT]
Date analysed	-			06/09/2021	[NT]	[NT]	[NT]	[NT]	06/09/2021	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date prepared	-			07/09/2021	[NT]	[NT]	[NT]	[NT]	07/09/2021	[NT]
Date analysed	-			07/09/2021	[NT]	[NT]	[NT]	[NT]	07/09/2021	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: Phenoxy Acid Herbicides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	277008-10
Date extracted	-			07/09/2021	5	07/09/2021	07/09/2021		07/09/2021	07/09/2021
Date analysed	-			08/09/2021	5	08/09/2021	08/09/2021		08/09/2021	08/09/2021
Clopyralid	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
3,5-Dichlorobenzoic acid	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
o-chlorophenoxy acetic acid	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
4-CPA	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Dicamba	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	105	103
MCPP	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	96	96
MCPA	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	98	97
Dichlorprop	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
2,4-D	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	98	96
Bromoxynil	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Triclopyr	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
2,4,5-TP	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
2,4,5-T	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	99	97
MCPB	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Dinoseb	mg/kg	1	Ext-054	<1	5	<1	<1	0	[NT]	[NT]
2,4-DB	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Ioxynil	mg/kg	1	Ext-054	<1	5	<1	<1	0	[NT]	[NT]
Picloram	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
DCPA (Chlorthal) Diacid	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Acifluorfen	mg/kg	2	Ext-054	<2	5	<2	<2	0	[NT]	[NT]
2,4,6-T	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
2,6-D	mg/kg	0.5	Ext-054	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Surrogate 2.4- DCPA	%		Ext-054	100	5	110	99	11	99	96

QUALITY CONTROL: Small Community Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date prepared	-			08/09/2021	5	08/09/2021	08/09/2021		08/09/2021	[NT]
Date analysed	-			09/09/2021	5	09/09/2021	09/09/2021		09/09/2021	[NT]
Glyphosate	mg/kg	1	ORG-029	<1	5	<100	<100	0	129	[NT]
Surrogate: L-Cysteic Acid	%		Ext-054	134	5	#	#		134	[NT]

QUALITY CONTROL: Triazine Herbicides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date extracted	-			03/09/2021	5	03/09/2021	03/09/2021		03/09/2021	[NT]
Date analysed	-			09/09/2021	5	09/09/2021	09/09/2021		09/09/2021	[NT]
Simazine	mg/kg	0.5	Org-022/025	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Atrazine	mg/kg	0.5	Org-022/025	<0.5	5	<0.5	<0.5	0	92	[NT]
Propazine	mg/kg	0.5	Org-022/025	<0.5	5	<0.5	<0.5	0	90	[NT]
Terbuthylazine	mg/kg	0.5	Org-022/025	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Metribuzin	mg/kg	0.5	Org-022/025	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Ametryn	mg/kg	0.5	Org-022/025	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Prometryn	mg/kg	0.5	Org-022/025	<0.5	5	<0.5	<0.5	0	120	[NT]
Terbutryn	mg/kg	0.5	Org-022/025	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Cyanazine	mg/kg	0.5	Org-022/025	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Irgarol	mg/kg	0.5	Org-022/025	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Hexazinone	mg/kg	0.5	Org-022/025	<0.5	5	<0.5	<0.5	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	71	5	85	81	5	71	[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-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Note: All samples analysed as received. However, sample 277008-4 is below the minimum recommended 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

Factual description of asbestos identified in the soil samples: NEPM
Sample 277008-1; Chrysotile and Amosite asbestos identified in 0.0684g of fibre cement material <7mm

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: Sample 277008-5 was sub-sampled from a bag provided by the client.

Acid Herbicides & Glyphosate analysed by MPL Laboratories. Report No. 268296

Glyphosate:
- # Surrogate recovery not reported due to sample matrix interferences.
- PQL Has been raised due to the sample matrix requiring dilution.

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CERTIFICATE OF ANALYSIS 277008-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**207253.01, Warriewood**
Number of Samples	additional analysis
Date samples received	01/09/2021
Date completed instructions received	09/09/2021

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

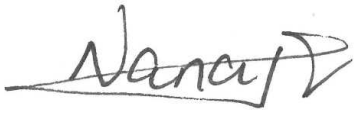
Date results requested by	17/09/2021
Date of Issue	15/09/2021

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
Steven Luong, Organics Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

PAHs in TCLP (USEPA 1311)		
Our Reference		277008-A-1
Your Reference	UNITS	BH104/0-0.1
Date Sampled		01/09/2021
Type of sample		Soil
pH of soil for fluid# determ.	pH units	10.3
pH of soil TCLP (after HCl)	pH units	2.0
Extraction fluid used	-	1
pH of final Leachate	pH units	6.3
Date extracted	-	13/09/2021
Date analysed	-	14/09/2021
Naphthalene in TCLP	mg/L	0.001
Acenaphthylene in TCLP	mg/L	<0.001
Acenaphthene in TCLP	mg/L	0.002
Fluorene in TCLP	mg/L	<0.001
Phenanthrene in TCLP	mg/L	0.003
Anthracene in TCLP	mg/L	<0.001
Fluoranthene in TCLP	mg/L	<0.001
Pyrene in TCLP	mg/L	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001
Chrysene in TCLP	mg/L	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001
Total +ve PAH's	mg/L	0.0060
Surrogate p-Terphenyl-d14	%	110

Method ID	Methodology Summary
INORG-004	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
Org-022/025	Leachates are extracted with Dichloromethane and analysed by GC-MS/GC-MSMS.

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			13/09/2021	[NT]	[NT]	[NT]	[NT]	13/09/2021	[NT]
Date analysed	-			14/09/2021	[NT]	[NT]	[NT]	[NT]	14/09/2021	[NT]
Naphthalene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	70	[NT]
Acenaphthylene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	65	[NT]
Fluorene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	82	[NT]
Phenanthrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	104	[NT]
Anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	76	[NT]
Pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	84	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	80	[NT]
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	90	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	105	[NT]	[NT]	[NT]	[NT]	92	[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.
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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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

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

CERTIFICATE OF ANALYSIS 277008-B

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**207253.01, Warriewood**
Number of Samples	additional analysis
Date samples received	01/09/2021
Date completed instructions received	13/09/2021

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	20/09/2021
Date of Issue	16/09/2021

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

Results Approved By
Alexander Mitchell Maclean, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

PFAS in TCLP Short		
Our Reference		277008-B-2
Your Reference	UNITS	BH104/0.4-0.5
Date Sampled		01/09/2021
Type of sample		Soil
Date prepared	-	15/09/2021
Date analysed	-	15/09/2021
pH of soil for fluid# determ.	pH units	6.9
pH of soil TCLP (after HCl)	pH units	1.7
Extraction fluid used	-	1
pH of final Leachate	pH units	4.9
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	<0.01
Perfluorooctanoic acid PFOA	µg/L	<0.01
6:2 FTS	µg/L	<0.01
8:2 FTS	µg/L	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	98
Surrogate $^{13}C_2$ *PFOA*	%	122
Extracted ISTD $^{18}O_2$ *PFHxS*	%	101
Extracted ISTD $^{13}C_4$ *PFOS*	%	74
Extracted ISTD $^{13}C_4$ *PFOA*	%	87
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	80
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	84
Total Positive PFHxS & PFOS	µg/L	<0.01
Total Positive PFOS & PFOA	µg/L	<0.01
Total Positive PFAS	µg/L	<0.01

Method ID	Methodology Summary
INORG-004	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.3 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: PFAS in TCLP Short						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	277008-B-2
Date prepared	-			15/09/2021	2	15/09/2021	15/09/2021		15/09/2021	15/09/2021
Date analysed	-			15/09/2021	2	15/09/2021	15/09/2021		15/09/2021	15/09/2021
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	2	<0.01	<0.01	0	104	106
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	2	<0.01	<0.01	0	100	99
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	2	<0.01	<0.01	0	101	106
6:2 FTS	µg/L	0.01	Org-029	<0.01	2	<0.01	<0.01	0	112	112
8:2 FTS	µg/L	0.02	Org-029	<0.02	2	<0.02	<0.02	0	91	94
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	96	2	98	110	12	94	96
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	123	2	122	119	2	122	119
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	103	2	101	105	4	103	102
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	82	2	74	68	8	76	72
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	85	2	87	88	1	87	87
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	77	2	80	77	4	73	76
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	83	2	84	84	0	87	85

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.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	207253.01	**Suburb:**	Warriewood	**To:**	*Envirolab Services*
Project Manager:	Nerilee Edwards	**Order Number:**		**Sampler:**	A.Spencer		*12 Ashley St, Chatswood NSW 2067*
Email:	Nerilee.Edwards@douglaspartners.com.au					**Attn:**	*Sample Receipt*
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day					**Contact:**	*(02) 9910 6200 samplereceipt@envirolab.com.au*
Prior Storage:	☐ Fridge ☐ Freezer ☑ Esky	**Do samples contain 'potential' HBM?**	☐ No ☑ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)				

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: Combo 8A (NEPC Asb)	Combo 8A	Combo 8	PFAS (short)	pH, CEC	Asbestos (NEPC)	metals, PAH	Phenoxy Acid Herbicides	Glyphosate Triazine Herbicides	Combo 8	ASS Screen	Notes/ Preservation/ Additional Requirements
1	BH103	0.14	0.2	31/08/21	S	G/P												
2	BH103	0.4	0.5	31/08/21	S	G/P	×							×	×			
3	BH103	0.5	0.95	31/08/21	S	G/P												
4	BH103	0.9	1	31/08/21	S	G/P												
5	BH103	1.4	1.5	31/08/21	S	G/P											×	
6	BH103	1.5	1.95	31/08/21	S	G/P												
7	BH103	1.9	2	31/08/21	S	G/P											×	
8	BH103	2.4	2.5	31/08/21	S	G/P											×	
9	BH103	2.9	3	31/08/21	S	G/P											×	
10	BH103	3.4	3.5	31/08/21	S	G/P											×	
11	BH103	3.9	4	31/08/21	S	G/P											×	
12	BH101	0.12	0.2	31/08/21	S	G/P						×						
13	BH101	0.4	0.5	31/08/21	S	G/P	×											
14	BH101	0.9	1	31/08/21	S	G/P											×	

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

Job No: 277156

Date Received: 31/08/21
Time Received: 1000
Received By: CH
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Metals to analyse:	HM9 (As, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Zn)		
Number of samples in container:		**Transported to laboratory by:**	
Send results to:	Douglas Partners Pty Ltd		
Address:	96 Hermitage Road, West Ryde NSW 211	**Phone:** (02) 9809 0666	
Relinquished by:		**Date:**	**Signed:**

LAB RECEIPT

Lab Ref. No:	
Received by:	christine
Date & Time:	31/08/21 1000
Signed:	

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	207253.01	**Suburb:**	Warriewood	**To:**	*Envirolab Services*
Project Manager:	Nerilee Edwards	**Order Number:**		**Dispatch date:**	*12 Ashley St, Chatswood NSW 2067*

Lab ID	Sample ID: Location / Other ID	Sample ID: Depth From	Sample ID: Depth To	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: Combo 8A (NEPC Asb)	Combo 8A	Combo 8	PFAS (short)	pH, CEC	Asbestos (NEPC)	metals, PAH	Phenoxy Acid Herbicides	Glyphosate Triazine Herbicides	Combo 8	ASS Screen	Notes/ Preservation/ Additional Requirements
15	BH101	1.4	1.5	31/08/21	S	G/P	×										×	
16	BH101	1.5	1.95	31/08/21	S	G/P												
17	BH101	1.9	2	31/08/21	S	G/P											×	
18	BH101	2.4	2.5	31/08/21	S	G/P											×	
19	BH101	2.9	3	31/08/21	S	G/P											×	
20	BH101	3.4	3.5	31/08/21	S	G/P											×	
21	BH101	3.9	4	31/08/21	S	G/P											×	
22	BH109	0.02	0.1	31/08/21	S	G/P	×			×								
23	BH109	0.4	0.5	31/08/21	S	G/P	×											
24	BH109	0.9	1	31/08/21	S	G/P												
25	BH109	1.4	1.5	31/08/21	S	G/P												
26	BH109	1.9	2	31/08/21	S	G/P												
27	BH106	0.14	0.25	31/08/21	S	G/P	×											
28	BH106	0.5	0.6	31/08/21	S	G/P												
29	BH106	0.9	1	31/08/21	S	G/P												
30	BH111	0.07	0.15	31/08/21	S	G/P	×				×							
31	BH111	0.4	0.5	31/08/21	S	G/P												
32	BH111	0.9	1	31/08/21	S	G/P											×	

#277156

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	207253.01	**Suburb:** Warriewood	**To:** *Envirolab Services*
Project Manager:	Nerilee Edwards		**Dispatch date:**

Lab ID	Sample ID: Location / Other ID	Sample ID: Depth From	Sample ID: Depth To	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: Combo 8A (NEPC Asb)	Combo 8A	Combo 8	PFAS (short)	pH, CEC	Asbestos (NEPC)	metals, PAH	Phenoxy Acid Herbicides	Glyphosate Triazine Herbicides	Combo 8	ASS Screen	Notes/ Preservation/ Additional Requirements
33	BH111	1	1.45	31/08/21	S	G/P												
34	BH111	1.4	1.5	31/08/21	S	G/P											×	
35	BH111	1.9	2	31/08/21	S	G/P											×	
WR	BH111	2	2.45	31/08/21	S	G/P												
36	BH111	2.4	2.5	31/08/21	S	G/P											×	
37	BH111	2.9	3	31/08/21	S	G/P											×	
38	BH111	3.4	3.5	31/08/21	S	G/P											×	
39	BH111	3.9	4	31/08/21	S	G/P											×	
40	BH111	4.4	4.5	31/08/21	S	G/P											×	
41	BH111	4.9	5	31/08/21	S	G/P											×	
42	BH115	0.05	0.15	31/08/21	S	G/P												
43	BH115	0.4	0.5	31/08/21	S	G/P	×											
44	BH115	0.9	1	31/08/21	S	G/P											×	
45	BH115	1.4	1.5	31/08/21	S	G/P											×	
46	BH115	1.9	2	31/08/21	S	G/P											×	
47	BH115	2.4	2.5	31/08/21	S	G/P											×	
48	BH115	2.9	3	31/08/21	S	G/P											×	
49	BH114	0.05	0.15	31/08/21	S	G/P												
50	BH114	0.4	0.5	31/08/21	S	G/P	×											

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	207253.01	**Suburb:** Warriewood	**To:** *Envirolab Services*
Project Manager:	Nerilee Edwards		**Dispatch date:** ×

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: Combo 8A (NEPC Asb)	Combo 8A	Combo 8	PFAS (short)	pH, CEC	Asbestos (NEPC)	metals, PAH	Phenoxy Acid Herbicides	Glyphosate Triazine Herbicides	Combo 8	ASS Screen	Notes/ Preservation/ Additional Requirements
51	BH114	0.9	1	31/08/21	S	G/P												
52	BH114	1.4	1.5	31/08/21	S	G/P												
53	BH113	0.05	0.15	31/08/21	S	G/P	×			×								
54	BH113	0.4	0.5	31/08/21	S	G/P												
55	BH113	0.9	1	31/08/21	S	G/P												
56	BH113	1.4	1.5	31/08/21	S	G/P												
57	BH113	1.9	2	31/08/21	S	G/P												
—	BD1/20210831			31/08/21	S	G/P												Pls send to second lab as below
58	BD2/20210831			31/08/21	S	G/P												
59	BD3/20210831			31/08/21	S	G/P												
60	ACM-01			31/08/21	fibro	P						Asb ID						

#277156

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	207253.01	**Suburb:**	Warriewood	**To:**	Envirolab Services
Project No:	207253.01	**Suburb:**	Warriewood	**To:**	Envirolab Services
Project Manager:	Nerilee Edwards	**Order Number:**		**Sampler:** A.Spencer	12 Ashley St, Chatswood NSW 2067
Email:	Nerilee.Edwards@douglaspartners.com.au			**Attn:**	Sample Receipt
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day			**Contact:**	(02) 9910 6200 samplereceipt@envirolab.com.au
Prior Storage:	☐ Fridge ☐ Freezer ☑ Esky	**Do samples contain 'potential' HBM?**	☐ No ☑ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)		

Lab ID	Sample ID: Location / Other ID	Sample ID: Depth From	Sample ID: Depth To	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: metals, PAH	TRH, BTEX	OCP, OPP, PCB	phenols							Notes/ Preservation/ Additional Requirements
—	BD1/20210831			31/08/21	S	G/P	x	x	x	x							Pls send to second lab

#277156

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
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customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards

Sample Login Details

Your reference	207253.01, Warriewood
Envirolab Reference	277156
Date Sample Received	31/08/2021
Date Instructions Received	02/09/2021
Date Results Expected to be Reported	10/09/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	59 Soil, 1 Material
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	3
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Sample not received: BH111/2-2.45

Please direct any queries to:

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

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Triazine Herbicides in Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils NEPM	PFAS in Soils Short	Misc Inorg - Soil	CEC	Phenoxy Acid Herbicidesin Soil	Glyphosate in Soil	sPOCAS field test	Asbestos ID - materials	On Hold
BH103-0.14-0.2																		✓
BH103-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓			
BH103-0.5-0.95																		✓
BH103-0.9-1																		✓
BH103-1.4-1.5																✓		
BH103-1.5-1.95																		✓
BH103-1.9-2																✓		
BH103-2.4-2.5																✓		
BH103-2.9-3																✓		
BH103-3.4-3.5																✓		
BH103-3.9-4																✓		
BH101-0.12-0.2										✓								
BH101-0.4-0.5	✓	✓	✓	✓	✓	✓		✓	✓	✓								
BH101-0.9-1																✓		
BH101-1.4-1.5	✓	✓	✓	✓	✓	✓		✓	✓	✓						✓		
BH101-1.5-1.95																		✓
BH101-1.9-2																✓		
BH101-2.4-2.5																✓		
BH101-2.9-3																✓		
BH101-3.4-3.5																✓		

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Triazine Herbicides in Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils NEPM	PFAS in Soils Short	Misc Inorg - Soil	CEC	Phenoxy Acid Herbicidesin Soil	Glyphosate in Soil	sPOCAS field test	Asbestos ID - materials	On Hold
BH101-3.9-4																✓		
BH109-0.02-0.1	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓							
BH109-0.4-0.5	✓	✓	✓	✓	✓	✓		✓	✓	✓								
BH109-0.9-1																		✓
BH109-1.4-1.5																		✓
BH109-1.9-2																		✓
BH106-0.14-0.25	✓	✓	✓	✓	✓	✓		✓	✓	✓								
BH106-0.5-0.6																		✓
BH106-0.9-1																		✓
BH111-0.07-0.15	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓					
BH111-0.4-0.5																		✓
BH111-0.9-1																✓		
BH111-1-1.45																		✓
BH111-1.4-1.5																✓		
BH111-1.9-2																✓		
BH111-2.4-2.5																✓		
BH111-2.9-3																✓		
BH111-3.4-3.5																✓		
BH111-3.9-4																✓		
BH111-4.4-4.5																✓		

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Triazine Herbicides in Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils NEPM	PFAS in Soils Short	Misc Inorg - Soil	CEC	Phenoxy Acid Herbicidesin Soil	Glyphosate in Soil	sPOCAS field test	Asbestos ID - materials	On Hold
BH111-4.9-5																✓		
BH115-0.05-0.15																		✓
BH115-0.4-0.5	✓	✓	✓	✓	✓	✓		✓	✓	✓								
BH115-0.9-1																✓		
BH115-1.4-1.5																✓		
BH115-1.9-2																✓		
BH115-2.4-2.5																✓		
BH115-2.9-3																✓		
BH114-0.05-0.15																		✓
BH114-0.4-0.5	✓	✓	✓	✓	✓	✓		✓	✓	✓								
BH114-0.9-1																		✓
BH114-1.4-1.5																		✓
BH113-0.05-0.15	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓							
BH113-0.4-0.5																		✓
BH113-0.9-1																		✓
BH113-1.4-1.5																		✓
BH113-1.9-2																		✓
BD2/20210831																		✓
BD3/20210831																		✓
ACM-01																	✓	

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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.

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CERTIFICATE OF ANALYSIS 277156

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**207253.01, Warriewood**
Number of Samples	59 Soil, 1 Material
Date samples received	31/08/2021
Date completed instructions received	02/09/2021

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	10/09/2021
Date of Issue	15/09/2021

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Ridwan Wijaya
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
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Dragana Tomas, Senior Chemist
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Hannah Nguyen, Metals Supervisor
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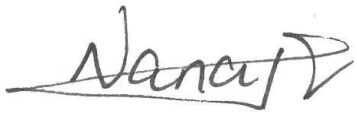

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		277156-2	277156-13	277156-15	277156-22	277156-23
Your Reference	UNITS	BH103	BH101	BH101	BH109	BH109
Depth		0.4-0.5	0.4-0.5	1.4-1.5	0.02-0.1	0.4-0.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	03/09/2021	03/09/2021	07/09/2021	07/09/2021	07/09/2021
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	%	105	97	87	92	98

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		277156-27	277156-30	277156-43	277156-50	277156-53
Your Reference	UNITS	BH106	BH111	BH115	BH114	BH113
Depth		0.14-0.25	0.07-0.15	0.4-0.5	0.4-0.5	0.05-0.15
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	07/09/2021	07/09/2021	07/09/2021	07/09/2021	07/09/2021
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	%	87	84	80	104	96

svTRH (C10-C40) in Soil						
Our Reference		277156-2	277156-13	277156-15	277156-22	277156-23
Your Reference	UNITS	BH103	BH101	BH101	BH109	BH109
Depth		0.4-0.5	0.4-0.5	1.4-1.5	0.02-0.1	0.4-0.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	03/09/2021	04/09/2021	06/09/2021	06/09/2021	06/09/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	91	96	77	80	86

svTRH (C10-C40) in Soil						
Our Reference		277156-27	277156-30	277156-43	277156-50	277156-53
Your Reference	UNITS	BH106	BH111	BH115	BH114	BH113
Depth		0.14-0.25	0.07-0.15	0.4-0.5	0.4-0.5	0.05-0.15
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	03/09/2021	03/09/2021	03/09/2021
Date analysed	-	06/09/2021	06/09/2021	07/09/2021	07/09/2021	06/09/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	84	78	87	92	83

PAHs in Soil						
Our Reference		277156-2	277156-13	277156-15	277156-22	277156-23
Your Reference	UNITS	BH103	BH101	BH101	BH109	BH109
Depth		0.4-0.5	0.4-0.5	1.4-1.5	0.02-0.1	0.4-0.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	07/09/2021	07/09/2021	06/09/2021	06/09/2021	06/09/2021
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	%	112	104	120	113	118

PAHs in Soil						
Our Reference		277156-27	277156-30	277156-43	277156-50	277156-53
Your Reference	UNITS	BH106	BH111	BH115	BH114	BH113
Depth		0.14-0.25	0.07-0.15	0.4-0.5	0.4-0.5	0.05-0.15
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	08/09/2021	08/09/2021	06/09/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.1	0.2	<0.1	0.2
Pyrene	mg/kg	<0.1	0.2	0.2	<0.1	0.2
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	0.4	<0.2	<0.2	0.3
Benzo(a)pyrene	mg/kg	<0.05	0.1	0.09	<0.05	0.06
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	1.0	0.4	<0.05	0.66
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	%	114	112	95	99	113

Organochlorine Pesticides in soil						
Our Reference		277156-2	277156-13	277156-15	277156-22	277156-23
Your Reference	UNITS	BH103	BH101	BH101	BH109	BH109
Depth		0.4-0.5	0.4-0.5	1.4-1.5	0.02-0.1	0.4-0.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	07/09/2021	07/09/2021	06/09/2021	06/09/2021	06/09/2021
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	%	115	117	120	122	122

Organochlorine Pesticides in soil						
Our Reference		277156-27	277156-30	277156-43	277156-50	277156-53
Your Reference	UNITS	BH106	BH111	BH115	BH114	BH113
Depth		0.14-0.25	0.07-0.15	0.4-0.5	0.4-0.5	0.05-0.15
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	08/09/2021	08/09/2021	06/09/2021
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	%	116	119	111	114	115

Organophosphorus Pesticides in Soil						
Our Reference		277156-2	277156-13	277156-15	277156-22	277156-23
Your Reference	UNITS	BH103	BH101	BH101	BH109	BH109
Depth		0.4-0.5	0.4-0.5	1.4-1.5	0.02-0.1	0.4-0.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	07/09/2021	07/09/2021	06/09/2021	06/09/2021	06/09/2021
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	%	115	117	120	122	122

Organophosphorus Pesticides in Soil						
Our Reference		277156-27	277156-30	277156-43	277156-50	277156-53
Your Reference	UNITS	BH106	BH111	BH115	BH114	BH113
Depth		0.14-0.25	0.07-0.15	0.4-0.5	0.4-0.5	0.05-0.15
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	08/09/2021	08/09/2021	06/09/2021
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	%	116	119	111	114	115

PCBs in Soil						
Our Reference		277156-2	277156-13	277156-15	277156-22	277156-23
Your Reference	UNITS	BH103	BH101	BH101	BH109	BH109
Depth		0.4-0.5	0.4-0.5	1.4-1.5	0.02-0.1	0.4-0.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/09/2021	03/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	07/09/2021	07/09/2021	06/09/2021	06/09/2021	06/09/2021
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	%	115	117	120	122	122

PCBs in Soil						
Our Reference		277156-27	277156-30	277156-43	277156-50	277156-53
Your Reference	UNITS	BH106	BH111	BH115	BH114	BH113
Depth		0.14-0.25	0.07-0.15	0.4-0.5	0.4-0.5	0.05-0.15
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	08/09/2021	08/09/2021	06/09/2021
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	%	116	119	111	114	115

Triazine Herbicides in Soil		
Our Reference		277156-2
Your Reference	UNITS	BH103
Depth		0.4-0.5
Date Sampled		31/08/2021
Type of sample		Soil
Date extracted	-	03/09/2021
Date analysed	-	06/09/2021
Simazine	mg/kg	<0.5
Atrazine	mg/kg	<0.5
Propazine	mg/kg	<0.5
Terbuthylazine	mg/kg	<0.5
Metribuzin	mg/kg	<0.5
Ametryn	mg/kg	<0.5
Prometryn	mg/kg	<0.5
Terbutryn	mg/kg	<0.5
Cyanazine	mg/kg	<0.5
Irgarol	mg/kg	<0.5
Hexazinone	mg/kg	<0.5
Surrogate p-Terphenyl-d14	%	73

Acid Extractable metals in soil						
Our Reference		277156-2	277156-13	277156-15	277156-22	277156-23
Your Reference	UNITS	BH103	BH101	BH101	BH109	BH109
Depth		0.4-0.5	0.4-0.5	1.4-1.5	0.02-0.1	0.4-0.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Arsenic	mg/kg	<4	8	<4	<4	<4
Cadmium	mg/kg	<0.4	0.5	<0.4	<0.4	<0.4
Chromium	mg/kg	3	16	9	19	<1
Copper	mg/kg	<1	19	5	37	2
Lead	mg/kg	4	81	12	4	1
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	6	2	70	<1
Zinc	mg/kg	1	360	98	49	11
Manganese	mg/kg	<1	76	16	340	6

Acid Extractable metals in soil						
Our Reference		277156-27	277156-30	277156-43	277156-50	277156-53
Your Reference	UNITS	BH106	BH111	BH115	BH114	BH113
Depth		0.14-0.25	0.07-0.15	0.4-0.5	0.4-0.5	0.05-0.15
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Arsenic	mg/kg	11	<4	5	<4	91
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	14	6	4	7
Copper	mg/kg	15	37	17	3	20
Lead	mg/kg	76	20	55	5	24
Mercury	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Nickel	mg/kg	10	16	4	<1	24
Zinc	mg/kg	210	66	44	4	41
Manganese	mg/kg	97	140	79	18	220

Misc Soil - Inorg						
Our Reference		277156-2	277156-13	277156-15	277156-22	277156-23
Your Reference	UNITS	BH103	BH101	BH101	BH109	BH109
Depth		0.4-0.5	0.4-0.5	1.4-1.5	0.02-0.1	0.4-0.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference		277156-27	277156-30	277156-43	277156-50	277156-53
Your Reference	UNITS	BH106	BH111	BH115	BH114	BH113
Depth		0.14-0.25	0.07-0.15	0.4-0.5	0.4-0.5	0.05-0.15
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Moisture						
Our Reference		277156-2	277156-13	277156-15	277156-22	277156-23
Your Reference	UNITS	BH103	BH101	BH101	BH109	BH109
Depth		0.4-0.5	0.4-0.5	1.4-1.5	0.02-0.1	0.4-0.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/09/2021	03/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	07/09/2021	07/09/2021	07/09/2021
Moisture	%	7.6	24	23	6.5	16

Moisture						
Our Reference		277156-27	277156-30	277156-43	277156-50	277156-53
Your Reference	UNITS	BH106	BH111	BH115	BH114	BH113
Depth		0.14-0.25	0.07-0.15	0.4-0.5	0.4-0.5	0.05-0.15
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	07/09/2021	07/09/2021	07/09/2021	07/09/2021	07/09/2021
Moisture	%	18	12	9.4	8.1	14

Asbestos ID - soils NEPM						
Our Reference		277156-2	277156-12	277156-13	277156-15	277156-22
Your Reference	UNITS	BH103	BH101	BH101	BH101	BH109
Depth		0.4-0.5	0.12-0.2	0.4-0.5	1.4-1.5	0.02-0.1
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	08-09/09/2021	08-09/09/2021	08-09/09/2021	08-09/09/2021	08-09/09/2021
Sample mass tested	g	817.1	1,213.82	695.8	749.26	1,173.3
Sample Description	-	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected Organic fibres detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1	0.3890	0.4874	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	See Above	See Above	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	0.1252	0.3652	–
FA and AF Estimation*	g	–	–	0.1455	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	0.0209	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		277156-23	277156-27	277156-30	277156-43	277156-50
Your Reference	UNITS	BH109	BH106	BH111	BH115	BH114
Depth		0.4-0.5	0.14-0.25	0.07-0.15	0.4-0.5	0.4-0.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	08-09/09/2021	08-09/09/2021	08-09/09/2021	08-09/09/2021	08-09/09/2021
Sample mass tested	g	814.33	1,055.46	1,017.67	644.85	767.16
Sample Description	-	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Grey fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM		
Our Reference		277156-53
Your Reference	UNITS	BH113
Depth		0.05-0.15
Date Sampled		31/08/2021
Type of sample		Soil
Date analysed	-	08-09/09/2021
Sample mass tested	g	760.2
Sample Description	-	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected
ACM >7mm Estimation*	g	–
FA and AF Estimation*	g	–
FA and AF Estimation*#2	%(w/w)	<0.001

PFAS in Soils Short			
Our Reference		277156-22	277156-53
Your Reference	UNITS	BH109	BH113
Depth		0.02-0.1	0.05-0.15
Date Sampled		31/08/2021	31/08/2021
Type of sample		Soil	Soil
Date prepared	-	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021
Perfluorohexanesulfonic acid - PFHxS	µg/kg	<0.1	<0.1
Perfluorooctanesulfonic acid PFOS	µg/kg	0.5	1.1
Perfluorooctanoic acid PFOA	µg/kg	<0.1	0.2
6:2 FTS	µg/kg	<0.1	<0.1
8:2 FTS	µg/kg	<0.2	<0.2
Surrogate $^{13}C_8$ *PFOS*	%	104	103
Surrogate $^{13}C_2$ *PFOA*	%	116	116
Extracted ISTD $^{18}O_2$ *PFHxS*	%	105	101
Extracted ISTD $^{13}C_4$ *PFOS*	%	97	91
Extracted ISTD $^{13}C_4$ *PFOA*	%	93	92
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	102	96
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	106	108
Total Positive PFHxS & PFOS	µg/kg	0.5	1.1
Total Positive PFOS & PFOA	µg/kg	0.5	1.3
Total Positive PFAS	µg/kg	0.5	1.3

Misc Inorg - Soil		
Our Reference		277156-30
Your Reference	UNITS	BH111
Depth		0.07-0.15
Date Sampled		31/08/2021
Type of sample		Soil
Date prepared	-	06/09/2021
Date analysed	-	06/09/2021
pH 1:5 soil:water	pH Units	8.4

CEC		
Our Reference		277156-30
Your Reference	UNITS	BH111
Depth		0.07-0.15
Date Sampled		31/08/2021
Type of sample		Soil
Date prepared	-	07/09/2021
Date analysed	-	07/09/2021
Exchangeable Ca	meq/100g	12
Exchangeable K	meq/100g	0.3
Exchangeable Mg	meq/100g	0.78
Exchangeable Na	meq/100g	<0.1
Cation Exchange Capacity	meq/100g	13

Phenoxy Acid Herbicides in Soil		
Our Reference		277156-2
Your Reference	UNITS	BH103
Depth		0.4-0.5
Date Sampled		31/08/2021
Type of sample		Soil
Date extracted	-	13/09/2021
Date analysed	-	14/09/2021
Clopyralid	mg/kg	<0.5
3,5-Dichlorobenzoic acid	mg/kg	<0.5
o-chlorophenoxy acetic acid	mg/kg	<0.5
4-CPA	mg/kg	<0.5
Dicamba	mg/kg	<0.5
MCPP	mg/kg	<0.5
MCPA	mg/kg	<0.5
Dichlorprop	mg/kg	<0.5
2,4-D	mg/kg	<0.5
Bromoxynil	mg/kg	<0.5
Triclopyr	mg/kg	<0.5
2,4,5-TP	mg/kg	<0.5
2,4,5-T	mg/kg	<0.5
MCPB	mg/kg	<0.5
Dinoseb	mg/kg	<1
2,4-DB	mg/kg	<0.5
Ioxynil	mg/kg	<1
Picloram	mg/kg	<0.5
DCPA (Chlorthal) Diacid	mg/kg	<0.5
Acifluorfen	mg/kg	<2
2,4,6-T	mg/kg	<0.5
2,6-D	mg/kg	<0.5
Surrogate 2.4- DCPA	%	100

Glyphosate in Soil		
Our Reference		277156-2
Your Reference	UNITS	BH103
Depth		0.4-0.5
Date Sampled		31/08/2021
Type of sample		Soil
Date Extracted	-	13/09/2021
Date analysed	-	13/09/2021
Glyphosate*	mg/kg	<10
Surrogate-L-cysteic acid	% rec	#

sPOCAS field test						
Our Reference		277156-5	277156-7	277156-8	277156-9	277156-10
Your Reference	UNITS	BH103	BH103	BH103	BH103	BH103
Depth		1.4-1.5	1.9-2	2.4-2.5	2.9-3	3.4-3.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
pH_F (field pH test)*	pH Units	4.5	5.5	5.5	5.4	5.2
pH_{FOX} (field peroxide test)*	pH Units	3.5	4.0	4.0	2.5	1.6
Reaction Rate*	-	Medium reaction	Medium reaction	Low reaction	Medium reaction	Medium reaction

sPOCAS field test						
Our Reference		277156-11	277156-14	277156-15	277156-17	277156-18
Your Reference	UNITS	BH103	BH101	BH101	BH101	BH101
Depth		3.9-4	0.9-1	1.4-1.5	1.9-2	2.4-2.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
pH_F (field pH test)*	pH Units	6.0	6.7	6.5	6.4	5.9
pH_{FOX} (field peroxide test)*	pH Units	3.4	2.8	2.0	1.8	2.6
Reaction Rate*	-	Volcanic reaction	Medium reaction	Volcanic reaction	Extreme reaction	Medium reaction

sPOCAS field test						
Our Reference		277156-19	277156-20	277156-21	277156-32	277156-34
Your Reference	UNITS	BH101	BH101	BH101	BH111	BH111
Depth		2.9-3	3.4-3.5	3.9-4	0.9-1	1.4-1.5
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
pH_F (field pH test)*	pH Units	5.9	5.5	5.4	5.8	5.2
pH_{FOX} (field peroxide test)*	pH Units	2.8	3.0	2.5	4.3	4.2
Reaction Rate*	-	Medium reaction	Medium reaction	Medium reaction	Medium reaction	Medium reaction

sPOCAS field test						
Our Reference		277156-35	277156-36	277156-37	277156-38	277156-39
Your Reference	UNITS	BH111	BH111	BH111	BH111	BH111
Depth		1.9-2	2.4-2.5	2.9-3	3.4-3.5	3.9-4
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
pH_F (field pH test)*	pH Units	5.1	4.6	4.7	5.2	5.2
pH_{FOX} (field peroxide test)*	pH Units	4.5	3.6	3.7	4.2	4.1
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test						
Our Reference		277156-40	277156-41	277156-44	277156-45	277156-46
Your Reference	UNITS	BH111	BH111	BH115	BH115	BH115
Depth		4.4-4.5	4.9-5	0.9-1	1.4-1.5	1.9-2
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021	06/09/2021	06/09/2021	06/09/2021
pH_F (field pH test)*	pH Units	5.0	5.2	7.1	5.8	5.8
pH_{FOX} (field peroxide test)*	pH Units	4.2	4.3	5.0	5.0	5.0
Reaction Rate*	-	Low reaction	Low reaction	Medium reaction	Medium reaction	Low reaction

sPOCAS field test			
Our Reference		277156-47	277156-48
Your Reference	UNITS	BH115	BH115
Depth		2.4-2.5	2.9-3
Date Sampled		31/08/2021	31/08/2021
Type of sample		Soil	Soil
Date prepared	-	06/09/2021	06/09/2021
Date analysed	-	06/09/2021	06/09/2021
pH_F (field pH test)*	pH Units	5.1	4.7
pH_{FOX} (field peroxide test)*	pH Units	2.3	2.9
Reaction Rate*	-	High reaction	High reaction

Asbestos ID - materials		
Our Reference		277156-60
Your Reference	UNITS	ACM-01
Depth		-
Date Sampled		31/08/2021
Type of sample		Material
Date analysed	-	07/09/2021
Mass / Dimension of Sample	-	41x34x5mm
Sample Description	-	Grey fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected
Trace Analysis	-	[NT]

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Ext-054	Analysed by MPL Envirolab
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.
Inorg-063	pH- measured using pH meter and electrode. Soil is oxidised with Hydrogen Peroxide or extracted with water. Based on section H, Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004. To ensure accurate results these tests are recommended to be done in the field as pH may change with time thus these results may not be representative of true field conditions.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.

Method ID	Methodology Summary
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
ORG-029	Glyphosate & AMPA analysis using LC-MSMS.*
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.3 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	277156-15
Date extracted	-			03/09/2021	2	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Date analysed	-			07/09/2021	2	03/09/2021	03/09/2021		06/09/2021	07/09/2021
TRH C_6 - C_9	mg/kg	25	Org-023	<25	2	<25	<25	0	107	76
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	2	<25	<25	0	107	76
Benzene	mg/kg	0.2	Org-023	<0.2	2	<0.2	<0.2	0	110	86
Toluene	mg/kg	0.5	Org-023	<0.5	2	<0.5	<0.5	0	101	82
Ethylbenzene	mg/kg	1	Org-023	<1	2	<1	<1	0	109	70
m+p-xylene	mg/kg	2	Org-023	<2	2	<2	<2	0	107	72
o-Xylene	mg/kg	1	Org-023	<1	2	<1	<1	0	110	74
naphthalene	mg/kg	1	Org-023	<1	2	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	79	2	105	78	30	111	72

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	277156-15
Date extracted	-			03/09/2021	2	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Date analysed	-			06/09/2021	2	03/09/2021	06/09/2021		06/09/2021	06/09/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	2	<50	<50	0	98	93
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	2	<100	<100	0	104	78
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	2	<100	<100	0	116	88
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	2	<50	<50	0	98	93
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	2	<100	<100	0	104	78
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	2	<100	<100	0	116	88
Surrogate o-Terphenyl	%		Org-020	81	2	91	84	8	84	85

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	277156-15
Date extracted	-			03/09/2021	2	03/09/2021	06/09/2021		03/09/2021	06/09/2021
Date analysed	-			07/09/2021	2	07/09/2021	06/09/2021		07/09/2021	07/09/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	107	93
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	125	103
Fluorene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	109	99
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	116	116
Anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	123	112
Pyrene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	131	113
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	95	83
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	2	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	2	<0.05	<0.05	0	106	106
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	96	2	112	110	2	96	110

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	277156-15
Date extracted	-			03/09/2021	2	03/09/2021	06/09/2021		03/09/2021	06/09/2021
Date analysed	-			07/09/2021	2	07/09/2021	06/09/2021		07/09/2021	07/09/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	130	100
HCB	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	124	96
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	131	89
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	130	111
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	128	112
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	129	107
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	118	112
Endrin	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	121	109
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	108	74
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	120	112
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	116	2	115	114	1	111	122

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	277156-15
Date extracted	-			03/09/2021	2	03/09/2021	06/09/2021		03/09/2021	06/09/2021
Date analysed	-			07/09/2021	2	07/09/2021	06/09/2021		07/09/2021	07/09/2021
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	123	76
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	126	118
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	77	70
Malathion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	122	99
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	128	109
Parathion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	78	70
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	90	88
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	116	2	115	114	1	111	122

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	277156-15
Date extracted	-			03/09/2021	2	03/09/2021	06/09/2021		03/09/2021	06/09/2021
Date analysed	-			07/09/2021	2	07/09/2021	06/09/2021		07/09/2021	07/09/2021
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	120	120
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	116	2	115	114	1	111	122

QUALITY CONTROL: Triazine Herbicides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	277156-2
Date extracted	-			03/09/2021	2	03/09/2021	03/09/2021		03/09/2021	03/09/2021
Date analysed	-			06/09/2021	2	06/09/2021	06/09/2021		06/09/2021	06/09/2021
Simazine	mg/kg	0.5	Org-022/025	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Atrazine	mg/kg	0.5	Org-022/025	<0.5	2	<0.5	<0.5	0	102	104
Propazine	mg/kg	0.5	Org-022/025	<0.5	2	<0.5	<0.5	0	112	114
Terbuthylazine	mg/kg	0.5	Org-022/025	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Metribuzin	mg/kg	0.5	Org-022/025	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Ametryn	mg/kg	0.5	Org-022/025	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Prometryn	mg/kg	0.5	Org-022/025	<0.5	2	<0.5	<0.5	0	124	124
Terbutryn	mg/kg	0.5	Org-022/025	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Cyanazine	mg/kg	0.5	Org-022/025	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Irgarol	mg/kg	0.5	Org-022/025	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Hexazinone	mg/kg	0.5	Org-022/025	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	78	2	73	77	5	76	74

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	277156-15
Date prepared	-			06/09/2021	2	06/09/2021	06/09/2021		06/09/2021	06/09/2021
Date analysed	-			06/09/2021	2	06/09/2021	06/09/2021		06/09/2021	06/09/2021
Arsenic	mg/kg	4	Metals-020	<4	2	<4	<4	0	97	84
Cadmium	mg/kg	0.4	Metals-020	<0.4	2	<0.4	<0.4	0	95	89
Chromium	mg/kg	1	Metals-020	<1	2	3	3	0	93	91
Copper	mg/kg	1	Metals-020	<1	2	<1	<1	0	95	94
Lead	mg/kg	1	Metals-020	<1	2	4	4	0	94	85
Mercury	mg/kg	0.1	Metals-021	<0.1	2	<0.1	<0.1	0	102	80
Nickel	mg/kg	1	Metals-020	<1	2	<1	<1	0	95	89
Zinc	mg/kg	1	Metals-020	<1	2	1	1	0	97	#
Manganese	mg/kg	1	Metals-020	<1	2	<1	<1	0	98	85

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	277156-15
Date prepared	-			06/09/2021	2	06/09/2021	06/09/2021		06/09/2021	06/09/2021
Date analysed	-			06/09/2021	2	06/09/2021	06/09/2021		06/09/2021	06/09/2021
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	2	<5	<5	0	100	99

QUALITY CONTROL: PFAS in Soils Short						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	277156-22
Date prepared	-			06/09/2021	53	06/09/2021	06/09/2021		06/09/2021	06/09/2021
Date analysed	-			06/09/2021	53	06/09/2021	06/09/2021		06/09/2021	06/09/2021
Perfluorohexanesulfonic acid - PFHxS	µg/kg	0.1	Org-029	<0.1	53	<0.1	<0.1	0	90	96
Perfluorooctanesulfonic acid PFOS	µg/kg	0.1	Org-029	<0.1	53	1.1	0.7	44	98	104
Perfluorooctanoic acid PFOA	µg/kg	0.1	Org-029	<0.1	53	0.2	0.2	0	95	99
6:2 FTS	µg/kg	0.1	Org-029	<0.1	53	<0.1	<0.1	0	91	100
8:2 FTS	µg/kg	0.2	Org-029	<0.2	53	<0.2	<0.2	0	91	102
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	106	53	103	101	2	104	101
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	104	53	116	108	7	108	124
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	108	53	101	102	1	107	89
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	98	53	91	93	2	98	80
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	103	53	92	94	2	98	72
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	116	53	96	83	15	106	63
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	108	53	108	103	5	99	59

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date prepared	-			06/09/2021	[NT]	[NT]	[NT]	[NT]	06/09/2021	[NT]
Date analysed	-			06/09/2021	[NT]	[NT]	[NT]	[NT]	06/09/2021	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date prepared	-			07/09/2021	[NT]	[NT]	[NT]	[NT]	07/09/2021	[NT]
Date analysed	-			07/09/2021	[NT]	[NT]	[NT]	[NT]	07/09/2021	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	87	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: Phenoxy Acid Herbicides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	277156-2
Date extracted	-			13/09/2021	2	13/09/2021	13/09/2021		13/09/2021	13/09/2021
Date analysed	-			14/09/2021	2	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Clopyralid	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
3,5-Dichlorobenzoic acid	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
o-chlorophenoxy acetic acid	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
4-CPA	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Dicamba	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	110	115
MCPP	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	101	109
MCPA	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	101	107
Dichlorprop	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
2,4-D	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	99	109
Bromoxynil	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Triclopyr	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
2,4,5-TP	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
2,4,5-T	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	101	119
MCPB	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Dinoseb	mg/kg	1	Ext-054	<1	2	<1	<1	0	[NT]	[NT]
2,4-DB	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Ioxynil	mg/kg	1	Ext-054	<1	2	<1	<1	0	[NT]	[NT]
Picloram	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
DCPA (Chlorthal) Diacid	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Acifluorfen	mg/kg	2	Ext-054	<2	2	<2	<2	0	[NT]	[NT]
2,4,6-T	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
2,6-D	mg/kg	0.5	Ext-054	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
Surrogate 2.4- DCPA	%		Ext-054	120	2	100	98	2	97	98

QUALITY CONTROL: Glyphosate in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	277156-2
Date Extracted	-			13/09/2021	[NT]	[NT]	[NT]	[NT]	13/09/2021	13/09/2021
Date analysed	-			14/09/2021	[NT]	[NT]	[NT]	[NT]	14/09/2021	14/09/2021
Glyphosate*	mg/kg	1	Ext-054	<1	[NT]	[NT]	[NT]	[NT]	105	88
Surrogate-L-cysteic acid	% rec		ORG-029	102	[NT]	[NT]	[NT]	[NT]	102	#

QUALITY CONTROL: sPOCAS field test						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date prepared	-			06/09/2021	[NT]	[NT]	[NT]	[NT]	06/09/2021	[NT]
Date analysed	-			06/09/2021	[NT]	[NT]	[NT]	[NT]	06/09/2021	[NT]
pH_F (field pH test)*	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
pH_{FOX} (field peroxide test)*	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: sPOCAS field test						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date prepared	-			[NT]	[NT]	[NT]	[NT]	[NT]	06/09/2021	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	06/09/2021	[NT]
pH_F (field pH test)*	pH Units		Inorg-063	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
pH_{FOX} (field peroxide test)*	pH Units		Inorg-063	[NT]	[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

8 metals in soil - # Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

PFAS in Soil Short were provided without the ideal container type, Plastic containers are the recommended container type.

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

Factual description of asbestos identified in the soil samples: NEPM
Sample 277156-13; Chrysotile, Amosite and Crocidolite asbestos identified in 0.8345g of fibre cement material >7mm

Sample 277156-13; Chrysotile, Amosite and Crocidolite asbestos identified in 0.7276g of fibre cement material <7mm

Sample 277156-15; Chrysotile, Amosite and Crocidolite asbestos identified in 2.4346g of fibre cement material >7mm

Acid Herbicides & Glyphosate in Soil analysed by MPL Laboratories. Report No. 268713

Glyphosate in Soil:
- PQL has been raised due to interfernce from analytes (other than those being tested) in the sample/s.
- # Surrogate recovery was low due to suspected sample matrix interference during extraction.

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CERTIFICATE OF ANALYSIS 277156-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**207253.01, Warriewood**
Number of Samples	additional analysis
Date samples received	31/08/2021
Date completed instructions received	09/09/2021

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	17/09/2021
Date of Issue	16/09/2021

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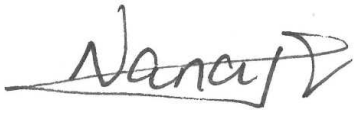
Results Approved By
Hannah Nguyen, Metals Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

Metals from Leaching Fluid pH 2.9 or 5		
Our Reference		277156-A-22
Your Reference	UNITS	BH109
Depth		0.02-0.1
Date Sampled		31/08/2021
Type of sample		Soil
Date extracted	-	13/09/2021
Date analysed	-	13/09/2021
pH of soil for fluid# determ.	pH units	9.4
pH of soil TCLP (after HCl)	pH units	1.9
Extraction fluid used	-	1
pH of final Leachate	pH units	5.3
Nickel	mg/L	0.07

Method ID	Methodology Summary
INORG-004	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
Metals-020	Determination of various metals by ICP-AES following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.

QUALITY CONTROL: Metals from Leaching Fluid pH 2.9 or 5					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			13/09/2021	[NT]	[NT]	[NT]	[NT]	13/09/2021	[NT]
Date analysed	-			13/09/2021	[NT]	[NT]	[NT]	[NT]	13/09/2021	[NT]
Nickel	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	90	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

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CERTIFICATE OF ANALYSIS 277156-B

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**207253.01, Warriewood**
Number of Samples	additional analysis
Date samples received	31/08/2021
Date completed instructions received	13/09/2021

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	21/09/2021
Date of Issue	21/09/2021

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Results Approved By
Alexander Mitchell Maclean, Senior Chemist
Priya Samarawickrama, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

Chromium Suite					
Our Reference		277156-B-10	277156-B-14	277156-B-17	277156-B-48
Your Reference	UNITS	BH103	BH101	BH101	BH115
Depth		3.4-3.5	0.9-1	1.9-2	2.9-3
Date Sampled		31/08/2021	31/08/2021	31/08/2021	31/08/2021
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	17/09/2021	17/09/2021	17/09/2021	17/09/2021
Date analysed	-	17/09/2021	17/09/2021	17/09/2021	17/09/2021
pH $_{kcl}$	pH units	4.0	5.8	4.8	3.5
s-TAA pH 6.5	%w/w S	0.06	0.01	0.04	0.18
TAA pH 6.5	moles H^+ /t	40	8	22	110
Chromium Reducible Sulfur	%w/w	0.08	0.02	0.12	0.008
a-Chromium Reducible Sulfur	moles H^+ /t	47	11	72	5
S_{HCl}	%w/w S	0.044	[NT]	[NT]	0.008
S_{KCl}	%w/w S	0.039	[NT]	[NT]	0.006
S_{NAS}	%w/w S	0.005	[NT]	[NT]	<0.005
ANC_{BT}	% $CaCO_3$	[NT]	[NT]	[NT]	[NT]
s-ANC_{BT}	%w/w S	[NT]	[NT]	[NT]	[NT]
s-Net Acidity	%w/w S	0.14	0.030	0.15	0.19
a-Net Acidity	moles H^+ /t	90	19	94	120
Liming rate	kg $CaCO_3$ /t	7	1	7	8.8
a-Net Acidity without ANCE	moles H^+ /t	90	19	94	120
Liming rate without ANCE	kg $CaCO_3$ /t	6.8	1.4	7.1	8.8
s-Net Acidity without ANCE	%w/w S	0.14	0.030	0.15	0.19

PFAS in TCLP Short			
Our Reference		277156-B-22	277156-B-53
Your Reference	UNITS	BH109	BH113
Depth		0.02-0.1	0.05-0.15
Date Sampled		31/08/2021	31/08/2021
Type of sample		Soil	Soil
Date prepared	-	16/09/2021	16/09/2021
Date analysed	-	17/09/2021	17/09/2021
pH of soil for fluid# determ.	pH units	[NA]	6.5
pH of soil TCLP (after HCl)	pH units	[NA]	1.7
Extraction fluid used	-	[NA]	1
pH of final Leachate	pH units	[NA]	4.9
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.01	<0.01
Perfluorooctanesulfonic acid PFOS	µg/L	<0.01	0.01
Perfluorooctanoic acid PFOA	µg/L	<0.01	<0.01
6:2 FTS	µg/L	<0.01	<0.01
8:2 FTS	µg/L	<0.02	<0.02
Surrogate $^{13}C_8$ *PFOS*	%	99	99
Surrogate $^{13}C_2$ *PFOA*	%	98	92
Extracted ISTD $^{18}O_2$ *PFHxS*	%	99	95
Extracted ISTD $^{13}C_4$ *PFOS*	%	96	95
Extracted ISTD $^{13}C_4$ *PFOA*	%	94	97
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	75	72
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	106	105
Total Positive PFHxS & PFOS	µg/L	<0.01	0.01
Total Positive PFOS & PFOA	µg/L	<0.01	0.01
Total Positive PFAS	µg/L	<0.01	0.01

Method ID	Methodology Summary
INORG-004	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
Inorg-068	Chromium Reducible Sulfur - Hydrogen Sulfide is quantified by iodometric titration after distillation to determine potential acidity.
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.3 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: Chromium Suite						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			17/09/2021	10	17/09/2021	17/09/2021		17/09/2021	[NT]
Date analysed	-			17/09/2021	10	17/09/2021	17/09/2021		17/09/2021	[NT]
pH $_{kcl}$	pH units		Inorg-068	[NT]	10	4.0	4.0	0	97	[NT]
s-TAA pH 6.5	%w/w S	0.01	Inorg-068	<0.01	10	0.06	0.07	15	[NT]	[NT]
TAA pH 6.5	moles H^+ /t	5	Inorg-068	<5	10	40	42	5	99	[NT]
Chromium Reducible Sulfur	%w/w	0.005	Inorg-068	<0.005	10	0.08	0.08	0	[NT]	[NT]
a-Chromium Reducible Sulfur	moles H^+ /t	3	Inorg-068	<3	10	47	48	2	109	[NT]
S_{HCl}	%w/w S	0.005	Inorg-068	<0.005	10	0.044	0.044	0	[NT]	[NT]
S_{KCl}	%w/w S	0.005	Inorg-068	<0.005	10	0.039	0.048	21	[NT]	[NT]
S_{NAS}	%w/w S	0.005	Inorg-068	<0.005	10	0.005	<0.005	0	[NT]	[NT]
ANC_{BT}	% $CaCO_3$	0.05	Inorg-068	<0.05	10	[NT]	[NT]		[NT]	[NT]
s-ANC_{BT}	%w/w S	0.05	Inorg-068	<0.05	10	[NT]	[NT]		[NT]	[NT]
s-Net Acidity	%w/w S	0.005	Inorg-068	<0.005	10	0.14	0.14	0	[NT]	[NT]
a-Net Acidity	moles H^+ /t	5	Inorg-068	<5	10	90	90	0	[NT]	[NT]
Liming rate	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	10	7	7	0	[NT]	[NT]
a-Net Acidity without ANCE	moles H^+ /t	5	Inorg-068	<5	10	90	90	0	[NT]	[NT]
Liming rate without ANCE	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	10	6.8	6.8	0	[NT]	[NT]
s-Net Acidity without ANCE	%w/w S	0.005	Inorg-068	<0.005	10	0.14	0.14	0	[NT]	[NT]

QUALITY CONTROL: PFAS in TCLP Short						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			16/09/2021	22	16/09/2021	16/09/2021		16/09/2021	[NT]
Date analysed	-			17/09/2021	22	17/09/2021	17/09/2021		17/09/2021	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.01	Org-029	<0.01	22	<0.01	<0.01	0	108	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.01	Org-029	<0.01	22	<0.01	<0.01	0	108	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.01	Org-029	<0.01	22	<0.01	<0.01	0	104	[NT]
6:2 FTS	µg/L	0.01	Org-029	<0.01	22	<0.01	<0.01	0	104	[NT]
8:2 FTS	µg/L	0.02	Org-029	<0.02	22	<0.02	<0.02	0	111	[NT]
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	103	22	99	105	6	104	[NT]
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	97	22	98	95	3	93	[NT]
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	100	22	99	93	6	99	[NT]
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	95	22	96	93	3	95	[NT]
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	94	22	94	96	2	93	[NT]
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	74	22	75	74	1	72	[NT]
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	107	22	106	102	4	96	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

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.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	207253.01	**Suburb:**	Warriewood	**To:**	*Envirolab Services*
Project Manager:	Nerilee Edwards	**Order Number:**		**Sampler:** A.Spencer	*12 Ashley St, Chatswood NSW 2067*
Email:	Nerilee.Edwards@douglaspartners.com.au			**Attn:**	*Sample Receipt*
Turnaround time:	☐ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day **on hold**			**Contact:**	*(02) 9910 6200 samplereceipt@envirolab.com.au*
Prior Storage:	☐ Fridge ☐ Freezer ☑ Esky	**Do samples contain 'potential' HBM?**	☐ No ☑ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)		

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: BTEX	VOC	Hardness	PFAS (short, trace)	Glyphosate, Triazine Herbicides	Phenoxy Acid Herbicides	6L (trace OCP, OPP, PCB)	3L				Notes/ Preservation/ Additional Requirements
1	TS/20210908	-	-	-	W	G	X											
2	TB/20210908	-	-	-	W	G	X											
3	BD1/20210908	-	-	8/09/21	W	G/P								X				
4	BH103	-	-	8/09/21	W	G/P		X	X	X	X	X	X					
5	BH101	-	-	8/09/21	W	G/P		X	X	X	X	X	X					
6	BH111	-	-	8/09/21	W	G/P		X	X	X	X	X	X					

ENVIROLAB 12 Ashley Chatswood NSW Ph: (02) 9910 6200
Job No: 277522
Date Received: 08/09/21
Time Received: 1500
Received By: CH
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Br...

Metals to analyse:	HM9 (As, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Zn)		
Number of samples in container:	6	**Transported to laboratory by:**	dropped off
Send results to:	Douglas Partners Pty Ltd		
Address:	96 Hermitage Road, West Ryde NSW 2114	**Phone:**	(02) 9809 0666
Relinquished by:	A.Spencer	**Date:** 08/09/2021	**Signed:**

LAB RECEIPT
Lab Ref. No:
Received by: Christina
Date & Time: 08/09/21 1500
Signed:

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	Nerilee Edwards

Sample Login Details

Your reference	207253.01, Warriewood
Envirolab Reference	277522
Date Sample Received	08/09/2021
Date Instructions Received	08/09/2021
Date Results Expected to be Reported	15/09/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	6 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	6
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	VOCs in water	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water - Low Level	OCPs in Water - Trace Level	OP in water Trace ANZECCF/ADWG	PCBs in Water - Trace Level	Triazine Herbicides in Water	HM in water - dissolved	Cations in water Dissolved	PFAS in Water TRACE Short	Acid Herbicides in Water	Small Community Pesticides
TS/20210908		✓											
TB/20210908		✓											
BD1/20210908		✓	✓	✓					✓				
BH103	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BH101	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BH111	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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 277522

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**207253.01, Warriewood**
Number of Samples	6 Water
Date samples received	08/09/2021
Date completed instructions received	08/09/2021

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	15/09/2021
Date of Issue	16/09/2021

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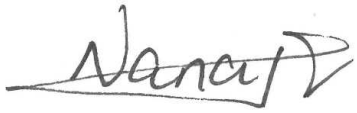
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Dragana Tomas, Senior Chemist
Greta Petzold, Senior Report Coordinator
Hannah Nguyen, Metals Supervisor
Josh Williams, LC Supervisor
Steven Luong, Organics Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

VOCs in water				
Our Reference		277522-4	277522-5	277522-6
Your Reference	UNITS	BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water
Date extracted	-	10/09/2021	10/09/2021	10/09/2021
Date analysed	-	10/09/2021	10/09/2021	10/09/2021
Dichlorodifluoromethane	µg/L	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1
Chloroform	µg/L	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1
Benzene	µg/L	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1
Toluene	µg/L	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1

VOCs in water				
Our Reference		277522-4	277522-5	277522-6
Your Reference	UNITS	BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water
Bromoform	µg/L	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2
Styrene	µg/L	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1
o-xylene	µg/L	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1
Surrogate Dibromofluoromethane	%	98	99	99
Surrogate toluene-d8	%	88	88	88
Surrogate 4-BFB	%	93	94	93

vTRH(C6-C10)/BTEXN in Water						
Our Reference		277522-1	277522-2	277522-3	277522-4	277522-5
Your Reference	UNITS	TS/20210908	TB/20210908	BD1/20210908	BH103	BH101
Date Sampled		08/09/2021	08/09/2021	08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	10/09/2021	10/09/2021	10/09/2021	10/09/2021	10/09/2021
Date analysed	-	10/09/2021	10/09/2021	10/09/2021	10/09/2021	10/09/2021
TRH C_6 - C_9	µg/L	[NA]	[NA]	<10	<10	<10
TRH C_6 - C_{10}	µg/L	[NA]	[NA]	<10	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	[NA]	[NA]	<10	<10	<10
Benzene	µg/L	101%	<1	<1	<1	<1
Toluene	µg/L	99%	<1	<1	<1	<1
Ethylbenzene	µg/L	110%	<1	<1	<1	<1
m+p-xylene	µg/L	104%	<2	<2	<2	<2
o-xylene	µg/L	103%	<1	<1	<1	<1
Naphthalene	µg/L	[NA]	[NA]	<1	<1	<1
Surrogate Dibromofluoromethane	%	99	98	99	98	99
Surrogate toluene-d8	%	90	88	88	88	88
Surrogate 4-BFB	%	92	93	94	93	94

vTRH(C6-C10)/BTEXN in Water		
Our Reference		277522-6
Your Reference	UNITS	BH111
Date Sampled		08/09/2021
Type of sample		Water
Date extracted	-	10/09/2021
Date analysed	-	10/09/2021
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	99
Surrogate toluene-d8	%	88
Surrogate 4-BFB	%	93

svTRH (C10-C40) in Water					
Our Reference	UNITS	277522-3	277522-4	277522-5	277522-6
Your Reference		BD1/20210908	BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water	Water
Date extracted	-	09/09/2021	09/09/2021	09/09/2021	09/09/2021
Date analysed	-	11/09/2021	11/09/2021	11/09/2021	11/09/2021
TRH C_{10} - C_{14}	µg/L	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	<50	<50	<50
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	<50	<50	<50
Surrogate o-Terphenyl	%	81	79	87	111

PAHs in Water - Low Level					
Our Reference	UNITS	277522-3	277522-4	277522-5	277522-6
Your Reference		BD1/20210908	BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water	Water
Date extracted	-	09/09/2021	09/09/2021	09/09/2021	09/09/2021
Date analysed	-	10/09/2021	10/09/2021	10/09/2021	10/09/2021
Naphthalene	µg/L	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	75	70	86	83

OCPs in Water - Trace Level				
Our Reference	UNITS	277522-4	277522-5	277522-6
Your Reference		BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water
Date extracted	-	09/09/2021	09/09/2021	09/09/2021
Date analysed	-	10/09/2021	10/09/2021	10/09/2021
alpha-BHC	µg/L	<0.001	<0.001	<0.001
HCB	µg/L	<0.001	<0.001	<0.001
beta-BHC	µg/L	<0.001	<0.001	<0.001
gamma-BHC	µg/L	<0.001	<0.001	<0.001
Heptachlor	µg/L	<0.001	<0.001	<0.001
delta-BHC	µg/L	<0.001	<0.001	<0.001
Aldrin	µg/L	<0.001	<0.001	<0.001
Heptachlor Epoxide	µg/L	<0.001	<0.001	<0.001
gamma-Chlordane	µg/L	<0.001	<0.001	<0.001
alpha-Chlordane	µg/L	<0.001	<0.001	<0.001
Endosulfan I	µg/L	<0.002	<0.002	<0.002
pp-DDE	µg/L	<0.001	0.002	<0.001
Dieldrin	µg/L	<0.001	<0.001	<0.001
Endrin	µg/L	<0.001	<0.001	<0.001
Endosulfan II	µg/L	<0.002	<0.002	<0.002
pp-DDD	µg/L	<0.001	0.002	<0.001
Endrin Aldehyde	µg/L	<0.001	<0.001	<0.001
pp-DDT	µg/L	<0.001	0.004	<0.001
Endosulfan Sulphate	µg/L	<0.001	<0.001	<0.001
Methoxychlor	µg/L	<0.001	<0.001	<0.001
Surrogate TCMX	%	63	74	68

OP in water Trace ANZECCF/ADWG				
Our Reference	UNITS	277522-4	277522-5	277522-6
Your Reference		BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water
Date extracted	-	09/09/2021	09/09/2021	09/09/2021
Date analysed	-	10/09/2021	10/09/2021	10/09/2021
Dichlorovos	µg/L	<0.2	<0.2	<0.2
Dimethoate	µg/L	<0.15	<0.15	<0.15
Diazinon	µg/L	<0.01	<0.01	<0.01
Chlorpyriphos-methyl	µg/L	<0.2	<0.2	<0.2
Methyl Parathion	µg/L	<0.2	<0.2	<0.2
Ronnel	µg/L	<0.2	<0.2	<0.2
Fenitrothion	µg/L	<0.2	<0.2	<0.2
Malathion	µg/L	<0.05	<0.05	<0.05
Chlorpyriphos	µg/L	<0.009	<0.009	<0.009
Parathion	µg/L	<0.004	<0.004	<0.004
Bromophos ethyl	µg/L	<0.2	<0.2	<0.2
Ethion	µg/L	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	µg/L	<0.02	<0.02	<0.02
Surrogate TCMX	%	63	74	68

PCBs in Water - Trace Level				
Our Reference	UNITS	277522-4	277522-5	277522-6
Your Reference		BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water
Date extracted	-	09/09/2021	09/09/2021	09/09/2021
Date analysed	-	10/09/2021	10/09/2021	10/09/2021
Aroclor 1016	µg/L	<0.01	<0.01	<0.01
Aroclor 1221	µg/L	<0.01	<0.01	<0.01
Aroclor 1232	µg/L	<0.01	<0.01	<0.01
Aroclor 1242	µg/L	<0.01	<0.01	<0.01
Aroclor 1248	µg/L	<0.01	<0.01	<0.01
Aroclor 1254	µg/L	<0.01	<0.01	<0.01
Aroclor 1260	µg/L	<0.01	<0.01	<0.01
Surrogate TCMX	%	63	74	68

Triazine Herbicides in Water				
Our Reference	UNITS	277522-4	277522-5	277522-6
Your Reference		BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water
Date extracted	-	09/09/2021	09/09/2021	09/09/2021
Date analysed	-	14/09/2021	14/09/2021	14/09/2021
Atrazine	mg/L	<0.002	<0.002	<0.002
Ametryn	mg/L	<0.002	<0.002	<0.002
Cyanazine	mg/L	<0.002	<0.002	<0.002
Hexazinone	mg/L	<0.002	<0.002	<0.002
Irgarol	mg/L	<0.002	<0.002	<0.002
Metribuzin	mg/L	<0.002	<0.002	<0.002
Prometryn	mg/L	<0.002	<0.002	<0.002
Propazine	mg/L	<0.002	<0.002	<0.002
Simazine	mg/L	<0.002	<0.002	<0.002
Terbutryn	mg/L	<0.002	<0.002	<0.002
Terbuthylazine	mg/L	<0.002	<0.002	<0.002
Surrogate p-Terphenyl-d14	%	85	84	76

HM in water - dissolved					
Our Reference	UNITS	277522-3	277522-4	277522-5	277522-6
Your Reference		BD1/20210908	BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water	Water
Date prepared	-	09/09/2021	09/09/2021	09/09/2021	09/09/2021
Date analysed	-	09/09/2021	09/09/2021	09/09/2021	09/09/2021
Arsenic-Dissolved	µg/L	2	4	3	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1
Copper-Dissolved	µg/L	<1	<1	<1	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	<1	<1	<1	1
Zinc-Dissolved	µg/L	27	36	32	23

Cations in water Dissolved				
Our Reference		277522-4	277522-5	277522-6
Your Reference	UNITS	BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water
Date digested	-	09/09/2021	09/09/2021	09/09/2021
Date analysed	-	09/09/2021	09/09/2021	09/09/2021
Calcium - Dissolved	mg/L	6.1	17	6.4
Magnesium - Dissolved	mg/L	9.4	7.1	11
Hardness	mgCaCO 3 /L	54	71	61

PFAS in Water TRACE Short				
Our Reference	UNITS	277522-4	277522-5	277522-6
Your Reference		BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water
Date prepared	-	10/09/2021	10/09/2021	10/09/2021
Date analysed	-	10/09/2021	10/09/2021	10/09/2021
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0072	0.0058	0.0060
Perfluorooctanesulfonic acid PFOS	µg/L	0.0025	0.002	0.002
Perfluorooctanoic acid PFOA	µg/L	0.0056	0.0030	0.0035
6:2 FTS	µg/L	<0.0004	0.0008	0.0005
8:2 FTS	µg/L	<0.0004	<0.0004	<0.0004
Surrogate $^{13}C_8$ *PFOS*	%	97	100	90
Surrogate $^{13}C_2$ *PFOA*	%	93	100	95
Extracted ISTD $^{18}O_2$ *PFHxS*	%	89	99	91
Extracted ISTD $^{13}C_4$ *PFOS*	%	76	84	89
Extracted ISTD $^{13}C_4$ *PFOA*	%	80	88	96
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	73	97	94
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	71	102	80
Total Positive PFHxS & PFOS	µg/L	0.0098	0.0077	0.0079
Total Positive PFOS & PFOA	µg/L	0.0081	0.0049	0.0055
Total Positive PFAS	µg/L	0.015	0.012	0.012

Acid Herbicides in Water				
Our Reference	UNITS	277522-4	277522-5	277522-6
Your Reference		BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water
Date extracted	-	13/09/2021	13/09/2021	13/09/2021
Date analysed	-	14/09/2021	14/09/2021	14/09/2021
Clopyralid	µg/L	<0.5	<0.5	<0.5
3,5-Dichlorobenzoic acid	µg/L	<0.5	<0.5	<0.5
o-chlorophenoxy acetic acid	µg/L	<0.5	<0.5	<0.5
4-CPA	µg/L	<0.5	<0.5	<0.5
Dicamba	µg/L	<0.5	<0.5	<0.5
MCPP	µg/L	<0.5	<0.5	<0.5
MCPA	µg/L	<0.5	<0.5	<0.5
Dichlorprop	µg/L	<0.5	<0.5	<0.5
2,4-D	µg/L	<0.5	<0.5	<0.5
Bromoxynil	µg/L	<0.5	<0.5	<0.5
Triclopyr	µg/L	<0.5	<0.5	<0.5
2,4,5-TP	µg/L	<0.5	<0.5	<0.5
2,4,5-T	µg/L	<0.5	<0.5	<0.5
MCPB	µg/L	<0.5	<0.5	<0.5
Dinoseb	µg/L	<1	<1	<1
2,4-DB	µg/L	<0.5	<0.5	<0.5
Ioxynil	µg/L	<1	<1	<1
Picloram	µg/L	<1	<1	<1
Acifluorfen	µg/L	<2	<2	<2
2,4,6-T	µg/L	<0.5	<0.5	<0.5
2,6-D	µg/L	<0.5	<0.5	<0.5
Surrogate 2.4- DCPA	%	88	73	92

Small Community Pesticides				
Our Reference		277522-4	277522-5	277522-6
Your Reference	UNITS	BH103	BH101	BH111
Date Sampled		08/09/2021	08/09/2021	08/09/2021
Type of sample		Water	Water	Water
Date prepared	-	14/09/2021	14/09/2021	14/09/2021
Date analysed	-	14/09/2021	14/09/2021	14/09/2021
Glyphosate*	mg/L	<0.01	<0.01	<0.01
Surrogate: L-Cysteic Acid	%	103	101	102

Method ID	Methodology Summary
Disclaimer	Please note that sampling strategies are outside the control of the laboratory and are therefore not covered under NATA accreditation.
Ext-054	Analysed by MPL Envirolab
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. 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-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.3 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			10/09/2021	4	10/09/2021	13/09/2021		10/09/2021	[NT]
Date analysed	-			10/09/2021	4	10/09/2021	13/09/2021		10/09/2021	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	4	<10	<10	0	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	4	<10	<10	0	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	4	<10	<10	0	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	4	<10	<10	0	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	4	<10	<10	0	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	4	<10	<10	0	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	4	<1	<1	0	105	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	4	<1	<1	0	115	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	4	<1	<1	0	120	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	4	<1	<1	0	100	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Dibromomethane	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	4	<1	<1	0	123	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	4	<1	<1	0	104	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	4	<1	<1	0	94	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	4	<1	<1	0	91	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Bromoform	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	4	<2	<2	0	[NT]	[NT]
Styrene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
o-xylene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	98	4	98	99	1	100	[NT]
Surrogate toluene-d8	%		Org-023	88	4	88	98	11	89	[NT]
Surrogate 4-BFB	%		Org-023	95	4	93	100	7	91	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			10/09/2021	4	10/09/2021	13/09/2021		10/09/2021	[NT]
Date analysed	-			10/09/2021	4	10/09/2021	13/09/2021		10/09/2021	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	4	<10	<10	0	103	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	4	<10	<10	0	103	[NT]
Benzene	µg/L	1	Org-023	<1	4	<1	<1	0	101	[NT]
Toluene	µg/L	1	Org-023	<1	4	<1	<1	0	97	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	4	<1	<1	0	103	[NT]
m+p-xylene	µg/L	2	Org-023	<2	4	<2	<2	0	106	[NT]
o-xylene	µg/L	1	Org-023	<1	4	<1	<1	0	101	[NT]
Naphthalene	µg/L	1	Org-023	<1	4	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	98	4	98	99	1	100	[NT]
Surrogate toluene-d8	%		Org-023	88	4	88	98	11	89	[NT]
Surrogate 4-BFB	%		Org-023	95	4	93	100	7	91	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	277522-3
Date extracted	-			09/09/2021	3	09/09/2021	09/09/2021		09/09/2021	09/09/2021
Date analysed	-			11/09/2021	3	11/09/2021	11/09/2021		11/09/2021	11/09/2021
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	3	<50	<50	0	111	116
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	3	<100	<100	0	121	127
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	3	<100	<100	0	93	120
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	3	<50	<50	0	111	116
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	3	<100	<100	0	121	127
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	3	<100	<100	0	93	120
Surrogate o-Terphenyl	%		Org-020	96	3	81	80	1	105	105

QUALITY CONTROL: PAHs in Water - Low Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			09/09/2021	3	09/09/2021	09/09/2021		09/09/2021	[NT]
Date analysed	-			10/09/2021	3	10/09/2021	10/09/2021		10/09/2021	[NT]
Naphthalene	µg/L	0.2	Org-022/025	<0.2	3	<0.2	<0.2	0	115	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	90	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	93	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	116	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	93	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	102	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	106	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	3	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	83	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	3	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	87	3	75	78	4	89	[NT]

QUALITY CONTROL: OCPs in Water - Trace Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			09/09/2021	[NT]	[NT]	[NT]	[NT]	09/09/2021	[NT]
Date analysed	-			10/09/2021	[NT]	[NT]	[NT]	[NT]	10/09/2021	[NT]
alpha-BHC	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	129	[NT]
HCB	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	128	[NT]
gamma-BHC	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	122	[NT]
delta-BHC	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	132	[NT]
Heptachlor Epoxide	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	132	[NT]
gamma-Chlordane	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-Chlordane	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	µg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	127	[NT]
Dieldrin	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	117	[NT]
Endrin	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	135	[NT]
Endosulfan II	µg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	127	[NT]
Endrin Aldehyde	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	122	[NT]
Methoxychlor	µg/L	0.001	Org-022/025	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	96	[NT]	[NT]	[NT]	[NT]	72	[NT]

QUALITY CONTROL: OP in water Trace ANZECCF/ADWG						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			09/09/2021	[NT]	[NT]	[NT]	[NT]	09/09/2021	[NT]
Date analysed	-			10/09/2021	[NT]	[NT]	[NT]	[NT]	10/09/2021	[NT]
Dichlorovos	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	114	[NT]
Dimethoate	µg/L	0.15	Org-022/025	<0.15	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	µg/L	0.01	Org-022/025	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyriphos-methyl	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Methyl Parathion	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	121	[NT]
Fenitrothion	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	104	[NT]
Malathion	µg/L	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	127	[NT]
Chlorpyriphos	µg/L	0.009	Org-022/025	<0.009	[NT]	[NT]	[NT]	[NT]	132	[NT]
Parathion	µg/L	0.004	Org-022/025	<0.004	[NT]	[NT]	[NT]	[NT]	98	[NT]
Bromophos ethyl	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	106	[NT]
Azinphos-methyl (Guthion)	µg/L	0.02	Org-022/025	<0.02	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	96	[NT]	[NT]	[NT]	[NT]	72	[NT]

QUALITY CONTROL: PCBs in Water - Trace Level					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			09/09/2021	[NT]	[NT]	[NT]	[NT]	09/09/2021	[NT]
Date analysed	-			10/09/2021	[NT]	[NT]	[NT]	[NT]	10/09/2021	[NT]
Aroclor 1016	µg/L	0.01	Org-021	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	µg/L	0.01	Org-021	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	µg/L	0.01	Org-021	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	µg/L	0.01	Org-021	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	µg/L	0.01	Org-021	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	µg/L	0.01	Org-021	<0.01	[NT]	[NT]	[NT]	[NT]	120	[NT]
Aroclor 1260	µg/L	0.01	Org-021	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	96	[NT]	[NT]	[NT]	[NT]	72	[NT]

QUALITY CONTROL: Triazine Herbicides in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			09/09/2021	[NT]	[NT]	[NT]	[NT]	09/09/2021	[NT]
Date analysed	-			14/09/2021	[NT]	[NT]	[NT]	[NT]	14/09/2021	[NT]
Atrazine	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	84	[NT]
Ametryn	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyanazine	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexazinone	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Irgarol	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Metribuzin	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Prometryn	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	92	[NT]
Propazine	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	88	[NT]
Simazine	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Terbutryn	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Terbuthylazine	mg/L	0.002	Org-022/025	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	86	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	277522-4
Date prepared	-			09/09/2021	3	09/09/2021	09/09/2021		09/09/2021	09/09/2021
Date analysed	-			09/09/2021	3	09/09/2021	09/09/2021		09/09/2021	09/09/2021
Arsenic-Dissolved	µg/L	1	Metals-022	<1	3	2	2	0	101	98
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	3	<0.1	<0.1	0	100	100
Chromium-Dissolved	µg/L	1	Metals-022	<1	3	<1	<1	0	102	99
Copper-Dissolved	µg/L	1	Metals-022	<1	3	<1	<1	0	103	101
Lead-Dissolved	µg/L	1	Metals-022	<1	3	<1	<1	0	102	103
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	3	<0.05	[NT]		116	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	3	<1	<1	0	103	101
Zinc-Dissolved	µg/L	1	Metals-022	<1	3	27	27	0	102	97

QUALITY CONTROL: Cations in water Dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			09/09/2021	[NT]	[NT]	[NT]	[NT]	09/09/2021	[NT]
Date analysed	-			09/09/2021	[NT]	[NT]	[NT]	[NT]	09/09/2021	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	99	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: PFAS in Water TRACE Short						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	277522-5
Date prepared	-			10/09/2021	4	10/09/2021	10/09/2021		10/09/2021	10/09/2021
Date analysed	-			10/09/2021	4	10/09/2021	10/09/2021		10/09/2021	10/09/2021
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0002	Org-029	<0.0002	4	0.0072	0.0067	7	90	81
Perfluorooctanesulfonic acid PFOS	µg/L	0.0002	Org-029	<0.0002	4	0.0025	0.0025	0	95	92
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	<0.0002	4	0.0056	0.0059	5	99	108
6:2 FTS	µg/L	0.0004	Org-029	<0.0004	4	<0.0004	<0.0004	0	104	104
8:2 FTS	µg/L	0.0004	Org-029	<0.0004	4	<0.0004	<0.0004	0	94	115
Surrogate $^{13}C_8$ PFOS	%		Org-029	101	4	97	92	5	98	89
Surrogate $^{13}C_2$ PFOA	%		Org-029	103	4	93	100	7	98	107
Extracted ISTD $^{18}O_2$ PFHxS	%		Org-029	96	4	89	97	9	97	101
Extracted ISTD $^{13}C_4$ PFOS	%		Org-029	88	4	76	80	5	91	88
Extracted ISTD $^{13}C_4$ PFOA	%		Org-029	100	4	80	79	1	100	85
Extracted ISTD $^{13}C_2$ 6:2FTS	%		Org-029	101	4	73	83	13	99	98
Extracted ISTD $^{13}C_2$ 8:2FTS	%		Org-029	104	4	71	65	9	96	100

QUALITY CONTROL: Acid Herbicides in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	277522-6
Date extracted	-			13/09/2021	4	13/09/2021	13/09/2021		13/09/2021	13/09/2021
Date analysed	-			14/09/2021	4	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Clopyralid	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	[NT]	[NT]
3,5-Dichlorobenzoic acid	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	[NT]	[NT]
o-chlorophenoxy acetic acid	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	[NT]	[NT]
4-CPA	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	[NT]	[NT]
Dicamba	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	79	99
MCPP	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	72	96
MCPA	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	72	94
Dichlorprop	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	[NT]	[NT]
2,4-D	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	67	93
Bromoxynil	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	[NT]	[NT]
Triclopyr	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	[NT]	[NT]
2,4,5-TP	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	[NT]	[NT]
2,4,5-T	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	78	98
MCPB	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	[NT]	[NT]
Dinoseb	µg/L	1	Ext-054	<1	4	<1	<1	0	[NT]	[NT]
2,4-DB	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	[NT]	[NT]
Ioxynil	µg/L	1	Ext-054	<1	4	<1	<1	0	[NT]	[NT]
Picloram	µg/L	1	Ext-054	<1	4	<1	<1	0	[NT]	[NT]
Acifluorfen	µg/L	2	Ext-054	<2	4	<2	<2	0	[NT]	[NT]
2,4,6-T	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	[NT]	[NT]
2,6-D	µg/L	0.5	Ext-054	<0.5	4	<0.5	<0.5	0	[NT]	[NT]
Surrogate 2.4- DCPA	%		Ext-054	78	4	88	79	11	70	88

QUALITY CONTROL: Small Community Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	277522-5
Date prepared	-			14/09/2021	4	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Date analysed	-			14/09/2021	4	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Glyphosate*	mg/L	0.01	Ext-054	<0.01	4	<0.01	<0.01	0	107	96
Surrogate: L-Cysteic Acid	%		Disclaimer	97	4	103	103	0	97	96

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

Acid Herbicides & Glyphosate in Water analysed by MPL Laboratories. Report No. 268712

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	207253.01	**Suburb:**	Warriewood	**To:**	*Envirolab Services*
Project Manager:	Nerilee Edwards	**Order Number:**		**Sampler:** A.Spencer	*12 Ashley St, Chatswood NSW 2067*
Email:	Nerilee.Edwards@douglaspartners.com.au			**Attn:**	*Sample Receipt*
Turnaround time:	☐ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day **on hold**			**Contact:**	*(02) 9910 6200 samplereceipt@envirolab.com.au*
Prior Storage:	☐ Fridge ☐ Freezer ☑ Esky	**Do samples contain 'potential' HBM?**	☐ No ☑ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)		

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: On Hold										Notes/ Preservation/ Additional Requirements
1	TS/20210908	-	-	-	S	G	X										
2	TB/20210908	-	-	-	S	G	X										
3	BD1/20210908	-	-	8/09/21	S	G	X										
4	BD2/20210908	-	-	8/09/21	S	G	X										
5	BH102	0.13	0.2	8/09/21	S	G/P	X										
6	BH102	0.5	0.6	8/09/21	S	G/P	X										
7	BH102	0.9	1	8/09/21	S	G/P	X										
8	BH110	0.13	0.2	8/09/21	S	G/P	X										
9	BH110	0.4	0.5	8/09/21	S	G/P	X										
10	BH110	0.9	1	8/09/21	S	G/P	X										
11	BH112	0.13	0.23	8/09/21	S	G/P	X										
12	BH112	0.5	0.6	8/09/21	S	G/P	X										
13	BH112	0.9	1	8/09/21	S	G/P	X										

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

Job No:

Date Received:
Time Received:
Received By:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Metals to analyse:	HM9 (As, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Zn)		
Number of samples in container:	13	**Transported to laboratory by:**	dropped off
Send results to:	Douglas Partners Pty Ltd		
Address:	96 Hermitage Road, West Ryde NSW 2114	**Phone:**	(02) 9809 0666
Relinquished by:		**Date:**	**Signed:**

LAB RECEIPT

Lab Ref. No:	277525
Received by:	TS HAW
Date & Time:	8/9/21 1500
Signed:	

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	Nerilee Edwards

Sample Login Details

Your reference	207253.01, Warriewood
Envirolab Reference	277525
Date Sample Received	08/09/2021
Date Instructions Received	08/09/2021
Date Results Expected to be Reported	On Hold

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	13 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	9
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	Misc Inorg - Soil	Asbestos ID - soils	On Hold
TS/20210908											✓
TB/20210908											✓
BD1/20210908											✓
BD2/20210908											✓
BH102-0.13-0.2											✓
BH102-0.5-0.6											✓
BH102-0.9-1											✓
BH110-0.13-0.2											✓
BH110-0.4-0.5											✓
BH110-0.9-1											✓
BH112-0.13-0.23											✓
BH112-0.5-0.6											✓
BH112-0.9-1											✓

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 277525

Client Details

Client	Douglas Partners Pty Ltd
Attention	Nerilee Edwards
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**207253.01, Warriewood**
Number of Samples	13 Soil
Date samples received	08/09/2021
Date completed instructions received	08/09/2021

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	16/09/2021
Date of Issue	16/09/2021

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

Results Approved By
Diego Bigolin, Inorganics Supervisor
Hannah Nguyen, Metals Supervisor
Josh Williams, LC Supervisor
Lucy Zhu, Asbestos Supervisor
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		277525-1	277525-2	277525-6	277525-7	277525-8
Your Reference	UNITS	TS/20210908	TB/20210908	BH102	BH102	BH110
Depth		-	-	0.5-0.6	0.9-1	0.13-0.2
Date Sampled		8/09/2021	8/09/2021	8/09/2021	8/09/2021	8/09/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	13/09/2021	13/09/2021	13/09/2021	13/09/2021	13/09/2021
Date analysed	-	14/09/2021	14/09/2021	14/09/2021	14/09/2021	14/09/2021
TRH C_6 - C_9	mg/kg	[NA]	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	[NA]	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	[NA]	<25	<25	<25	<25
Benzene	mg/kg	84%	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	83%	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	85%	<1	<1	<1	<1
m+p-xylene	mg/kg	85%	<2	<2	<2	<2
o-Xylene	mg/kg	85%	<1	<1	<1	<1
naphthalene	mg/kg	[NA]	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	[NA]	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	84	94	78	78	75

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		277525-11
Your Reference	UNITS	BH112
Depth		0.13-0.23
Date Sampled		8/09/2021
Type of sample		Soil
Date extracted	-	13/09/2021
Date analysed	-	14/09/2021
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<3
Surrogate aaa-Trifluorotoluene	%	76

svTRH (C10-C40) in Soil					
Our Reference		277525-6	277525-7	277525-8	277525-11
Your Reference	UNITS	BH102	BH102	BH110	BH112
Depth		0.5-0.6	0.9-1	0.13-0.2	0.13-0.23
Date Sampled		8/09/2021	8/09/2021	8/09/2021	8/09/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	13/09/2021	13/09/2021	13/09/2021	13/09/2021
Date analysed	-	15/09/2021	15/09/2021	15/09/2021	15/09/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50
Surrogate o-Terphenyl	%	109	107	106	109

PAHs in Soil					
Our Reference		277525-6	277525-7	277525-8	277525-11
Your Reference	UNITS	BH102	BH102	BH110	BH112
Depth		0.5-0.6	0.9-1	0.13-0.2	0.13-0.23
Date Sampled		8/09/2021	8/09/2021	8/09/2021	8/09/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	13/09/2021	13/09/2021	13/09/2021	13/09/2021
Date analysed	-	14/09/2021	14/09/2021	14/09/2021	14/09/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	0.4
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.4
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	0.2
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.06	0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	0.06	1.5
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	101	98	100	101

Organochlorine Pesticides in soil					
Our Reference		277525-6	277525-7	277525-8	277525-11
Your Reference	UNITS	BH102	BH102	BH110	BH112
Depth		0.5-0.6	0.9-1	0.13-0.2	0.13-0.23
Date Sampled		8/09/2021	8/09/2021	8/09/2021	8/09/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	13/09/2021	13/09/2021	13/09/2021	13/09/2021
Date analysed	-	14/09/2021	14/09/2021	14/09/2021	14/09/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	127	111	111	112

Organophosphorus Pesticides in Soil					
Our Reference		277525-6	277525-7	277525-8	277525-11
Your Reference	UNITS	BH102	BH102	BH110	BH112
Depth		0.5-0.6	0.9-1	0.13-0.2	0.13-0.23
Date Sampled		8/09/2021	8/09/2021	8/09/2021	8/09/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	13/09/2021	13/09/2021	13/09/2021	13/09/2021
Date analysed	-	14/09/2021	14/09/2021	14/09/2021	14/09/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	127	111	111	112

PCBs in Soil					
Our Reference		277525-6	277525-7	277525-8	277525-11
Your Reference	UNITS	BH102	BH102	BH110	BH112
Depth		0.5-0.6	0.9-1	0.13-0.2	0.13-0.23
Date Sampled		8/09/2021	8/09/2021	8/09/2021	8/09/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	13/09/2021	13/09/2021	13/09/2021	13/09/2021
Date analysed	-	14/09/2021	14/09/2021	14/09/2021	14/09/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	127	111	111	112

Acid Extractable metals in soil					
Our Reference		277525-6	277525-7	277525-8	277525-11
Your Reference	UNITS	BH102	BH102	BH110	BH112
Depth		0.5-0.6	0.9-1	0.13-0.2	0.13-0.23
Date Sampled		8/09/2021	8/09/2021	8/09/2021	8/09/2021
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	14/09/2021	14/09/2021	14/09/2021	14/09/2021
Date analysed	-	14/09/2021	14/09/2021	14/09/2021	14/09/2021
Arsenic	mg/kg	<4	<4	<4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	3	5	44
Copper	mg/kg	1	<1	24	9
Lead	mg/kg	12	6	48	9
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	<1	1	1
Zinc	mg/kg	5	1	28	7
Manganese	mg/kg	9	4	55	13

Misc Soil - Inorg					
Our Reference		277525-6	277525-7	277525-8	277525-11
Your Reference	UNITS	BH102	BH102	BH110	BH112
Depth		0.5-0.6	0.9-1	0.13-0.2	0.13-0.23
Date Sampled		8/09/2021	8/09/2021	8/09/2021	8/09/2021
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	14/09/2021	14/09/2021	14/09/2021	14/09/2021
Date analysed	-	14/09/2021	14/09/2021	14/09/2021	14/09/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5

Moisture						
Our Reference		277525-6	277525-7	277525-8	277525-9	277525-11
Your Reference	UNITS	BH102	BH102	BH110	BH110	BH112
Depth		0.5-0.6	0.9-1	0.13-0.2	0.4-0.5	0.13-0.23
Date Sampled		8/09/2021	8/09/2021	8/09/2021	8/09/2021	8/09/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	13/09/2021	13/09/2021	13/09/2021	13/09/2021	13/09/2021
Date analysed	-	14/09/2021	14/09/2021	14/09/2021	14/09/2021	14/09/2021
Moisture	%	26	13	10	5.8	11

Asbestos ID - soils NEPM					
Our Reference		277525-5	277525-6	277525-8	277525-11
Your Reference	UNITS	BH102	BH102	BH110	BH112
Depth		0.13-0.2	0.5-0.6	0.13-0.2	0.13-0.23
Date Sampled		8/09/2021	8/09/2021	8/09/2021	8/09/2021
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	16/09/2021	16/09/2021	16/09/2021	16/09/2021
Sample mass tested	g	509.23	290.99	760.05	680.26
Sample Description	-	Brown clayey soil & rocks	Black coarse-grained soil & rocks	Grey fine-grained soil & rocks	Brown clayey soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–
FA and AF Estimation*	g	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001

PFAS in Soils Short			
Our Reference		277525-8	277525-9
Your Reference	UNITS	BH110	BH110
Depth		0.13-0.2	0.4-0.5
Date Sampled		8/09/2021	8/09/2021
Type of sample		Soil	Soil
Date prepared	-	14/09/2021	14/09/2021
Date analysed	-	14/09/2021	14/09/2021
Perfluorohexanesulfonic acid - PFHxS	µg/kg	<0.1	<0.1
Perfluorooctanesulfonic acid PFOS	µg/kg	<0.1	<0.1
Perfluorooctanoic acid PFOA	µg/kg	<0.1	<0.1
6:2 FTS	µg/kg	<0.1	<0.1
8:2 FTS	µg/kg	<0.2	<0.2
Surrogate $^{13}C_8$ *PFOS*	%	103	97
Surrogate $^{13}C_2$ *PFOA*	%	114	112
Extracted ISTD $^{18}O_2$ *PFHxS*	%	103	104
Extracted ISTD $^{13}C_4$ *PFOS*	%	85	92
Extracted ISTD $^{13}C_4$ *PFOA*	%	93	96
Extracted ISTD $^{13}C_2$ *6:2FTS*	%	110	101
Extracted ISTD $^{13}C_2$ *8:2FTS*	%	115	106
Total Positive PFHxS & PFOS	µg/kg	<0.1	<0.1
Total Positive PFOS & PFOA	µg/kg	<0.1	<0.1
Total Positive PFAS	µg/kg	<0.1	<0.1

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

Method ID	Methodology Summary
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.3 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	277525-7
Date extracted	-			13/09/2021	6	13/09/2021	13/09/2021		13/09/2021	13/09/2021
Date analysed	-			14/09/2021	6	14/09/2021	14/09/2021		14/09/2021	14/09/2021
TRH C_6 - C_9	mg/kg	25	Org-023	<25	6	<25	<25	0	92	86
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	6	<25	<25	0	92	86
Benzene	mg/kg	0.2	Org-023	<0.2	6	<0.2	<0.2	0	104	96
Toluene	mg/kg	0.5	Org-023	<0.5	6	<0.5	<0.5	0	86	81
Ethylbenzene	mg/kg	1	Org-023	<1	6	<1	<1	0	87	82
m+p-xylene	mg/kg	2	Org-023	<2	6	<2	<2	0	91	85
o-Xylene	mg/kg	1	Org-023	<1	6	<1	<1	0	88	83
naphthalene	mg/kg	1	Org-023	<1	6	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	80	6	78	77	1	84	80

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	277525-7
Date extracted	-			13/09/2021	6	13/09/2021	13/09/2021		13/09/2021	13/09/2021
Date analysed	-			15/09/2021	6	15/09/2021	15/09/2021		15/09/2021	15/09/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	6	<50	<50	0	100	114
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	6	<100	<100	0	80	88
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	6	<100	<100	0	101	93
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	6	<50	<50	0	100	114
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	6	<100	<100	0	80	88
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	6	<100	<100	0	101	93
Surrogate o-Terphenyl	%		Org-020	104	6	109	107	2	126	107

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	277525-7
Date extracted	-			13/09/2021	6	13/09/2021	13/09/2021		13/09/2021	13/09/2021
Date analysed	-			14/09/2021	6	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	92	82
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	93	89
Fluorene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	93	92
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	104	86
Anthracene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	104	92
Pyrene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	105	95
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	91	79
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	6	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	6	<0.05	<0.05	0	106	100
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	102	6	101	99	2	111	100

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	277525-7
Date extracted	-			13/09/2021	6	13/09/2021	13/09/2021		13/09/2021	13/09/2021
Date analysed	-			14/09/2021	6	14/09/2021	14/09/2021		14/09/2021	14/09/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	90	84
HCB	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	89	82
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	85	73
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	99	89
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	98	88
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	98	88
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	102	90
Endrin	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	103	90
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	102	90
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	94	70
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	114	6	127	110	14	120	118

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	277525-7
Date extracted	-			13/09/2021	6	13/09/2021	13/09/2021		13/09/2021	13/09/2021
Date analysed	-			14/09/2021	6	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	105	97
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	104	92
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	95	77
Malathion	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	110	99
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	106	94
Parathion	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	97	80
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	92	84
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	114	6	127	110	14	120	118

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	277525-7
Date extracted	-			13/09/2021	6	13/09/2021	13/09/2021		13/09/2021	13/09/2021
Date analysed	-			14/09/2021	6	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	100	80
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	114	6	127	110	14	120	118

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	277525-7
Date prepared	-			14/09/2021	6	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Date analysed	-			14/09/2021	6	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Arsenic	mg/kg	4	Metals-020	<4	6	<4	<4	0	107	103
Cadmium	mg/kg	0.4	Metals-020	<0.4	6	<0.4	<0.4	0	103	100
Chromium	mg/kg	1	Metals-020	<1	6	8	8	0	105	104
Copper	mg/kg	1	Metals-020	<1	6	1	1	0	106	112
Lead	mg/kg	1	Metals-020	<1	6	12	13	8	106	106
Mercury	mg/kg	0.1	Metals-021	<0.1	6	<0.1	<0.1	0	99	123
Nickel	mg/kg	1	Metals-020	<1	6	1	1	0	105	104
Zinc	mg/kg	1	Metals-020	<1	6	5	5	0	102	101
Manganese	mg/kg	1	Metals-020	<1	6	9	8	12	106	106

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	277525-7
Date prepared	-			14/09/2021	6	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Date analysed	-			14/09/2021	6	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	6	<5	<5	0	102	101

QUALITY CONTROL: PFAS in Soils Short						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	277525-9
Date prepared	-			14/09/2021	8	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Date analysed	-			14/09/2021	8	14/09/2021	14/09/2021		14/09/2021	14/09/2021
Perfluorohexanesulfonic acid - PFHxS	µg/kg	0.1	Org-029	<0.1	8	<0.1	<0.1	0	97	97
Perfluorooctanesulfonic acid PFOS	µg/kg	0.1	Org-029	<0.1	8	<0.1	<0.1	0	101	98
Perfluorooctanoic acid PFOA	µg/kg	0.1	Org-029	<0.1	8	<0.1	<0.1	0	101	101
6:2 FTS	µg/kg	0.1	Org-029	<0.1	8	<0.1	<0.1	0	114	113
8:2 FTS	µg/kg	0.2	Org-029	<0.2	8	<0.2	<0.2	0	99	99
Surrogate $^{13}C_8$ *PFOS*	%		Org-029	97	8	103	107	4	102	103
Surrogate $^{13}C_2$ *PFOA*	%		Org-029	123	8	114	113	1	109	115
Extracted ISTD $^{18}O_2$ *PFHxS*	%		Org-029	107	8	103	101	2	105	101
Extracted ISTD $^{13}C_4$ *PFOS*	%		Org-029	86	8	85	86	1	91	88
Extracted ISTD $^{13}C_4$ *PFOA*	%		Org-029	93	8	93	95	2	93	93
Extracted ISTD $^{13}C_2$ *6:2FTS*	%		Org-029	95	8	110	129	16	101	97
Extracted ISTD $^{13}C_2$ *8:2FTS*	%		Org-029	88	8	115	124	8	94	94

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

Note: All samples analysed as received. However, sample 277525-6 is below the minimum recommended 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	207253.01	**Suburb:**	Warriewood		**To:** Envirolab Services
Project Manager:	Nerilee Edwards	**Order Number:**		**Sampler:** A.Spencer	12 Ashley St, Chatswood NSW 2067
Email:	Nerilee.Edwards@douglaspartners.com.au				**Attn:** Sample Receipt
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day				**Contact:** (02) 9910 6200 samplereceipt@envirolab.com.au
Prior Storage:	☐ Fridge ☐ Freezer ☑ Esky	**Do samples contain 'potential' HBM?**	☐ No ☑ Yes	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 8A (NEPC Asb)	Combo 8A	Combo 8	PFAS (short)	pH, CEC	Asbestos (NEPC)	metals, PAH	Phenoxy Acid Herbicides	Glyphosate Triazine Herbicides	Combo 8	ASS Screen	Notes/ Preservation/ Additional Requirements
1	BH103	0.14	0.2	31/08/21	S	G/P												Envirolab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200
2	BH103	0.4	0.5	31/08/21	S	G/P	x							x	x			
3	BH103	0.5	0.95	31/08/21	S	G/P												Job No: 277156
4	BH103	0.9	1	31/08/21	S	G/P												Date Received: 31/08/21 Time Received: 1000
5	BH103	1.4	1.5	31/08/21	S	G/P											x	Received By: CH Temp: Cool/Ambient
6	BH103	1.5	1.95	31/08/21	S	G/P												Cooling: Ice/Icepack Security: Intact/Broken/None
7	BH103	1.9	2	31/08/21	S	G/P											x	
8	BH103	2.4	2.5	31/08/21	S	G/P											x	
9	BH103	2.9	3	31/08/21	S	G/P											x	Environmental Division Sydney
10	BH103	3.4	3.5	31/08/21	S	G/P											x	Work Order Reference ES2132305
11	BH103	3.9	4	31/08/21	S	G/P											x	
12	BH101	0.12	0.2	31/08/21	S	G/P						x						
13	BH101	0.4	0.5	31/08/21	S	G/P	x											
14	BH101	0.9	1	31/08/21	S	G/P											x	Telephone : +61-2-8784 8555

Metals to analyse: HM9 (As, Cd, Cr, Cu, Pb, Hg, Mn, Ni, Zn)			**LAB RECEIPT**
Number of samples in container:	**Transported to laboratory by:**		**Lab Ref. No:**
Send results to: Douglas Partners Pty Ltd			**Received by:** Christine
Address: 96 Hermitage Road, West Ryde NSW 2114	**Phone:** (02) 9809 0666		**Date & Time:** 31/08/21 1000
Relinquished by: ALS [illegible] (McKenzie)	**Date:** 6/9/21 900	**Signed:** [signature]	**Signed:** [signature]

Rec - SO/[illegible] 06/9/21 1630 8°C

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CHAIN OF CUSTODY DESPATCH SHEET

Project No: 207253.01	**Suburb:** Warriewood	**To:** *Envirolab Services*	
Project Manager: Nerilee Edwards		**Dispatch date:** ×	

Lab ID	Sample ID			Date Sampled	Sample Type	Container Type	Analytes											Notes/ Preservation/ Additional Requirements
	Location / Other ID	Depth From	Depth To		S - soil W - water	G - glass P - plastic	Combo 8A (NEPC Asb)	Combo 8A	Combo 8	PFAS (short)	pH, CEC	Asbestos (NEPC)	metals, PAH	Phenoxy Acid Herbicides	Glyphosate Triazine Herbicides	Combo 8	ASS Screen	
51	BH114	0.9	1	31/08/21	S	G/P												
52	BH114	1.4	1.5	31/08/21	S	G/P												
53	BH113	0.05	0.15	31/08/21	S	G/P	×			×								
54	BH113	0.4	0.5	31/08/21	S	G/P												
55	BH113	0.9	1	31/08/21	S	G/P												
56	BH113	1.4	1.5	31/08/21	S	G/P												
57	BH113	1.9	2	31/08/21	S	G/P												
—	BD1/20210831			31/08/21	S	G/P												Pls send to second lab as below
58	BD2/20210831			31/08/21	S	G/P												
59	BD3/20210831			31/08/21	S	G/P												
60	ACM-01			31/08/21	fibro	P						Asb ID						

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cmullenay
6/9/21 900
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\# 277156

Rev5/February 2021

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	207253.01	**Suburb:**	Warriewood	**To:**	*Envirolab Services*
Project No:	207253.01	**Suburb:**	Warriewood	**To:**	*Envirolab Services*
Project Manager:	Nerilee Edwards	**Order Number:**		**Sampler:**	A.Spencer		*12 Ashley St, Chatswood NSW 2067*
Email:	Nerilee.Edwards@douglaspartners.com.au					**Attn:**	*Sample Receipt*
Turnaround time:	☑ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day					**Contact:**	*(02) 9910 6200 samplereceipt@envirolab.com.au*
Prior Storage:	☐ Fridge ☐ Freezer ☑ Esky	**Do samples contain 'potential' HBM?**	☐ No ☑ Yes	(If YES, then handle, transport and store in accordance with FPM HAZID)			

Lab ID	Sample ID: Location / Other ID	Sample ID: Depth From	Sample ID: Depth To	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: metals, PAH	TRH, BTEX	OCP, OPP, PCB	phenols							Notes/ Preservation/ Additional Requirements
—	BD1/20210831			31/08/21	S	G/P	×	×	×	×							Pls send to second lab
Relinquished by ES SW																	
	CMellentine																
		6/9/21 900															
		CM															

#277156

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2132305**

Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR NERILEE EDWARDS	Contact	: Sepan Mahamad
Address	: 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 2114	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: nerilee.edwards@douglaspartners.com.au	E-mail	: Sepan.Mahamad@ALSGlobal.com
Telephone	: 08 9809 0666	Telephone	: +61 2 8784 8555
Facsimile	: 08 9809 4095	Facsimile	: +61-2-8784 8500
Project	: 207253.01	Page	: 1 of 2
Order number	: ----	Quote number	: EM2017DOUPAR0002 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: A.Spencer		

Dates

Date Samples Received	: 06-Sep-2021 16:30	Issue Date	: 07-Sep-2021
Client Requested Due Date	: 13-Sep-2021	Scheduled Reporting Date	: **13-Sep-2021**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: ----	Temperature	: 8.6'C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Sampling date / time	Sample ID	SOIL - EA055-103 Moisture Content	SOIL - S-19 TRH/BTEXN/PAH/Ph/OC/OP/PCB/8 metals
ES2132305-001	31-Aug-2021 00:00	BD1/20210831	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE INVOICES

- A4 - AU Tax Invoice (INV)	Email	apinvoices@douglaspartners.com.au

NERILEE EDWARDS

- *AU Certificate of Analysis - NATA (COA)	Email	nerilee.edwards@douglaspartners.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	nerilee.edwards@douglaspartners.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	nerilee.edwards@douglaspartners.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	nerilee.edwards@douglaspartners.com.au
- Chain of Custody (CoC) (COC)	Email	nerilee.edwards@douglaspartners.com.au
- EDI Format - ESDAT (ESDAT)	Email	nerilee.edwards@douglaspartners.com.au
- EDI Format - XTab (XTAB)	Email	nerilee.edwards@douglaspartners.com.au

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2132305**	Page	: 1 of 8
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR NERILEE EDWARDS	Contact	: Sepan Mahamad
Address	: 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 2114	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 08 9809 0666	Telephone	: +61 2 8784 8555
Project	: 207253.01	Date Samples Received	: 06-Sep-2021 16:30
Order number	: ----	Date Analysis Commenced	: 09-Sep-2021
C-O-C number	: ----	Issue Date	: 13-Sep-2021 16:10
Sampler	: A.Spencer		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EG005: Poor precision was obtained for Chromium on sample ES2132024-#003. Results have been confirmed by re-extraction and reanalysis.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD1/20210831	----	----	----	----
				Sampling date / time	31-Aug-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2132305-001	--------	--------	--------	--------
					Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		1.7	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg		<2	----	----	----	----
Copper	7440-50-8	5	mg/kg		<5	----	----	----	----
Lead	7439-92-1	5	mg/kg		<5	----	----	----	----
Nickel	7440-02-0	2	mg/kg		<2	----	----	----	----
Zinc	7440-66-6	5	mg/kg		7	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg		<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg		<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD1/20210831	----	----	----	----
				Sampling date / time	31-Aug-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2132305-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	----	----	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	----	----	----	----
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	----	----	----	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	----	----	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD1/20210831	----	----	----	----
				Sampling date / time	31-Aug-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2132305-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)A: Phenolic Compounds - Continued									
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	----	----	----	----
Pentachlorophenol	87-86-5	2	mg/kg		<2	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD1/20210831	----	----	----	----
				Sampling date / time	31-Aug-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2132305-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**93.9**	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**118**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**93.3**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**104**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**101**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**91.9**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**107**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**112**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**99.2**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**106**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**99.6**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BD1/20210831	----	----	----	----
				Sampling date / time	31-Aug-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2132305-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**105**	**----**	**----**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2132305**	Page	: 1 of 11
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR NERILEE EDWARDS	Contact	: Sepan Mahamad
Address	: 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 2114	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 08 9809 0666	Telephone	: +61 2 8784 8555
Project	: 207253.01	Date Samples Received	: 06-Sep-2021
Order number	: ----	Date Analysis Commenced	: 09-Sep-2021
C-O-C number	: ----	Issue Date	: 13-Sep-2021
Sampler	: A.Spencer		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3892163)									
ES2132024-003	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	137	# 110	22.3	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	165	166	0.0	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	62	61	1.8	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	90	88	2.1	0% - 50%
ES2132259-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	23	32	30.6	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	109	117	7.1	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3892169)									
ES2132024-045	Anonymous	EA055: Moisture Content	----	0.1	%	24.5	26.5	7.7	0% - 20%
ES2132259-004	Anonymous	EA055: Moisture Content	----	0.1	%	9.3	9.7	4.5	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3892165)									
ES2132296-003	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.8	0.9	0.0	No Limit
ES2132392-009	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.2	0.2	0.0	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 3889808)									
ES2132392-009	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES2132293-001	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3889807)									
ES2132293-001	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3889807)									
ES2132293-001	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3889807) - continued									
ES2132293-001	Anonymous	EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 3889806)									
ES2132392-009	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<2	<2	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.0	No Limit
ES2132293-001	Anonymous	EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3889806)									
ES2132392-009	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.8	<0.8	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3889806) - continued									
ES2132392-009	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.8	<0.8	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES2132293-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	0.7	0.7	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	0.7	0.7	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	0.6	0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	2.0	1.9	5.1	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3889618)									
EW2103795-002	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EW2103795-004	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3889805)									
ES2132392-009	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	940	720	26.7	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	710	580	20.5	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES2132293-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	110	130	18.7	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3889618)									
EW2103795-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EW2103795-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3889805)									
ES2132392-009	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	1370	1100	21.9	0% - 50%
		EP071: >C34 - C40 Fraction	----	100	mg/kg	490	350	32.7	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
ES2132293-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	140	160	13.6	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	110	120	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 3889618)									
EW2103795-002	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EW2103795-004	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3892163)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	94.2	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	102	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	113	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	108	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	102	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	100	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	90.1	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3892165)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	111	70.0	125
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 3889808)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	92.3	62.0	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 3889807)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	84.1	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	87.4	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	87.6	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	88.8	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	82.1	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.6	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	91.4	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	94.8	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	95.7	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	93.0	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	92.9	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	87.5	66.0	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	93.8	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.7	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	92.8	69.0	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.4	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	92.3	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.3	62.0	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	85.6	66.0	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	92.0	64.0	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	84.5	54.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3889807)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3889807) - continued								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	79.9	59.0	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	106	62.0	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	106	54.0	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	108	67.0	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	89.5	70.0	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	87.3	72.0	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	87.5	68.0	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	93.6	68.0	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	90.5	69.0	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.3	76.0	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	92.7	64.0	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	92.5	70.0	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	99.1	69.0	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	93.2	66.0	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	107	68.0	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	91.1	62.0	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	91.0	68.0	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	89.6	65.0	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	101	41.0	123
EP075(SIM)A: Phenolic Compounds (QCLot: 3889806)								
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	93.5	71.0	125
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	95.7	72.0	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	99.2	71.0	123
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	101	67.0	127
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	81.5	54.0	114
EP075(SIM): 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	94.8	68.0	126
EP075(SIM): 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	91.5	66.0	120
EP075(SIM): 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	92.4	70.0	120
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	91.6	70.0	116
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	73.8	54.0	114
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	75.8	60.0	114
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	43.8	10.0	57.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3889806)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	98.0	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	94.2	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	95.6	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	95.3	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	97.4	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	96.1	77.0	127

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3889806) - continued								
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	88.5	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	88.8	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	89.6	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	94.5	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	72.0	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	76.4	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	92.1	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	98.5	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	98.1	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	98.8	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3889618)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	92.4	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3889805)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	101	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	90.8	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	97.5	71.0	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3889618)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	93.5	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3889805)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	95.6	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	90.5	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	102	63.0	131
EP080: BTEXN (QCLot: 3889618)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	103	62.0	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	92.7	67.0	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	94.9	65.0	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	94.6	66.0	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	92.3	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	87.5	63.0	119

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Matrix Spike (MS) Report		
Spike	SpikeRecovery(%)	Acceptable Limits (%)

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3892163)							
ES2132024-003	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	83.9	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	86.2	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	108	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	99.4	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	91.2	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	96.8	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	81.7	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3892165)							
ES2132296-003	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	108	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 3889808)							
ES2132293-001	Anonymous	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	88.3	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 3889807)							
ES2132293-001	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	79.2	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	80.8	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	85.3	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	84.3	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	78.2	70.0	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	86.8	70.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3889807)							
ES2132293-001	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	104	70.0	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	75.0	70.0	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	90.7	70.0	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	80.6	70.0	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	82.2	70.0	130
EP075(SIM)A: Phenolic Compounds (QCLot: 3889806)							
ES2132293-001	Anonymous	EP075(SIM): Phenol	108-95-2	10 mg/kg	99.4	70.0	130
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	94.4	70.0	130
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	91.5	60.0	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	94.1	70.0	130
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	57.6	20.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3889806)							
ES2132293-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	92.4	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	79.3	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3889618)							
EW2103795-002	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	91.2	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3889805)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3889805) - continued							
ES2132293-001	Anonymous	EP071: C10 - C14 Fraction	----	480 mg/kg	112	73.0	137
		EP071: C15 - C28 Fraction	----	3100 mg/kg	104	53.0	131
		EP071: C29 - C36 Fraction	----	2060 mg/kg	113	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3889618)							
EW2103795-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	89.5	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3889805)							
ES2132293-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	107	73.0	137
		EP071: >C16 - C34 Fraction	----	4320 mg/kg	106	53.0	131
		EP071: >C34 - C40 Fraction	----	890 mg/kg	121	52.0	132
EP080: BTEXN (QCLot: 3889618)							
EW2103795-002	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	88.4	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	83.7	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	87.0	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	86.8	70.0	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	85.6	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	77.9	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2132305**	Page	: 1 of 5
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR NERILEE EDWARDS	Telephone	: +61 2 8784 8555
Project	: 207253.01	Date Samples Received	: 06-Sep-2021
Site	: ----	Issue Date	: 13-Sep-2021
Sampler	: A.Spencer	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **Duplicate outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG005(ED093)T: Total Metals by ICP-AES	ES2132024--003	Anonymous	**Chromium**	7440-47-3	22.3 %	0% - 20%	**RPD exceeds LOR based limits**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
BD1/20210831	**31-Aug-2021**	**----**	----	----	**09-Sep-2021**	14-Sep-2021	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
BD1/20210831	**31-Aug-2021**	**09-Sep-2021**	27-Feb-2022	✓	**09-Sep-2021**	27-Feb-2022	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
BD1/20210831	**31-Aug-2021**	**09-Sep-2021**	28-Sep-2021	✓	**10-Sep-2021**	28-Sep-2021	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066)							
BD1/20210831	**31-Aug-2021**	**09-Sep-2021**	14-Sep-2021	✓	**10-Sep-2021**	19-Oct-2021	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
BD1/20210831	**31-Aug-2021**	**09-Sep-2021**	14-Sep-2021	✓	**10-Sep-2021**	19-Oct-2021	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
BD1/20210831	**31-Aug-2021**	**09-Sep-2021**	14-Sep-2021	✓	**10-Sep-2021**	19-Oct-2021	✓
EP075(SIM)A: Phenolic Compounds							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BD1/20210831	**31-Aug-2021**	**09-Sep-2021**	14-Sep-2021	✓	**10-Sep-2021**	19-Oct-2021	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BD1/20210831	**31-Aug-2021**	**09-Sep-2021**	14-Sep-2021	✓	**10-Sep-2021**	19-Oct-2021	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
BD1/20210831	**31-Aug-2021**	**09-Sep-2021**	14-Sep-2021	✓	**09-Sep-2021**	14-Sep-2021	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
BD1/20210831	**31-Aug-2021**	**09-Sep-2021**	14-Sep-2021	✓	**09-Sep-2021**	14-Sep-2021	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
BD1/20210831	**31-Aug-2021**	**09-Sep-2021**	14-Sep-2021	✓	**09-Sep-2021**	14-Sep-2021	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Appendix K

Data Quality Assurance and Quality Control

Appendix K
Data Quality Assurance and Quality Control
20-22 MacPherson Street, Warriewood

K1.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA / QC) procedures and results are summarised in the following Table 1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details. The relative percentage difference (RPD) results, along with the other filed QC samples are included in the summary results tables at the end of this appendix.

Table 1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation	C
Holding times	Various based on type of analysis	C
Intra-laboratory replicates	5% of primary samples; <30% RPD	PC
Inter-laboratory replicates	5% of primary samples; <30% RPD	PC
Trip Spikes	1 per sampling event; 60-140% recovery	C
Trip Blanks	1 per sampling event; <PQL	C
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

Notes:
C = compliance; PC = partial compliance; NC = non-compliance

The RPD results were all within the acceptable range, with the exception of those indicated in Tables QA1 – QA3. The exceedances are not, however, considered to be of concern given that:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred, particularly for groundwater (e.g., arsenic in groundwater replicate pair BD1/20210908 and BH101 and nickel in soil replicate pair BD4/20210901 and BH104/0.4-0.5);
- The soil replicate pairs were collected from fill soils which by its nature is heterogeneous;
- Replicates, rather than homogenised duplicates, were used to minimise risk of volatile loss, hence greater variability can be expected;
- Most of the recorded concentrations being relatively close to the PQL;
- The majority of RPDs within a replicate pair being within the acceptable limits; and
- All other QA/QC parameters met the DQIs.

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

K2.0 Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs) as outlined in NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013):

- 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.

Table 2: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Systematic and selected target locations sampled.
	Preparation of borehole logs, sample location plan and chain of custody 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 chain of custody (COC) documentation.
	NATA accredited laboratory results certificates provided by the laboratory.
	Satisfactory frequency and results for field and laboratory quality control (QC) samples as discussed in Section 1.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project.
	Experienced samplers used.
	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.
	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 COC.
Precision	Field staff followed standard operating procedures.
	Acceptable RPD between original samples and replicates.
	Satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures.
	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been generally complied with.

K3.0 Conclusion

Based on the results of the field QA and field and laboratory QC, and evaluation against the DQIs it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

K4.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

Douglas Partners Pty Ltd

Table QA1: Relative Percentage Difference Results – Intra-laboratory Replicates - Soils

			Metals									TRH						BTEX					PAH				Phenol	OCP	OPP	PCB
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	Manganese	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	Phenol	Total OCP	Chlorpyrifos	Total PCB
Sample ID	Depth	Sample 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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BD4/20210901	0.4 - 0.5 m	01/09/2021	<4	<0.4	7	1	11	<0.1	2	5	5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05	<5	<PQL	<0.1	<PQL
HA104	0.4 - 0.5 m	01/09/2021	<4	<0.4	8	<1	11	<0.1	1	3	3	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05	<5	<PQL	<0.1	<PQL
		Difference	0	0	1	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	0%	0%	13.3%	0%	0%	0%	**66.7%**	**50.0%**	**50.0%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table QA2: Relative Percentage Difference Results – Inter-laboratory Replicates - Soils

			Metals									TRH						BTEX					PAH				Phenol	OCP	OPP	PCB
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	Manganese	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	Phenol	Total OCP	Chlorpyrifos	Total PCB
Sample ID	Depth	Sample 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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BD1/20210831	0.4 - 0.5 m	31/08/2021	<5	<1	<2	<5	<5	<0.1	<2	7	-	<10	<50	<10	<50	<100	<100	<0.2	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	-	<PQL	<0.05	<PQL
BH109	0.4 - 0.5 m	31/08/2021	<4	<0.4	<1	2	1	<0.1	<1	11	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05	<5	<PQL	<0.1	<PQL
		Difference	0	0	0	0	0	0	0	4	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0
		RPD	0%	0%	0%	0%	0%	0%	0%	**44.4%**	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%

Table QA3: Relative Percentage Difference Results – Intra-laboratory Replicates - Water

			Metals								TRH			BTEX	PAH															
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Total Xylenes	Acenaphthene	Acenaphthylene	Benzo(a)anthracene	Naphthalene	Benzo(a)pyrene (BaP)	Benzo(b+k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	Pyrene
Sample ID	Sample Date		µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	µg/L	mg/L
BD1/20210908	08/09/21		2	<0.1	<1	<1	<1	<0.05	<1	27	<10	<50	<0.1	<0.1	<0.002	<0.0001	<0.0001	<0.0001	<1	<0.1	<0.0002	<0.0001	<0.0001	<0.0001	<0.1	<0.0001	<0.0001	<0.1	<0.0001
MW101	08/09/21		3	<0.1	<1	<1	<1	<0.05	<1	32	<10	<50	<0.1	<0.1	<0.002	<0.0001	<0.0001	<0.0001	<1	<0.1	<0.0002	<0.0001	<0.0001	<0.0001	<0.1	<0.0001	<0.0001	<0.1	<0.0001
		Difference	1	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	**40%**	0%	0%	0%	0%	0%	0%	17%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

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Table QA4: Trip Blank Results - Soils (mg/kg)

Sample ID	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TB/20210908	<0.2	<0.5	<1	<1	<2

Table QA5: Trip Spike Results – Soils (% Recovery)

Sample ID	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TS/20210908	84	83	85	85	85

Table QA6: Trip Blank Results - Water (µg/L)

Sample ID	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TB/20210908	<1	<1	<1	<1	<2

Table QA7: Trip Spike Results – Water (% Recovery)

Sample ID	Benzene	Toluene	Ethylbenzene	o-Xylene	m+p-Xylene
TS/20210908	101	99	110	103	104