FOUNDATION EARTH SCIENCES

PRELIMINARY SITE INVESTIGATION (PSI)

Property Address

106 Wyee Road & 1496 Hue Hue Road, Wyee NSW

Prepared for

High Line Projects Pty Ltd

Date

January 2024

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ABBREVIATIONS

AIP	*Australian Institute of Petroleum Ltd*	**QA/QC**	*Quality Assurance, Quality Control*
ANZECC	*Australian and New Zealand Environment and Conservation Council*	**RAC**	*Remediation Acceptance Criteria*
AST	*Aboveground Storage Tank*	**RAP**	*Remediation Action Plan*
BGL	*Below Ground Level*	**RPD**	*Relative Percentage Difference*
BTEX	*Benzene, Toluene, Ethyl benzene and Xylene*	**SAC**	*Site Assessment Criteria*
COC	*Chain of Custody*	**SVC**	*Site Validation Criteria*
DA	*Development Approval*	**SWL**	*Standing Water Level*
DP	*Deposited Plan*	**TCLP**	*Toxicity Characteristics Leaching Procedure*
DQOs	*Data Quality Objectives*	**TPH**	*Total Petroleum Hydrocarbons*
EPA	*Environment Protection Authority*	**UCL**	*Upper Confidence Limit*
ESA	*Environmental Site Assessment*	**UST**	*Underground Storage Tank*
HIL	*Health-Based Soil Investigation Level*	**VHC**	*Volatile Halogenated Compounds*
LGA	*Local Government Area*	**VOC**	*Volatile Organic Compounds*
NEHF	*National Environmental Health Forum*	**DPI**	Department of Primary Industries
NEPC	*National Environmental Protection Council*		
NHMRC	*National Health and Medical Research Council*		
OCP	*Organochlorine Pesticides*		
OPP	*Organophosphate Pesticides*		
PAH	*Polycyclic Aromatic Hydrocarbon*		
PCB	*Polychlorinated Biphenyl*		
PID	*Photo Ionisation Detector*		
PQL	*Practical Quantitation Limit*		

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EXECUTIVE SUMMARY

Foundation Earth Sciences was appointed by High Line Projects Pty Ltd to undertake a Preliminary Site Investigation (PSI) for the property situated at 106 Wyee Road & 1496 Hue Hue Road, Wyee NSW ("the site").

The site is currently occupied by two rural residential properties, with residential dwellings, storage sheds, unsealed driveways, dam, and large grassed areas. The proposal is to rezone the site into a commercial zoning (business zone) to enable the development of commercial uses. A supermarket will be a key component of the proposed development. The following uses are also being considered for the site; Supermarket, Childcare, other potential commercial uses include gym/fitness, medical centre, small office and bank etc.

A site visit was undertaken on the 12th of October 2023. Fieldwork and reporting were conducted in general accordance with the Foundation Earth Sciences proposal and with reference to relevant regulatory criteria and Foundation Earth Sciences fieldwork protocols.

The preliminary soil data revealed the following:

- The laboratory results for the soil samples analysed were below the adopted detection limits and/or relevant guideline criteria.
- No identified asbestos was detected in the soil samples analysed. No fibro cement fragments were observed in the fill material located within the boreholes. The investigation is limited to the boreholes.

The following data gaps were identified:

- The groundwater quality at the site has not been investigated and/or assessed regarding the contamination status.
- The soil surrounding the dam walls have not been accessed for site suitability.
- An existing service station is located 30m northeast of the site. This presents a potential vapour intrusion risk and therefore further investigation will be required.
- It is noted that one of the uses being considered is a childcare, a DSI will be required to adequately assess the contamination status of the site.

Based on the results of this investigation to date it is considered that the risks to human health and the environment associated with contamination at the site are low to moderate in the context of the proposed use of the site. The site ***can be made suitable*** for the proposed development, subject to the following recommendations:

- Preparation of a Detailed Site Investigation (Phase 2 Environmental Site assessment) by a suitably qualified Environmental Consultant to address the data gaps identified once the planning proposal / rezoning has been approved and the proposed development plans have been finalised.
- Any soil requiring removal from the site, as part of future site works, should be classified in accordance with the "Waste Classification Guidelines, Part 1: Classifying Waste" NSW EPA (2014).

1.0 INTRODUCTION

Foundation Earth Sciences was appointed by High Line Projects Pty Ltd to undertake a Preliminary Site Investigation (PSI) for the property situated at 106 Wyee Road & 1496 Hue Hue Road, Wyee NSW ("the site"). This report has been prepared to assist in the rezoning application of the site to facilitate commercial/industrial development.

This PSI has been requested to determine the potential for onsite contamination arising from any areas of concern located within the site and its surrounding area. This report shall provide a preliminary assessment of any site contamination and, if required, provide a basis for a more detailed investigation.

A site visit was undertaken on the 12th of October 2023. Fieldwork and reporting were conducted in general accordance with the Foundation Earth Sciences proposal and with reference to relevant regulatory criteria and Foundation Earth Sciences fieldwork protocols.

The format of this report closely follows that recommended in the NSW Environment Protection Authority (EPA), "*Consultants Reporting on Contaminated Land*" – 2020.

2.0 OBJECTIVE

The objective of this PSI was to assess the potential for the soils at the site to have been impacted by previous and current activities undertaken at or adjacent to the site and to assess the site suitability for the proposed development.

This report may also recommend additional investigations and / or remediation works and possible strategies for the management of the site.

3.0 SCOPE OF WORKS

The scope of works for this PSI included:

- Research and review of the information available, including previous environmental investigations, past and current titles, aerial photographs, EPA records and anecdotal evidence, site survey, site records on waste management practices.
- Site walkover, including research of the location of sewers, drains, holding tanks and pits, spills, patches of discoloured vegetation, etc.
- Quality Assurance/Quality Control (QA/QC): work will be undertaken in accordance with relevant regulations and are consistent with industry standards; and
- Preliminary Soil Sampling.

4.0 SITE IDENTIFICATION

4.1.1 Site identification

The site is identified as follows:

Table 1: Site Identification Review

Site Identifier	Site Details	
Site Location	106 Wyee Road & 1496 Hue Hue Road, Wyee NSW	
Lot/DP	Lot 281 in DP 659927 – 106 Wyee Road Lot 282 in DP 755242 – 1496 Hue Hue Road	
Site Coordinates #	S Corner: Latitude: -33.176699, Longitude: 151.479469	
Parish	Morisset	
County	Northumberland	
Site Area	Approximately 1.42ha	
Local Government Area (LGA)#	City of Lake Macquarie	
Zoning##	RU4 – Primary Production Small Lots	
Surrounding Land Uses	*North*	Commercial/industrial and some rural residential
	South	Hue Hue Rd, Rural residential and vacant land
	East	Wyee Rd, commercial and fuel station then residential
	West	Rural residential

Notes:

Refer to NSW LPI "Six Maps" https://maps.six.nsw.gov.au/

https://www.planningportal.nsw.gov.au/find-a-property

4.1.2 Site Background

The site, located at 1496 Hue Hue Road, Wyee NSW is 1.42ha in size. The site has predominantly been used for agricultural and rural residential purposes.

5.0 SITE HISTORY AND PROPOSED DEVELOPMENT

5.1 Underground Services

Dial Before You Dig' plans were requested and reviewed for the site. Plans were provided by NBN, Ausgrid, Nextgen, Vocus response, Hunter Water Corporation, Jemena Gas & Telstra NSW Central. The plans did not indicate the presence of any major underground services or utility easements within site with the exception of the Telstra NSW Central.

The plans provided by Telstra NSW indicated the presence of a mains line running into the site from the south-eastern corner of 1496 Hue Hue Road, Wyee and the eastern corner of 106 Wyee Road. It is noted that these underground services are considered a potential preferential pathway.

Refer to **Appendix A** – DBYD Plans.

5.2 Review of Aerial Photographs

Several aerial photographs from Spatial Services were located and a review is presented in the following table:

Table 2 Review of Aerial Photographs

Year	Site		Surrounding areas
1966	Rural Residential	The property at 106 Wyee Rd is occupied by a rural residential property. The property at 1496 Hue Hue Rd also appears to have a single rural residential property along with some storage structures.	N: Wyee road, then some rural residential and vacant land. S: Hue Hue road, Vacant and some rural residential E: Wyee road, Vacant and some rural residential W: Bushland/Vacant and rural residential.
1975	Rural Residential	Some of the storage sheds appear to have removed from the property at 1496 Hue Hue Road.	N: Rural residential developments S: Rural residential developments E: Rural residential developments W: Rural residential developments
1984	Rural Residential	No major changes	N: Rural residential developments S: Rural residential developments E: Rural residential developments W: Rural residential developments
2006	Rural Residential	No major changes	N: Rural residential developments S: Rural residential developments E: a service station established, residential developments W: Rural residential developments
Current	Rural Residential	The site is as inspected (section 7.1)	As per inspection.

From 1966, the site appeared to be occupied by a rural residential property at no.1496 Hue Hue Road along with some storage structures, and a rural residential property at no.106 Wyee Road. By 1975, the property at 1496 appeared to have some storage structures removed. From 1975 to the present time, the site has remained relatively unchanged.

Up until 1966, the surrounding lands appeared to be mostly vacant land with some rural residential type properties or developments and bushland. Between 1975 and 1984, there appeared to be several rural residential developments in the surrounding areas, as well as the construction of some possible commercial properties to the east. Between 1984 and 2006 there were further rural residential properties developed in the surrounding areas and a service station near the site to the east appears to have been established. From 2006 until the present there have been further rural residential developments in the surrounding areas and no other major changes.

Refer to **Appendix B** – Historical Aerial Photographs.

5.2.1 Title search

A review of historical documents held at the NSW Department of Lands offices was undertaken to characterise the previous land use and occupiers of the site.

Table 3 Land Title Information

Lot 281 in DP 659927 (106 Wyee Rd, Wyee NSW)		
Year	**Proprietor**	**Company/ Personal occupation / notes**
27/08/2018 – Current	Murray Bull & Pamela Douglas	
7/11/2013	Beverley June Dalton	Inheritance from death of Geoffery Guy Dalton
16/05/2000	Geoffery Guy Dalton & Beverley June Dalton	
?	Beryl Joyce R	
3/06/1981	Ronald David Cushway & Patricia Majorie Cushway	
7/11/1973	Frederick Leonard Laws	
2/03/1959	Irene Pettiford	
18/09/1953	Alfred Ernest Morris	

15/07/1946	Angus Maurice Deaves	
12/10/1917	James Augustus Phillip Armitage	

Lot 282 in DP 755242 (1496 Hue Hue Rd, Wyee NSW)		
Year	**Proprietor**	**Company/ Personal occupation / notes**
19/11/2018 – Current	Stephen Richard Hogeveen, Patricia Diane Hogeveen, Raymond John Marshall & Rebecca Ashley Cataria	
21/04/2016	Ann Eileen Ditton, Norman William Wakeham, Kevin James Wakeham, Marie Louise Walbank	
25/08/2003	Mavis Eileen Wakeham	Inheritance from death of Ernest Thomas Wakeham
9/05/1947	Ernest Thomas Wakeham & Mavis Eileen Wakeham	
21/10/1942	Maria Hodges	
12/10/1917	James Charles Hodges	

The land title information for 106 Wyee Road, Wyee NSW indicated predominantly private ownership from 1917 up until the current date. The current landowner is listed as Murray Bull & Pamela Douglas. The land titles for the subject site have not indicated any potential land use of particular concern.

The land title information for 1496 Hue Hue Road, Wyee NSW indicated predominantly private ownership from 1917 up until the current date. The current landowner is listed as Stephen Richard Hogeveen, Patricia Diane Hogeveen, Raymond John Marshall & Rebecca Ashley Cataria. The land titles for the subject site have not indicated any potential land use of particular concern.

Refer to **Appendix C** – Land Title Information.

5.2.2 NSW EPA Contaminated Land Records, List of Notified Sites and POEO Records

5.2.3 NSW EPA Contaminated Land Records

The NSW EPA publishes records of contaminated sites under Section 58 of the Contaminated Land Management (CLM) Act 1997. The notices relate to investigation and/or remediation of site contamination considered to pose a significant risk of harm under the definition in the CLM Act.

A search of the database revealed that the subject site is not listed and there were no listed properties within the suburb of Wyee with current notices.

It should be noted that the NSW EPA record of Notices for Contaminated Land does not provide a record of all contaminated land in NSW.

Refer to **Appendix D** – NSW EPA Records.

5.2.4 NSW EPA POEO Register

A search of the POEO Register revealed the subject site is not listed on the register. There were two listed properties within the suburb of Wyee with current notices, however these were located more than 500m from the subject site.

Refer to **Appendix D** – NSW EPA Records.

5.2.5 NSW EPA List of Notified Sites

The NSW EPA publishes a list of notified contaminated sites each month. The list of notified sites contain land that has been notified to the EPA as being potentially contaminated.

A search of the list was completed on the 11th of October 2023. The search indicated there were no sites listed within the suburb of Wyee.

Refer to **Appendix D** – NSW EPA Records.

5.2.6 Preliminary PFAS Screen

NSW EPA requires that PFAS is considered when investigating land contamination. The preliminary screen is based on guidelines from the PFAS National Environmental Management Plan (NEMP 2020). From this screen a decision can be made as to whether PFAS sampling of soil and groundwater is required.

Table 4 PFAS Investigation Screening

Preliminary Screen	Risk of Occurrence
Any past or present site activity listed in NEMP 2020 as being activity associated with PFAS contamination? No	L
Any past or present off-site activity up-gradient/adjacent to the site listed in NEMP 2020 as being activity associated with PFAS contamination?	L
Did fire training involving the use of suppressants occur from 1970 to 2010?	L
Have fuel fires ever occurred on site from 1970 to 2010?	L

Have PFAS been used in manufacturing or stored on site?	L
Could PFAS have been imported to the site in fill material from a site activity listed in NEMP 2020?	L
Could PFAS contaminated groundwater or run-off migrated to the site?	No Suspected
Is the site or adjacent site listed in the NSW EPA PFAS Investigation Program?	No
If the risk is medium or high in any of the above, does the inclusion of preliminary sampling/testing of PFAS in soil (including ASLP) and water need to be included?	No

- Note 1
  - Risk: L – low (all necessary documentation has been reviewed and there is no recorded instance or compelling rationale),
  - M – medium/moderate (all necessary documentation has been reviewed and there is potential evidence of a recorded instance with compelling rationale).
  - H – high (all necessary documentation has been reviewed and there is evidence of a recorded instance with compelling rationale), r
  - Risk, N/A – not applicable (or "- ")].
  - No /Yes

- Note 2 Activities listed in Appendix B of the NEMP (2020).
- Note 3 Runoff from up-gradient PFAS use may impact surface water, soil, sediment and groundwater.
- Note 4 PFAS is used wide range of industrial processes and consumer products, including in the manufacture of non-stick cookware, specialised garments and textiles, ScotchguardTM and similar products (used to protect fabric, furniture, leather and carpets from oils and stains), metal plating and in some types of fire-fighting foam.
- Note 5 https://www.epa.nsw.gov.au/your-environment/contaminated-land/pfas-investigation-program

The potential for PFAS to be present on-site was considered low and thus subsequent preliminary PFAS sampling / analysis of soil is considered unwarranted during the DSI.

Refer to **Appendix D** – NSW EPA Records.

5.2.7 Previous Reports

No previous environmental investigation reports were provided or identified at the time of writing this report.

5.2.8 SafeWork NSW

Foundation Earth Sciences inspected the site on 12th October 2023 and there were no visual indicator of USTs and/or related infrastructure in accessible areas. Therefore, based on the weight of evidence above, no SafeWork NSW search was undertaken for this site.

5.2.9 Anecdotal evidence

Anecdotal evidence was not found for this site.

5.2.10 Integrity Assessment

The information found in the historical sources has been found to be in general concurrence. It is therefore considered that accuracy of this data is acceptable for this investigation.

5.2.11 Proposed Development

The site is currently occupied by two rural residential properties, with residential dwellings, storage sheds, unsealed driveways, dam, and large grassed areas. The proposal is to rezone the site into a commercial zoning (business zone) to enable the development of commercial uses. A supermarket will be a key component of the proposed development. The following uses are also being considered for the site; Supermarket, Childcare, other potential commercial uses include medical centre, small office and bank etc.

6.0 SITE CONDITION AND SURROUNDING ENVIRONMENT

Table 5: Site Condition and Surrounding Environment Review

Site Information	Descriptions
Sensitive Receivers	The nearest sensitive human receptors are the current and future users of the site, construction workers during the site redevelopment and the public. The nearest downgradient waterbody is mannering Creek located approximately 200m southeast of the site. There is also the Swampy creek located approximately 300m north of the site. There are many dams within & surrounding of the properties.
Soil Landscape *Review of NSW Soil and Land Information website ESPADE.*	The Soil Landscape Map viewed on NSW ESPADE indicates that the site is located at Doyalson Landscape area. do: moderately deep (50–150 cm) Yellow Earths (Gn2.24), Yellow Podzolic Soils (Dy2.21, Dy3.21) and Soloths (Dy2.41, Dy3.41) occur on sandstones and conglomerates; moderately deep (50–150cm) Yellow Podzolic Soils (Dy2.11, Dy3.21), Soloths (Dy2.41) and some Red Podzolic Soils (Dr3.21) occur on finegrained siltstones and claystone; moderately deep to deep (100–>150 cm) Yellow Leached Earths (Gn2.74), Grey Earths (Gn2.94), Soloths (Dy3.41) and Gleyed Podzolic Soils (Dg4.41) occur along drainage lines.
Topography	The Soil Landscape Map viewed on NSW ESPADE indicates that the site is located at Doyalson Landscape area. Gently undulating rises on Munmorah Conglomerate. Slope gradients <10%; local relief to 30m. Broad crests and ridges and long gently inclined slopes. Predominantly cleared eucalypt open forest.
Geological Profile	The 1:1000,000 Geological map of Gosford – Lake Macquarie, published by NSW Government in 1998, indicates the soils within the site to be underlain by Triassic Age Tuggerah Formation of the Narrabeen Group,

<table>
<tr><th>Site Information</th><th colspan="6">Descriptions</th></tr>
<tr><td></td><td colspan="6">comprising red, green and grey shale and quartz-lithic sandstone.</td></tr>
<tr><td>Presence of Acid Sulphate Soils
Review of ASRIS Acid Sulphate Soils, February 2013, Data delivered by CSIRO Land and Water.</td><td colspan="6">A review of the ASRIS Acid Sulphate Soils map indicated that the site is in an area of “No known occurrence” of acid sulphate soils.</td></tr>
<tr><td rowspan="7">Localised Hydrogeology
Review of DPI (Office of Water) Database.

Appendix I – DPI (Office of Water) Database Records.</td><td>Number</td><td>Location from Site</td><td>Depth (m BGL)</td><td>SWL (m BGL)</td><td>Use</td><td>Water Bearing Zones</td></tr>
<tr><td>GW064662</td><td>1.5km SE</td><td>24.0m</td><td>7.0m</td><td>Domestic</td><td>-</td></tr>
<tr><td>GW106449</td><td>1.38km W</td><td>4.5m</td><td>3.9m</td><td>General use</td><td>Unconsolidated</td></tr>
<tr><td>GW053092</td><td>1.7km SW</td><td>4.0m</td><td>-</td><td>Irrigation</td><td>-</td></tr>
<tr><td>GW200380</td><td>4.6km S</td><td>6.0m</td><td>5.0m</td><td>Monitoring bore</td><td>-</td></tr>
<tr><td>GW078214</td><td>3.5km NE</td><td>36.0m</td><td>9.0m</td><td>Domestic</td><td>-</td></tr>
<tr><td>Nearest Surface Water Body</td><td colspan="6">The nearest downgradient waterbody is mannering Creek located approximately 200m southeast of the site. There is also the Swampy creek located approximately 300m north of the site. There are many dams within & surrounding of the properties.</td></tr>
<tr><td>Local Meteorology
(Bureau of Meteorology BOM website)
Appendix J – BOM Data.</td><td colspan="6">The monthly rainfall of the local surrounding area is represented by the data collected from the BOM rainfall gauge located in Gorokan (Goobarabah St) which is approximately 7.7km from Gorokan. The records indicate that the annual mean rainfall recorded for the month of October was 88.5mm (date of fieldwork).</td></tr>
</table>

Site Information	Descriptions
Nearest Active Service Station & Dry Cleaner (Google Maps Search)	Service station is 30m Northeast of the site. There is no dry cleaner within 500m of the site.

7.0 SITE INSPECTION

7.1.1 Site observations

The site was visited on the 12th of October 2023 to inspect the site for any potential sources of contamination. The following observations were made:

Table 6: Site Inspection Review

Factors Considered	Description of Sites
Buildings & Structures on Site	This site is rectangular in shape and occupied by two rural residential lots. Each lot contains a residential dwelling, multiple storage structures, an unsealed driveway which connects the lots together and provides access to Hue Hue Road, a dam on the northern border, as well as some agricultural practices (such as horse paddocks). The site however is mostly dominated by grassed areas.
Percentage Hard-standing surface	Approximate 10%
Concrete Condition	Average
Chemical Storage	Chemical storage areas were not noted at the time of the site inspection in accessible areas.
Above and Underground Storage Tanks	No above or underground storage tanks areas were noted at the time of the site inspection in accessible areas.
Trade Waste Pits	No trade waste pits were identified at the site.
Nearby Electrical Transformers	No electrical transformers are located within the site. However, there are electrical power lines spanning the width of the site from the eastern portion to the western portion.
Asbestos	Fibro cement sheeting was not identified within the borehole sample locations.
Site Vegetation	Appeared healthy.
Soil Staining and Odours	No odours were identified within the property. No significant

	soil staining was noted during the inspection.
Stormwater and Sewer	Stormwater appeared to be connected to the local utilities.

Refer to **Figure 1** - Site Locality and **Figure 2** - Site Features and Borehole Location Plan.

8.0 CONCEPTUAL SITE MODEL (CSM)

Based on the above information, site history and site walkover, the areas of potential concern and associated contaminants for the site CSM were identified. These are summarised in the following table.

Table 7: Areas and Contaminants of Concern

Known and potential contamination source	Associated Contaminants
Historical Site Uses (Rural Residential)	Heavy Metals, TRH, BTEX, PAH, OCP, PCB & Asbestos
Overhead Powerlines	Heavy Metals, TRH, BTEX, PAH, OCP, PCB & Asbestos
Dam Walls and drainage lines	Heavy Metals, TRH, BTEX, PAH, OCP, PCB & Asbestos
Surrounding Land Uses (service station located 30m northeast of the site)	Heavy Metals, TRH, BTEXN, PAH, VOC, Phenol
Potential Pesticides Use	OCP, OPP
Imported Fill	Heavy Metals, TRH, BTEX, PAH, OCP, PCB & Asbestos
Car parking Areas	TRH, BTEX, PAH
Building degradation/ Demolition	Heavy Metals and Asbestos

Table 8: Potentially Contaminated Media

Known and potential contamination source	Associated Contaminants
Fill Material	There is the potential for contamination to be present in the upper fill material.
Groundwater	There is the potential for the leaching of contaminants into groundwater onsite and also migration of the contaminants.
Soil Vapour	Given the surrounding land uses site history (service station) soil vapour is considered a potential contaminated media.

8.1 Potential for Migration

Contaminants generally migrate from site via a combination of windblown dusts, rainwater infiltration, groundwater migration and surface water runoff. The potential for contaminants to migrate is a combination of:

- The nature of the contaminants (solid/liquid and mobility characteristics).
- The extent of the contaminants (isolated or widespread).
- The location of the contaminants (surface soils or at depth); and
- The site topography, geology, hydrology and hydrogeology.

The potential contaminants identified as part of the site history review & site inspection are present in solid (e.g., impacted fill, asbestos) liquid (e.g., dissolved in water) & gaseous forms.

Aerial photography has indicated that there are unsealed ground surfaces and therefore there is the potential for migration of contaminants via wind-blown dust.

Rainfall infiltration at the site is expected to occur in unsealed areas. There is therefore the potential that soil contamination could result in impacts to shallow groundwater.

8.2 Potential Exposure Pathways

Potential exposure pathways include:

- Dermal.
- Ingestion; and
- Inhalation.

Due to the presence of exposed potentially impacted soil/fill on ground surfaces, dermal exposure is considered a potential exposure pathway.

There is low risk potential for vapour to be present in the underlying profile within the site based on the sampling results.

The potential for ingestion of soil is considered as a potential exposure pathway.

Dermal and inhalation exposure pathways by potentially contaminated groundwater and/or vapour are considered as a low concern based on historical land use.

8.3 Receptors

Potential receptors of environmental impact present within the site which will be required to be addressed with respect to the suitability of the site for the proposed use include:

- Excavation/construction/maintenance workers conducting activities at the site, who may potentially be exposed to COPCs through direct contact with impacted soils, Vapour Intrusion and/or groundwater present within excavations and/or inhalation of dusts/fibres associated with impacted soils.
- Future occupants/users of the site may potentially be exposed to COPCs through direct contact with impacted soils and/or ingestion of impacted soils and/or inhalation of dusts/fibres associated with impacted soils and/or exposure to vapour; and/or
- Offsite sensitive receptors of groundwater.
- Flora species to be established on vegetated areas of the site; and
- Mannering Creek and dams

8.4 Preferential Pathways

For the purpose of this assessment, preferential pathways have been identified as natural and/or man-made pathways that result in the preferential migration of COPCs as either liquids or gases.

Man-made preferential pathways are present throughout the site, generally associated with fill materials and services present beneath existing ground surface. Fill materials and service lines are anticipated to have a higher permeability than the underlying natural soil and/or bedrock.

Plans were provided by NBN, Ausgrid, Nextgen, Vocus response, Hunter Water Corporation, Jemena Gas & Telstra NSW Central. The plans did not indicate the presence of any major underground services or utility easements within site apart from the Telstra NSW Central. The plans provided by Telstra NSW indicated the presence of a mains line running into the site from the south-eastern corner of 1496 Hue Hue Road, Wyee and the eastern corner of 106 Wyee Road. It is noted that these underground services are considered a potential preferential pathway.

8.5 Offsite Contamination

An existing service station is located 30m northeast of the site. This presents a potential vapour intrusion risk and therefore further investigation will be required.

9.0 REVIEW OF DATA QUALITY OBJECTIVES

The DQOs were also prepared using Appendix IV of the Site Auditor Guidelines. These require 7 steps. The steps being.

a. State the problem.
b. Identify the decisions.
c. Identify inputs to decision.
d. Define the study boundaries.
e. Develop a decision rule.
f. Specify limits on decision errors.
g. Optimise the design for obtaining data.

9.1 State the Problem

The site requires to be confirmed suitable for the proposed development. The site has some areas of potential concern, those being impacts from historical & current uses (rural residential and agricultural), surrounding land uses (service station) imported fill of unknown origin, potential pesticide use, pipeline, dam walls, degradation of the building materials and leakages from vehicles on site.

Technically defensible evidence needs to be provided so that the identified Site does not present an unacceptable risk to human health or the environment and is suitable for the intended land use.

9.2 Identify the Decisions

The decisions to be made on the contamination and the new environmental data required includes considering relevant site contamination criteria for each medium (fill, soil and sediment). A proposed use of the 95% UCL on the mean concentrations for all soil chemicals of potential concern must be less than the site criteria identified for the relevant land use suitability.

The decisions made in completing this assessment are as follows:

- Does the site or is the site likely to present a risk of harm to humans or the environment
- Is the site currently suitable for the proposed land use being commercial and industrial with accessible soil?
- Is there a potential for soil and groundwater contamination?
- Is there a potential for offsite migration issues?
- Do the sampling results meet the site criteria proposed?
- If not, does the site require remediation works.

9.3 Identify Inputs to Decision

This step requires the identification of the environmental variables/characteristics that need measuring, identification of which media (fill, soil etc.) need to be collected, identification of the site criteria for each medium of concern and appropriate analytical testing. Inputs include:

- Existing site information
- Site history
- Regional geology, topography and hydrogeology
- Potential contaminants
- Proposed Land Use
- Site assessment criteria
- Results as measured against criteria.

9.4 Define the Study Boundaries

Specific spatial and temporal aspects must be provided to identify the boundaries of the investigation and to identify any restrictions that may hinder the assessment process. The site is located at 1496 Hue Hue Road & 106 Wyee Road, Wyee NSW. The site is approximately 1.4ha in area.

9.5 Develop a Decision Rule

The information obtained through this assessment will be used to characterise the soils and the groundwater on the site in terms of contamination issues and risks to human health and the environment. The decision rule in characterising the site will be as follows:

- Laboratory test results will be measured against the criteria provided within this report.
- The site will be deemed suitable for the proposed use if the following criteria are fulfilled:

- Soil and groundwater concentrations are within background levels.
- QA/QC shows data can be relied upon
- Results generally meet regulatory criteria.
- Results are from NATA accredited laboratories.
- Detection limits are below assessment criteria.
- Results can be shown to be of minimal concern.

9.6 Specify Limits on Decision Errors

The limits on decision errors for this assessment are as follows:

- The assessment criteria adopted from the guidelines within this report have risk probabilities already incorporated.
- The acceptable limits for inter/intra laboratory duplicate sample comparisons are laid out within our protocols.
- The acceptable limits for laboratory QA/QC parameters are based upon the laboratory reported acceptable limits and those stated within the NEPM 1999 Guidelines (2013 Amendment)

9.7 Optimise the Design for Obtaining Data

A resource-effective sampling and analysis design was undertaken for data collection that satisfies the DQO's. The sampling and analytical plan is designed to avoid Type 1 and Type 2 errors and includes defining minimum sample numbers required to detect contamination as determined with procedures provided in the NSW EPA 1995 Sampling Design Guidelines and AS 4482.1 - 2005 and appropriate quality control procedures.

Furthermore, only laboratories accredited by NATA for the analysis undertaken were used. The laboratory data was assessed from quality data calculated during this assessment. Field QA/QC protocols adopted and incorporate traceable documentation of procedures used in the sampling and analytical program and in data verification procedures.

10.0 PRELIMINARY SOIL INVESTIGATION

The preliminary soil investigation took place on the 12th of October 2023 and was designed to meet the Data Quality Objectives.

10.1 Soil Assessment

Six (6) soil samples were recovered from six (6) test pits labelled BH1 to BH6. These locations were selected to detect any contamination that may have originated from past and present activities, and due to potential excavation and future development in these areas.

Table 9: Sampling Information - Soil

Analyte / Analyte Group / Sample	Depth (m)	SAMPLING DATE	HEAVY METALS (8)	TRH	BTEX	PAH	OCP	PCB	OPP	PH / CEC / %CLAY	TRH C6-C10 & BTEXN	Asbestos ID
BH1	0.3-0.4	12.10.2023	X	X	X	X	X	X	X	X		X
BH2	0.2-0.3	12.10.2023	X	X	X	X	X	X				X
BH3	0.1-0.2	12.10.2023	X	X	X	X	X	X	X			X
BH4	0.3-0.4	12.10.2023	X	X	X	X	X	X				X
BH5	0.2-0.3	12.10.2023	X	X	X	X	X	X				X
BH6	0.2-0.3	12.10.2023	X	X	X	X	X	X	X			X
D1	-	12.10.2023	X	X	X	X	X	X				X
SS1	-	12.10.2023	X	X	X	X	X	X				
TS1	-	-									X	
TB1	-	-									X	

The locations of the boreholes are shown in **Figure 2** and details of the borehole logs are presented in **Appendix F** – Borehole Logs.

Based on information from all boreholes, the surface and sub-surface profile across the site is generalised as follows:

- Fill: Silty Clay
- Natural: Silty CLAY

10.1.1 Sampling Density and Rationale

Foundation Earth Sciences recovered six soil samples from six test pits across the site. *Sampling was preliminary in nature and not designed to meet the NSW EPA "Sampling Design Guidelines" (2022) but target any potential areas of concern.*

10.1.2 Sampling Methodology

In summary:

- Soil samples were collected directly from the excavator bucket to collect undisturbed samples.
- Samples were transferred directly into appropriately labelled clean laboratory supplied containers.
- Samples were transferred into chilled eskies for sample preservation.
- A Chain of Custody was completed and forwarded to the laboratory. Sampling analysis was based on field observations and was in accordance with the schedule outlined in Table 9.
- Soil samples were submitted to their respective laboratories as specified in Section 11.

11.0 QUALITY ASSURANCE / QUALITY CONTROL

11.1.1 General QA/QC

The frequency required for each field quality assurance / quality control (QA/QC) sample is presented in the table below.

Table 10: QA/QCs Frequencies

	Intra Lab	Inter Lab	Rinsate	Spikes	Blanks
Sampling Frequency	1 in 20	1 in 20	1/day	1/day	1/day

During the contamination assessment the integrity of data collected is considered vital. With the assessment of the site, several measures were taken to ensure the quality of the data. These are as follows:

11.1.2 Sample Containers

Soil samples collected during subsequent investigations are to be placed immediately into laboratory prepared glass jars with Teflon lid inserts. Standard identification labels are to be adhered to each individual container and labelled according to depth, date, sampling team and media collected.

11.1.3 Decontamination

All equipment used in the sampling program is to be decontaminated prior to use and between samples to prevent cross contamination. Decontamination of equipment involved the following procedures:

- Cleaning equipment in potable water to remove gross contamination.
- Cleaning in a solution of Decon 90;
- Rinsing in clean demineralised water then wiping with clean lint free cloths.

Foundation Earth Sciences will also adopt a sampling gradient of lowest to highest potential contamination to minimise the impact of cross contamination. This gradient is determined from the historical review and the on-site inspection to be carried out prior to sampling.

Although Foundation Earth Sciences maintains consistent sampling procedures, a rinsate sample is obtained to ensure false positive samples are not generated and that decontamination procedures are effective in preventing cross contamination. The Rinsate water is collected after being in contact generally with the trowel used for sampling. Analytical results that target the contaminants of concern are compared to a blank sample, which is taken directly from the rinsate water container supplied by the laboratory.

11.1.4 Sample Tracking, Identification and Holding Times

All samples are to be forwarded to Envirolab under recognised chain of custodies with clear identification outlining the date, location, sampler and sample ID. All samples are to be recorded by the laboratory as meeting their respective holding times. The sample tracking system is considered adequate for the purposes of sample collection.

11.1.5 Sample Transport

All samples are to be packed into an esky with ice from the time of collection. A trip blank and trip spike are collected where appropriate. These were transported under chain of custody from the site to Envirolab Pty Ltd, a NATA registered laboratory.

Samples are too kept below 4°C at all times, soil samples submitted for asbestos analysis are not required to be kept below 4°C.

11.1.6 Trip Spike

Trip Spike samples are to be obtained from the laboratory prior to conducting field sampling where volatile substances are suspected. Foundation Earth Sciences QA/QC procedures for the collection of environmental samples involves the collection of trip blanks, trip spikes and duplicate samples both intra and inter laboratory.

11.1.7 Trip Blank

A trip blank is to accompany the sampling for the sampling process and is not separated from the sample collection and transportation process. The purpose of the trip blank is

to identify whether cross-contamination is occurring during the sample collection and transport process.

11.1.8 Field Duplicate Samples

The tables below list the duplicate soil samples collected with their corresponding primary samples.

Table 11: Soil Field Duplicate Samples

Primary Sample	Sample Depth (m BGL)	Intra Duplicate	Inter Duplicate	Date Sampled
BH3	0.1-0.2	D1	SS1	12.10.2023

Field duplicate samples for soil were prepared in the field through the following process:

- A larger than normal quantity of soil is recovered from the sample location selected for duplication.
- Two Portions of the sub-sample are immediately transferred, one for an intra-laboratory duplicate and another as a sample.
- Samples are placed into a labelled, laboratory supplied 250ml glass jar and sealed with an airtight, Teflon screw top lid.
- The fully filled jars are labelled as the sample and duplicate and immediately placed in a chilled esky.

Soil Intra-Laboratory duplicate samples were sent to SGS Pty Ltd while Inter-Laboratory duplicate samples were sent to Envirolab Pty Ltd.

A summary of the test results with the Relative Percentage Difference (RPD) is presented in the following tables.

The comparisons between the duplicates and original samples indicate acceptable RPDs when they comply with criteria which are commonly set at:

- less than 30% for inorganics and 50% for organics
- greater than five (5) times the laboratory limit of recording (LOR)
- greater than 50% of the relevant health investigation level (HIL) concentration.

The tables, below, give details of intra laboratory and inter laboratory duplicates.

Table 12: Intra-lab RPD for Soil Sample D1

ANALYTE	BH3 0.3-0.4 mg/kg	ENVIROLAB D1 mg/kg	RELATIVE PERCENTAGE DIFFERENCE %
HEAVY METALS			
Arsenic	<4	<4	-
Cadmium	<0.4	<0.4	-
Chromium	3	3	0
Copper	2	1	67
Lead	11	10	10
Mercury	<0.1	<0.1	-
Nickel	1	<1	-
Zinc	28	18	43
TRH			
C10-C16	<25	<25	-
C16-C34	<100	<100	-
C34-C40	<100	<100	-
BTEX			
Benzene	<0.2	<0.2	-
Toulene	<0.5	<0.5	-
Ethylbenzene	<1	<1	-
Xylenes - Total	<2	<2	-
POLYCYCLIC HYDROCARBONS (PAH)			
Benzo(a)pyrene	<0.05	<0.05	-
Total PAH	0.7	<0.05	-
ORGANOCHLORINE PESTICIDES			
Heptachlor	<0.1	<0.1	-
Aldrin	<0.1	<0.1	-
Dieldrin	<0.1	<0.1	-
DDD	<0.1	<0.1	-
DDE	<0.1	<0.1	-
DDT	<0.1	<0.1	-
Chlordane (trans & cis)	<0.1	<0.1	-
POLYCHLORINATED BIPHENYLS			
Total PCB	<0.1	<0.1	-

The comparisons between the intra-laboratory duplicates and corresponding original samples for soil indicated generally acceptable RPD apart from copper which exceed the DQOs for this project. However, this exceedance is not considered a concern as they are most likely due to the heterogeneity of the sample or low concentrations within the sample.

Table 13: Inter-lab RPD for Soil Sample SS1

ANALYTE	BH3 0.3-0.4 mg/kg	SGS SS1 mg/kg	RELATIVE PERCENTAGE DIFFERENCE %
HEAVY METALS			
Arsenic	<4	<1	-
Cadmium	<0.4	<0.3	-
Chromium	3	2	35
Copper	2	1.6	22
Lead	11	9	20
Mercury	<0.1	<0.05	-
Nickel	1	0.5	67
Zinc	28	19	38
TRH			
C10-C14	<25	<25	-
C15-C28	<100	<90	-
C29-C36	<100	<120	-
BTEX			
Benzene	<0.2	<0.1	-
Toulene	<0.5	<0.1	-
Ethylbenzene	<1	<0.1	-
Xylenes - Total	<2	<0.3	-
POLYCYCLIC HYDROCARBONS (PAH)			
Benzo(a)pyrene	<0.05	<0.1	-
Total PAH	0.7	<0.8	-
ORGANOCHLORINE PESTICIDES			
Heptachlor	<0.1	<0.1	-
Aldrin	<0.1	<0.1	-
Dieldrin	<0.1	<0.1	-
DDD	<0.1	<0.1	-
DDE	<0.1	<0.1	-
DDT	<0.1	<0.1	-
Chlordane (trans & cis)	<0.1	<0.1	-
POLYCHLORINATED BIPHENYLS			
Total PCB	<0.1	<1	-

The comparisons between the inter-laboratory duplicates and corresponding original samples for soil indicated generally acceptable RPDs, with the exception of nickel which exceeded the DQOs for this project. However, this exceedance is not considered a concern as they are most likely due to the heterogeneity of the sample or low concentrations within the sample.

Field duplicates provide an indication of the whole investigation process, including the sampling process, sample preparation and analysis. The accuracy of the data is considered to be adequate due to the effect on confidence intervals with low concentrations in the samples and their duplicates.

11.1.9 Trip Spike and Trip Blank Results

Trip Spike samples were obtained from the laboratory prior to conducting field sampling where volatile substances are suspected. Trip spike and trip blank samples were collected to assess the effect of sample handling on volatile concentrations in the samples collected and the results are listed in the tables below:

Table 14: Trip Spike

ANALYTE	TS1 Trip Spike % Soil (mg/kg) 12.10.2023
BTEX	
Benzene	94%
Toluene	94%
Ethyl Benzene	94%
M & P Xylenes	93%
O-Xylenes	93%

Results discussed in Section 11.1.10.

Table 15: Trip Blank

ANALYTE	TB1 Trip Blank Soil (mg/kg) 12.10.2023
TRH	
C6-C10	<25
BTEX	
Naphthalene	<1
Benzene	<0.2
Toluene	<0.5
Ethyl Benzene	<1
Total Xylenes	<1

Results discussed in Section 11.1.10.

11.1.10 Laboratory QA/QC

The integrity of analytical data provides the second step in the QA/QC process for total data compliance. The data validation techniques adopted by Foundation Earth Sciences are based upon techniques published by the US EPA and in line with methods and guidelines adopted by the NSW EPA and outlined in the NEPM, 2013.

Descriptions are provided of the specific mechanisms used in the assessment of accuracy, precision, and useability of analytical data within the project.

11.1.11 QA/QC Results

The QA/QC results for soil collected at the site are summarised in the table below:

Table 16: QA/QC Results Summary

Data Quality Indicator	Results	DQI Met
Completeness		
Soil		
Data from critical samples is considered valid	Data is considered valid	Yes
Satisfactory frequency / result for QC samples	The QC results are considered adequate for the purpose of the investigation.	Yes
Field documentation completed	Field records are complete	Yes
Boreholes logs & COCs completed and holding times complied with	Logs, COCs and holding times have been completed and complied with	Yes
Comparability		
Soil		
Standard operating procedures used	Yes	Yes
Consistent field conditions, sampling staff and laboratory analysis	Sampling was conducted by one Foundation Earth Sciences scientist operating under the SOPs. The laboratories remained consistent throughout the investigation	Yes
Same analytical methods used	All analytical methods used between laboratories were based on the USEPA/APHA methods	Yes
Limit of reporting appropriate and consistent	The LORs were the same within each laboratory but differed between the primary and secondary laboratories. The LORs were considered appropriate based on the results.	Yes

Representativeness		
Soil		
Sampling appropriate for media and analytes	All sampling was conducted in accordance with Foundation Earth Sciences SOPs apart from lab cert 335236. A portion of the supplied sample was sub sampled for asbestos according to ASB-001 asbestos subsampling procedure. Samples 335236 1-6 were sub sampled from the bags provided.	Partial
Samples adequately preserved.	All samples collected were received by laboratories at the correct temperature. Where relevant, samples were stored in acid-preserved containers supplied by laboratories.	Yes
Precision		
Soil		
SOPs appropriate and complied with in relation to field duplicates	The recovery of field duplicates was conducted in accordance with Foundation Earth Sciences SOPs s to allow for the assessment of field precision.	Yes
RPDs of the field duplicates within control limits	The RPDs were <50%, the data set was considered to be adequately precise.	Yes
RPDs of the laboratory duplicates within control limits	The RPDs of the lab duplicates were generally within control limit with the exception of lab certificate 335236 in the metal sample 335236-1 Cr which exceeded the DQOs for this project, therefore a triplicate result has been	Partial

	issued as laboratory number 335236-10.	
Accuracy		
Soil		
SOPs appropriate and complied with in relation to field blanks	Yes	Yes
Rinsate Blanks, trip blanks & laboratory blanks free of contaminants	Laboratory blanks & trip blanks were free of contaminants.	Yes
Surrogate spikes within control limits	Yes	Yes
Laboratory control spikes within control limits	Laboratory Control Spike recoveries were within control limits.	Yes
Matrix Spike recoveries within control limits	Matrix spike recoveries were within control limits	Yes
Trip spike recoveries within control limits	Yes	Yes

It is therefore considered that the data is sufficiently reliable and that the results can be used for the purpose of this project.

12.0 SITE ASSESSMENT CRITERIA

12.1 SOILS

12.1.1 Health Investigation Levels (HILs)

To assess the contamination status of soils at a site, the NSW EPA refers to the document entitled National Environmental Protection (Assessment of Site Contamination) Measure (NEPM) (Amendment 2013).

During any future soil investigations, the site will be assessed against the NEPM exposure scenario 'Commercial / Industrial D' Health Investigation Levels of the above-mentioned guidelines and specifically refers to the following:

HIL 'D' Commercial/industrial includes premises such as shops, offices, factories and industrial sites.

The soil regulatory guidelines are presented in the table below.

Table 17: Health Investigation Levels (HIL) Criteria for Soil Contaminants

FOUNDATION EARTH SCIENCES	Commerical/Industrial D	Reference
Heavy Metals		
Arsenic	3000	NEPM 2013 - Table 1(A)1 HILs
Beryllium	500	NEPM 2013 - Table 1(A)1 HILs
Boron	300000	NEPM 2013 - Table 1(A)1 HILs
Cadmium	900	NEPM 2013 - Table 1(A)1 HILs
Chromium (VI)	3600	NEPM 2013 - Table 1(A)1 HILs
Cobalt	4000	NEPM 2013 - Table 1(A)1 HILs
Copper	240000	NEPM 2013 - Table 1(A)1 HILs
Lead	1500	NEPM 2013 - Table 1(A)1 HILs
Manganese	60000	NEPM 2013 - Table 1(A)1 HILs
Mercury (Inorganic)	730	NEPM 2013 - Table 1(A)1 HILs
Methyl Mercury	180	NEPM 2013 - Table 1(A)1 HILs
Nickel	6000	NEPM 2013 - Table 1(A)1 HILs
Selenium	10000	NEPM 2013 - Table 1(A)1 HILs
Zinc	400000	NEPM 2013 - Table 1(A)1 HILs
Cyanide (Free)	1500	NEPM 2013 - Table 1(A)1 HILs
Polycyclic Aromatic Hydrocarbons (PAHs)		
Carcinogenic PAHs (as Bap TEQ)	40	NEPM 2013 - Table 1(A)1 HILs
Total PAHs	4000	NEPM 2013 - Table 1(A)1 HILs
Organochlorine Pesticides		
DDT + DDE + DDD	3600	NEPM 2013 - Table 1(A)1 HILs
Aldrin + Dieldrin	45	NEPM 2013 - Table 1(A)1 HILs
Chlordane	530	NEPM 2013 - Table 1(A)1 HILs
Endosulfan	2000	NEPM 2013 - Table 1(A)1 HILs
Heptachlor	50	NEPM 2013 - Table 1(A)1 HILs
HCB	80	NEPM 2013 - Table 1(A)1 HILs
Phenols		
Phenols	240000	NEPM 2013 - Table 1(A)1 HILs
Pentachlorophenol	660	NEPM 2013 - Table 1(A)1 HILs
Cresols	25000	NEPM 2013 - Table 1(A)1 HILs
Polychlorinated Biphenyls (PCBs)		
PCBs	7	NEPM 2013 - Table 1(A)1 HILs
Other Pesticides		
Atrazine	2500	NEPM 2013 - Table 1(A)1 HILs
Chlorpyrifos	2000	NEPM 2013 - Table 1(A)1 HILs
Bifenthrin	4500	NEPM 2013 - Table 1(A)1 HILs
Herbicides		
2,4,5-T	5000	NEPM 2013 - Table 1(A)1 HILs
2,4-D	9000	NEPM 2013 - Table 1(A)1 HILs
MCPA	5000	NEPM 2013 - Table 1(A)1 HILs
MCPB	5000	NEPM 2013 - Table 1(A)1 HILs
Mecoprop	5000	NEPM 2013 - Table 1(A)1 HILs
Picloram	35000	NEPM 2013 - Table 1(A)1 HILs
Other Organics		
PDBE (Br1-Br9)	10	NEPM 2013 - Table 1(A)1 HILs

Note - All values are in mg/kg.

12.1.2 Health Screening Levels (HSLs)

The HSLs are applicable to generic land uses such as residential, commercial/industrial or recreational/public open space and different soil types between the ground surface

and soils >4 metres below ground level. The HILs have been applied to assess human health risks via the inhalation and direct contact pathways of exposure.

It should be noted that HSL D can be used in lieu of HSL B for buildings that comprise car parks or commercial properties on the ground floor. For selection of the health screening criteria an assessment of the in-situ soil profile should be undertaken.

Table 18: Health Screening Levels (HSL) Criteria

FOUNDATION EARTH SCIENCES	HSL D	HSL D	HSL D	HSL D	Soil Saturation Concentration (Csat)	Reference
	0m to <1m	1m to <2m	2m to <4m	4m+		
SAND						
Toluene	NL	NL	NL	NL	560	NEPM 2013 - Table 1(A) 3 HSLs
Ethylbenzene	NL	NL	NL	NL	64	NEPM 2013 - Table 1(A) 3 HSLs
Xylenes	NL	NL	NL	NL	300	NEPM 2013 - Table 1(A) 3 HSLs
Naphthalene	NL	NL	NL	NL	9	NEPM 2013 - Table 1(A) 3 HSLs
Benzene	3	3	3	3	360	NEPM 2013 - Table 1(A) 3 HSLs
F1	260	370	630	NL	950	NEPM 2013 - Table 1(A) 3 HSLs
F2	NL	NL	NL	NL	560	NEPM 2013 - Table 1(A) 3 HSLs
SILT						
Toluene	NL	NL	NL	NL	640	NEPM 2013 - Table 1(A) 3 HSLs
Ethylbenzene	NL	NL	NL	NL	69	NEPM 2013 - Table 1(A) 3 HSLs
Xylenes	NL	NL	NL	NL	330	NEPM 2013 - Table 1(A) 3 HSLs
Naphthalene	NL	NL	NL	NL	10	NEPM 2013 - Table 1(A) 3 HSLs
Benzene	4	4	6	10	440	NEPM 2013 - Table 1(A) 3 HSLs
F1	250	360	590	NL	910	NEPM 2013 - Table 1(A) 3 HSLs
F2	NL	NL	NL	NL	570	NEPM 2013 - Table 1(A) 3 HSLs
CLAY						
Toluene	NL	NL	NL	NL	630	NEPM 2013 - Table 1(A) 3 HSLs
Ethylbenzene	NL	NL	NL	NL	68	NEPM 2013 - Table 1(A) 3 HSLs
Xylenes	NL	NL	NL	NL	330	NEPM 2013 - Table 1(A) 3 HSLs
Naphthalene	NL	NL	NL	NL	10	NEPM 2013 - Table 1(A) 3 HSLs
Benzene	4	6	9	20	430	NEPM 2013 - Table 1(A) 3 HSLs
F1	310	480	NL	NL	850	NEPM 2013 - Table 1(A) 3 HSLs
F2	NL	NL	NL	NL	560	NEPM 2013 - Table 1(A) 3 HSLs

Note - All values are in mg/kg.

12.1.3 (EILs) and (ESLs)

Ecological Investigation Levels (EILs) -

The NEPM 2013 states that "Ecological Investigation Levels" (EILs) for the protection of terrestrial ecosystems have been derived for common contaminants in soil based on a species sensitivity distribution (SSD) model developed for Australian conditions. EILs have been derived for As, Cu, CrIII, DDT, naphthalene, Ni, Pb and Zn.

Insufficient data was available to derive ACLs for arsenic (As), DDT, lead (Pb) and naphthalene. As a result, the derived EILs are generic to all soils and are presented as total soil contaminant concentrations in Tables 1B (4) and 1B (5) within the NEPM 2013.

For the purposes of EIL derivation, a contaminant incorporated in soil for at least two years is considered to be aged for the purpose of EIL derivation. The majority of contaminated sites are likely to be affected by aged contamination. Fresh contamination is usually associated with current industrial activity and chemical spills.

The following process describes the method for calculation of site specific EILs.

A. EILs for Ni, Cr III, Cu, Zn and Pb aged contamination (>2 years)

Steps 1–4 below describe the process for deriving site-specific EILs for the above elements using Tables 1B (1) – 1B (4), which can be found at the end of the NEPM 2013.

1. Measure or analyse the soil properties relevant to the potential contaminant of concern (pH, CEC, organic carbon, clay content). Sufficient samples need to be taken for these determinations to obtain representative values for each soil type in which the contaminant occurs.

2. Establish the sample ACL for the appropriate land use and with consideration of the soil-specific pH, clay content or CEC. The ACL for Cu may be determined by pH or CEC and the lower of the determined values should be selected for EIL calculation. Note that the ACL for Pb is taken directly from Table 1(B) 4.

3. Calculate the contaminant ABC in soil for the particular contaminant and location from a suitable reference site measurement or other appropriate method.

4. Calculate the EIL by summing the ACL and ABC:

$$EIL = ABC + ACL$$

B. EILs for As, DDT and naphthalene

EILs for aged contamination for DDT and naphthalene are not available and the adopted EIL is based on fresh contamination taken directly from Table 1B (5). The EILs for As, DDT and naphthalene are generic i.e., they are not dependent on soil type and are taken directly from Table 1B (5). Only EILs for fresh contamination are available for As, DDT and naphthalene due to the absence of suitable data for aged contaminants.

Ecological Screening Levels (ESLs) -

Ecological screening levels (ESLs) are presented based on a review of Canadian guidance for petroleum hydrocarbons in soil and application of the Australian methodology (Schedule B5b) to derive Tier 1 ESLs for BTEX, benzo(a)pyrene and F1 and F2 (Warne 2010a, 2010b)

The Canadian Council of the Ministers of the Environment (CCME) has adopted risk-based TPH standards for human health and ecological aspects for various land uses in the *Canada-wide standard for petroleum hydrocarbons (PHC) in soil* (CCME 2008) (CWS PHC). The standards established soil values including ecologically based criteria for sites affected by TPH contamination for coarse- and fine-grained soil types.

Table 19: Ecological Investigation Levels (EIL) and Ecological Screening Levels (ESL)Criteria

FOUNDATION EARTH SCIENCES	Contaminant Age/Soil Texture	National parks and areas of high conservation value	Urban residential and open public spaces	Commercial and industrial	Reference
Ecological Investigation Levels (EILs)					
Heavy Metals					
Arsenic	Fresh	20	50	80	NEPM 2013 - Table 1(B) 1-5 EILs
	Aged	40	100	160	NEPM 2013 - Table 1(B) 1-5 EILs
Chromium (III)	Fresh	Site Specific Calculation Required			NEPM 2013 - Table 1(B) 1-5 EILs
	Aged				NEPM 2013 - Table 1(B) 1-5 EILs
Copper	Fresh	Site Specific Calculation Required			NEPM 2013 - Table 1(B) 1-5 EILs
	Aged				NEPM 2013 - Table 1(B) 1-5 EILs
Lead	Fresh	110	270	440	NEPM 2013 - Table 1(B) 1-5 EILs
	Aged	470	1100	1800	NEPM 2013 - Table 1(B) 1-5 EILs
Nickel	Fresh	Site Specific Calculation Required			NEPM 2013 - Table 1(B) 1-5 EILs
	Aged				NEPM 2013 - Table 1(B) 1-5 EILs
Zinc	Fresh	Site Specific Calculation Required			NEPM 2013 - Table 1(B) 1-5 EILs
	Aged				NEPM 2013 - Table 1(B) 1-5 EILs
Polycyclic Aromatic Hydrocarbons (PAHs)					
Naphthalene	Fresh	10	170	370	NEPM 2013 - Table 1(B) 1-5 EILs
	Aged	10	170	370	NEPM 2013 - Table 1(B) 1-5 EILs
Organochlorine Pesticides					
Ecological Screening Levels (ESLs) and Management Limits					
F1 (C_6-C_{10})	Coarse				NEPM 2013 - Table 1(B) 6-7 EILs
	Fine	125*	180*	215*	NEPM 2013 - Table 1(B) 6-7 EILs
F1 (C_6-C_{10})	Coarse		700	700	NEPM 2013 - Table 1(B) 6-7 EILs
(Management Limits)	Fine	-	800	800	NEPM 2013 - Table 1(B) 6-7 EILs
F2 (>C_{10}-C_{16})	Coarse				NEPM 2013 - Table 1(B) 6-7 EILs
	Fine	25*	120*	170*	NEPM 2013 - Table 1(B) 6-7 EILs
F2 (>C_{10}-C_{16})	Coarse		1000	1000	NEPM 2013 - Table 1(B) 6-7 EILs
(Management Limits)	Fine	-	1000	1000	NEPM 2013 - Table 1(B) 6-7 EILs
F3 (>C_{16}-C_{34})	Coarse	-	300	1700	NEPM 2013 - Table 1(B) 6-7 EILs
	Fine	-	1300	2500	NEPM 2013 - Table 1(B) 6-7 EILs
F3 (>C_{16}-C_{34})	Coarse		2500	3500	NEPM 2013 - Table 1(B) 6-7 EILs
(Management Limits)	Fine	-	3500	5000	NEPM 2013 - Table 1(B) 6-7 EILs
F4 (>C_{34}-C_{40})	Coarse	-	2800	3300	NEPM 2013 - Table 1(B) 6-7 EILs
	Fine	-	5600	6600	NEPM 2013 - Table 1(B) 6-7 EILs
F4 (>C_{34}-C_{40})	Coarse		10000	10000	NEPM 2013 - Table 1(B) 6-7 EILs
(Management Limits)	Fine	-	10000	10000	NEPM 2013 - Table 1(B) 6-7 EILs
Benzene	Coarse	10	50	75	NEPM 2013 - Table 1(B) 6-7 EILs
	Fine	10	65	95	NEPM 2013 - Table 1(B) 6-7 EILs
Toluene	Coarse	10	85	135	NEPM 2013 - Table 1(B) 6-7 EILs
	Fine	65	105	135	NEPM 2013 - Table 1(B) 6-7 EILs
Ethylbenzene	Coarse	1.5	70	165	NEPM 2013 - Table 1(B) 6-7 EILs
	Fine	40	125	185	NEPM 2013 - Table 1(B) 6-7 EILs
Xylenes	Coarse	10	105	180	NEPM 2013 - Table 1(B) 6-7 EILs
	Fine	1.6	45	95	NEPM 2013 - Table 1(B) 6-7 EILs
Benzo(a)pyrene	Coarse	0.7	0.7	0.7	NEPM 2013 - Table 1(B) 6-7 EILs
	Fine	0.7	0.7	0.7	NEPM 2013 - Table 1(B) 6-7 EILs

Notes

1 Urban residential/public open space is broadly equivalent to the HIL-A, HIL-B and HIL-C land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.

2 Aged values are applicable to arsenic contamination present in soil for at least two years. For fresh contamination refer to Schedule B5c.

3 Insufficient data was available to calculate aged values for DDT and naphthalene, consequently the values for fresh contamination should be used.

4 Insufficient data was available to calculate ACLs for As, DDT and naphthalene. The EIL should be taken directly from Table 1B(5).

5 ESLs are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability.

6 '-' indicates that insufficient data was available to derive a value.

7 To obtain F1, subtract the sum of BTEX concentrations from C6-C10 fraction and subtract naphthalene from >C10-C16 to obtain F2.

8 Management limits are applied after consideration of relevant ESLs and HSLs

9 Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.

12.1.4 Asbestos

Table 20: Health Screening Levels for Asbestos

	Health Screening Levels (w/w)			
Form of Asbestos	**Residential A**	**Residential B**	**Recreational C**	**Commercial/Industrial D**
Bonded ACM	0.01%	0.04%	0.02%	**0.05%**
FA and AF (Friable Asbestos)	**0.001%**			
All forms of asbestos	**No visible asbestos for surface soil**			

12.1.5 Aesthetic Considerations

Schedule B1 in NEPC (2013) requires the consideration of aesthetic issues arising from soils and groundwater within the site. The following assessment criteria are to be adopted when considering aesthetics:

- no persistently malodourous soils or extracted groundwater.
- no persistent hydrocarbon sheen on surface water.
- no staining or discolouration in soils, taking into consideration the natural state of the soil; and
- no large or frequently occurring anthropogenic materials present (to the extent practicable).

13.0 SOIL RESULTS

The laboratory certificates are presented in **Appendix H** – NATA Accredited Laboratory Certificates.

A summary of the results together with the assessment criteria adopted are provided in **Appendix G** – Summary Tables.

13.1 HEAVY METALS

13.1.1 Heath Investigation Levels

As indicated in Table G1 all the heavy metals were below the respective LOR and/or the Health Investigation Levels (HIL D) for a commercial/industrial development.

13.1.2 Ecological Investigation Levels

The EILs for Copper, Zinc, Lead, Nickel and Chromium III were derived by adding the Ambient Background Concentration (ABC) to the Added Contaminant Limits (ACL), as per the following formula:

EIL = ABC + ACL

The ABC for the site has been determined by recovering a sample from an appropriate reference point, that being:

- BH1 (0.3-0.4m)

The soil samples collected from BH1 was analysed for pH, CEC & %CLAY to provide the background parameters for the soil on the site.

As shown in Tables G1 all of locations were below the site derived EILs for a commercial/industrial development.

13.2 TRH, BTEX, NAPHTHALENE &/OR BENZO (A) PYRENE

13.2.1 Heath Screening Levels & Management Limits

As indicated in Table G1, the F1 (C_6-C_{10}), F2 (>C_{10}-C_{16}), benzene, toluene, ethyl benzene, xylenes and naphthalene concentrations were below the HSL 'D' for a CLAY soil profile with a source depth of "0m to <1m".

As shown in Table G1, the F1 (C_6-C_{10}), F2 (>C_{10}-C_{16}), F3 (C_{16}-C_{34}), F4 (C_{34}-C_{40}), concentrations were below the Management Limits for fine-grained soil for a commercial/industrial development.

13.2.2 Ecological Screening Levels

As indicated in Table G1, the F1 (C_6-C_{10}), F2 (>C_{10}-C_{16}), F3 (C_{16}-C_{34}), F4 (C_{34}-C_{40}), benzene, toluene, ethyl benzene, xylenes and benzo(a)pyrene concentrations were below the ESL criteria for a fine-grained soil texture in a commercial/industrial development.

13.3 PAH, OCP, OPP & PCB

13.3.1 Heath Investigation Levels

As indicated in Table G1, the concentrations of the benzo(a)pyrene (as TEQ), PAH, OCP, OPP & PCB were below the Health Investigation Level (HIL D) and/or LOR for a commercial/industrial development.

13.3.2 EILs & ESLs

As indicated in Table G1, the concentrations of arsenic, naphthalene and DDT were below the adopted EILs & ESLs site criteria.

13.3.3 Asbestos

As shown in Table G1, no asbestos detected within the samples tested.

14.0 DISCUSSION

14.1 SOILS

The soil data revealed the following:

- The laboratory results for the soil samples analysed were below the adopted detection limits and/or relevant guideline criteria.
- No identified asbestos was detected in the soil samples analysed. No fibro cement fragments were observed in the fill material located within the test pits. The investigation is limited to the test pits.

14.2 DATA GAPS

The following data gaps were identified:

- The groundwater quality at the site has not been investigated and/or assessed regarding the contamination status.
- The soil surrounding the dam walls have not been accessed for site suitability.
- An existing service station is located 30m northeast of the site. This presents a potential vapour intrusion risk and therefore further investigation will be required.
- It is noted that one of the uses being considered is a childcare, a DSI will be required to adequately assess the contamination status of the site.

14.3 DUTY TO REPORT

Under Section 60 of the Contaminated Land Management Act 1997, the owner of the land is required to notify contamination in circumstances as indicated in the NSW EPA (2015) Guidelines on Duty to Report Contamination under the Contaminated Land Management Act 1997.

Sites that are significantly impacted by soil, groundwater and ground gases are likely to require notification to the NSW EPA under section 60 of the CLM Act. A decision process for use by site owners or responsible persons considering reporting contamination under section 60 is provided in Appendix 1 (Figure 1) of the aforementioned guidelines.

No notification to NSW EPA is recommended based on the sampling and investigation to date.

15.0 CONCLUSION AND RECOMMENDATION

Based on the results of this investigation to date it is considered that the risks to human health and the environment associated with contamination at the site are low to moderate in the context of the proposed use of the site. The site ***can be made suitable*** for the proposed development, subject to the following recommendations:

- Preparation of a Detailed Site Investigation (Phase 2 Environmental Site assessment) by a suitably qualified Environmental Consultant to address the data gaps identified once the planning proposal / rezoning has been approved and the proposed development plans have been finalised.
- Any soil requiring removal from the site, as part of future site works, should be classified in accordance with the "Waste Classification Guidelines, Part 1: Classifying Waste" NSW EPA (2014).

If during any potential site works any significant unexpected occurrence is identified, site works should cease in that area, at least temporarily, and the environmental consultant should be notified immediately to set up a response to this unexpected occurrence.

Thank you for the opportunity of undertaking this work. We would be pleased to provide further information on any aspects of this report.

16.0 LIMITATIONS

To the best of our knowledge information contained in this report is accurate at the date of issue, however, subsurface conditions, including groundwater levels and contaminant concentrations, can change in a limited time. This should be borne in mind if the report is used after a protracted delay.

There is always some disparity in subsurface conditions across a site that cannot be fully defined by investigation. Hence it is unlikely that measurements and values obtained from sampling and testing during environmental works carried out at a site will characterise the extremes of conditions that exist within the site.

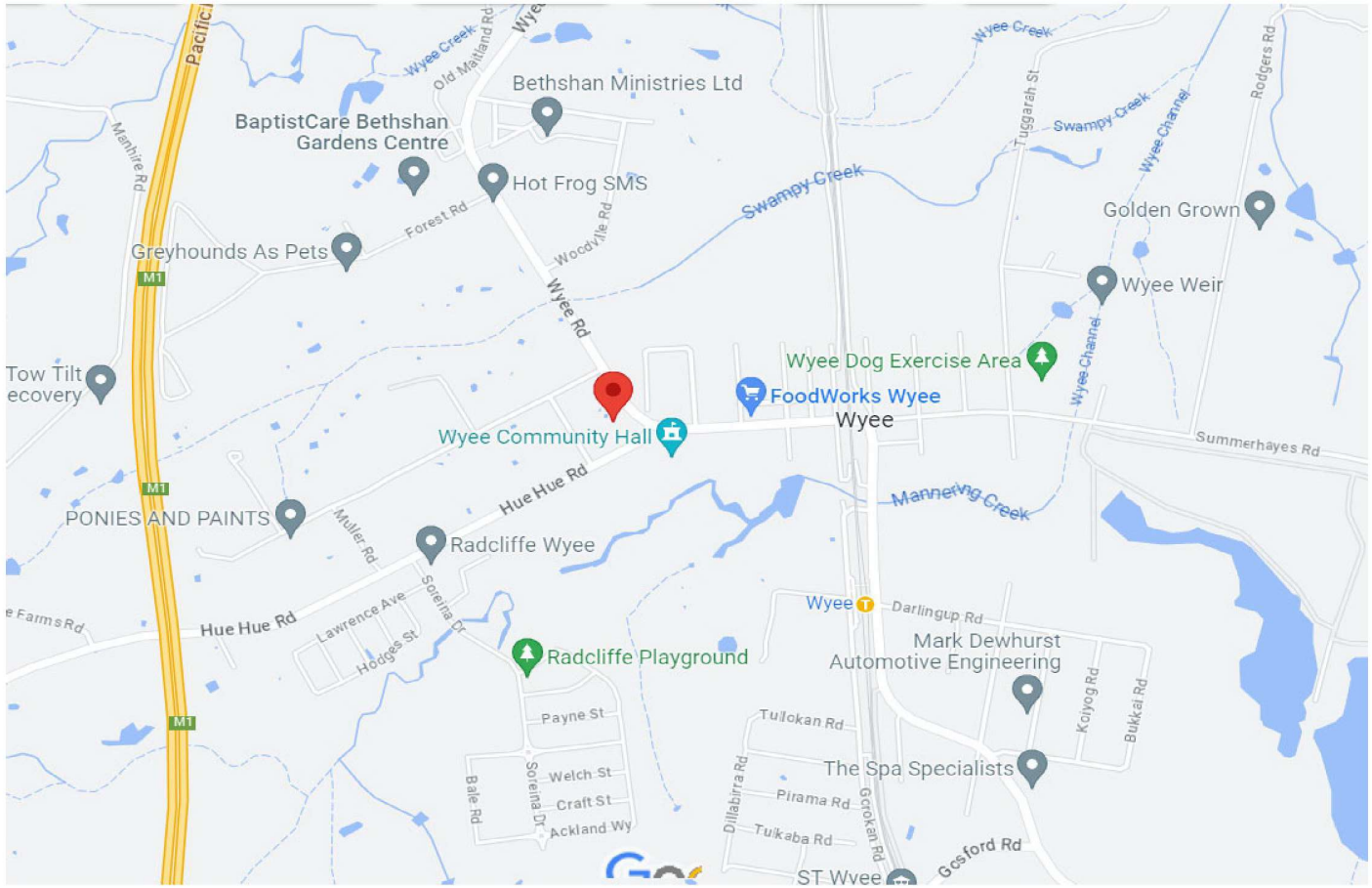
There is no investigation that is thorough enough to preclude the presence of material that presently or in the future, may be considered hazardous at the site. Since regulatory criteria are constantly changing, concentrations of contaminants presently considered low may, in the future, fall under different regulatory standards that require remediation.

Opinions expressed herein are judgements and are based on our understanding and interpretation of current regulatory standards and should not be construed as legal opinions.

REFERENCES

- ANZG Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2018).
- HEPA 2020, 'PFAS National Environmental Management Plan', Version 2, 2020.
- National Environmental Protection Council (NEPC) (1999) – *National Environmental Protection (Assessment of Site Contamination) Measure. Amendment 2013*
- NSW EPA (2014) "*Technical Note: Investigation of Service Station Sites*".
- NSW EPA (2009) "*Guidelines on Significant Risk of Harm from contaminated land and the duty to report*".
- NSW EPA "Consultants Reporting on Contaminated Land" (2020). NSW Environment Protection Authority, Parramatta, April 2020.
- NSW DEC, "Guidelines for the Assessment and Management of Groundwater Contamination" (March 2007).
- NSW DEC "Guidelines for the NSW Site Auditor Scheme" (2006, 2nd edition). NSW Environment Protection Authority, Sydney.
- NSW EPA (2014) – "Waste Classification Guidelines, Part 1: Classifying Waste".
- NSW EPA (2014) "Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997".
- NSW EPA "Sampling Design Guidelines – Part 1: Application" (2022). NSW Environment Protection Authority, Sydney.
- NSW EPA "Sampling Design Guidelines – Part 2: Interpretation" (2022). NSW Environment Protection Authority, Sydney.
- NSW Government, State Environmental Planning Policy (Resilience and Hazards) 2021.

FIGURE 1: SITE LOCALITY



Key Site Location	FOUNDATION EARTH SCIENCES	**DRAWN** RW	**SITE LOCALITY**
		FIGURE 1	Preliminary Site Investigation
		Job # E3124	106 Wyee road & 1496 Hue Hue Road, Wyee NSW

FIGURE 2: SITE FEATURES AND BOREHOLE LOCATION PLAN

Feature No	Details
a	Residential House
b	Storage Shed
c	Unsealed Driveway
d	Grassed Area
e	Former Dam

Key

Site Location

FES test pit Soil Location 2023

FOUNDATION EARTH SCIENCES

DRAWN RW	**Site Features and Borehole Location Plan**
Figure 2	Preliminary Site Investigation
Job # E3124	1496 Hue Hue Road & 106 Wyee Road, Wyee NSW

APPENDIX A: DBYD PLANS

Job No 35230517

Phone: 1100
www.byda.com.au

Caller Details

Contact:	reece wallace	**Caller Id:**	3311766	**Phone:**	0402 180 632
Company:	foundation earth sciences				
Address:	119/14 loyalty road north rocks NSW 2151	**Email:**	reece@foundationes.com.au		

Dig Site and Enquiry Details

WARNING: The map below only displays the location of the proposed dig site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

User Reference: 1496 Hue Hue Road
Working on Behalf of: Private

Enquiry Date:	Start Date:	End Date:
11/10/2023	12/10/2023	12/10/2023

Address:
1496 Hue Hue Road
Wyee NSW 2259

Job Purpose:	Onsite Activities:
Design	Planning & Design
Location of Workplace:	**Location in Road:**
Private	

- Check that the location of the dig site is correct. If not you must submit a new enquiry.
- Should the scope of works change, or plan validity dates expire, you must submit a new enquiry.
- Do NOT dig without plans. Safe excavation is your responsibility. If you do not understand the plans or how to proceed safely, please contact the relevant asset owners.

Notes/Description of Works:
Not supplied

Your Responsibilities and Duty of Care

- The lodgement of an enquiry does not authorise the project to commence. You must obtain all necessary information from any and all likely impacted asset owners prior to excavation.
- If plans are not received within 2 working days, contact the asset owners directly & quote their Sequence No.
- ALWAYS perform an onsite inspection for the presence of assets. Should you require an onsite location, contact the asset owners directly. Please remember, plans do not detail the exact location of assets.
- Pothole to establish the exact location of all underground assets using a hand shovel, before using heavy machinery.
- Ensure you adhere to any State legislative requirements regarding Duty of Care and safe digging requirements.
- If you damage an underground asset you MUST advise the asset owner immediately.
- By using this service, you agree to Privacy Policy and the terms and disclaimers set out at **www.byda.com.au**
- **For more information on safe excavation practices, visit www.byda.com.au**

Asset Owner Details

The assets owners listed below have been requested to contact you with information about their asset locations within 2 working days.
Additional time should be allowed for information issued by post. It is **your responsibility** to identify the presence of any underground assets in and around your proposed dig site. Please be aware, that not all asset owners are registered with the Before You Dig service, so it is **your responsibility** to identify and contact any asset owners not listed here directly.
** Asset owners highlighted by asterisks ** require that you visit their offices to collect plans.
# Asset owners highlighted with a hash # require that you call them to discuss your enquiry or to obtain plans.

Seq. No.	Authority Name	Phone	Status
230712274	Ausgrid	(02) 4951 0899	NOTIFIED
230712277	Hunter Water Corporation	1300 657 657	NOTIFIED
230712276	Jemena Gas North	1300 880 906	NOTIFIED
230712272	NBN Co NswAct	1800 687 626	NOTIFIED
230712273	Nextgen NCC - NSW	1800 262 663	NOTIFIED
230712278	Telstra NSW Central	1800 653 935	NOTIFIED
230712275	Vocus Communications 2	1800 262 663	NOTIFIED

END OF UTILITIES LIST

APPENDIX B: HISTORICAL AERIAL PHOTOGRAPHS

Historical Aerial Photographs

106 Wyee Road & 1496 Hue Hue Road, Wyee NSW

1966:

1975:

1984:

2006:

Current (Six Maps):

APPENDIX C: LAND TITLE INFORMATION

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APPENDIX D: NSW EPA RECORDS

+ POEO Public Register

– Contaminated land record of notices

About the record of notices

List of notified sites

Tips for searching

Disclaimer

Dangerous goods licences

Pesticide licences

Radiation licences

Search results

Your search for: Suburb: WYEE

Search Again Refine Search

did not find any records in our database.

Search TIP

To search for a specific site, search by LGA (local government area) and carefully review all sites listed.

... more search tips

If a site does not appear on the record it may still be affected by contamination. For example:

- Contamination may be present but the site has not been regulated by the EPA under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.
- The EPA may be regulating contamination at the site through a licence or notice under the Protection of the Environment Operations Act 1997 (POEO Act).
- Contamination at the site may be being managed under the planning process.

More information about particular sites may be available from:

- The POEO public register
- The appropriate planning authority: for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act.

See What's in the record and What's not in the record.

If you want to know whether a specific site has been the subject of notices issued by the EPA under the CLM Act, we suggest that you search by Local Government Area only and carefully review the sites that are listed.
This public record provides information about sites regulated by the EPA under the Contaminated Land Management Act 1997, including sites currently and previously regulated under the Environmentally Hazardous Chemicals Act 1985. Your inquiry using the above search criteria has not matched any record of current or former regulation. You should consider searching again using different criteria. The fact that a site does not appear on the record does not necessarily mean that it is not affected by contamination. The site may have been notified to the EPA but not yet assessed, or contamination may be present but the site is not yet being regulated by the EPA. Further information about particular sites may be available from the appropriate planning authority, for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act. In addition the EPA may be regulating contamination at the site through a licence under the Protection of the Environment Operations Act 1997. You may wish to search the POEO public register.POEO public register

11 October 2023

Suburb	SiteName	Address	ContaminationActivityType	ManagementClass	Latitude	Longitude
WOONGARRAH	Former Warnervale Landfill	236-264 Hakone ROAD	Landfill	Regulation under CLM Act not required	-33.2376313	151.464362
WOOTTON	Former Chemical Spill Site	11859 Pacific HIGHWAY	Chemical Industry	Regulation under CLM Act not required	-32.28168548	152.3117819
WOY WOY	Service Station and adjacent land	177-181 Blackwall ROAD	Service Station	regulated under the CLM Act	-33.49257884	151.3273559
WOY WOY	Barry Robertson Holden	231 Blackwall ROAD	Service Station	Regulation under CLM Act not required	-33.49621068	151.3285128
WOY WOY	Bogas Service Station	66 Memorial AVENUE	Service Station	Contamination currently regulated under CLM Act	-33.5069738	151.3315579
WOY WOY	Rogers Park	Dunban ROAD	Landfill	Regulation under CLM Act not required	-33.50009693	151.3181347
WOY WOY	Austin Butler Memorial Oval	Blackwall ROAD	Landfill	Regulation under CLM Act not required	-33.48672201	151.3283032
WOY WOY	James Browne Oval	Welcome STREET	Landfill	Regulation under CLM Act not required	-33.49720596	151.3242986
WOY WOY	7-Eleven Service Station	Corner Rawson and Ocean Beach ROADS	Service Station	Regulation under CLM Act not required	-33.49379351	151.3201639
WYALONG	Caltex Service Station	50 Neeld (Newell Highway) STREET	Service Station	Regulation under CLM Act not required	-33.92665025	147.2446546
WYOMING	Caltex Service Station Wyoming	465 Pacific HIGHWAY	Service Station	Regulation under CLM Act not required	-33.40945391	151.3499812
WYONG	Wyong Bayer/Kemcon	16 Lucca ROAD	Chemical Industry	Contamination currently regulated under POEO Act	-33.26192339	151.4429446
WYONG	Caltex Service Station	M1 Pacific (Northbound) MOTORWAY	Service Station	Regulation under CLM Act not required	-33.25641477	151.4024821
WYONG	Caltex Service Station	M1 Pacific (Southbound) MOTORWAY	Service Station	Regulation under CLM Act not required	-33.25330747	151.4053862

The NSW Government PFAS Investigation Program

View a map of the sites in NSW that may be contaminated with PFAS, learn how to reduce your exposure to these dangerous chemicals, and read about our investigation of the issue.

The EPA is leading an investigation program to assess the legacy of PFAS use across NSW. With the assistance of the NSW PFAS Technical Advisory Group, which includes NSW Health, Department of Primary Industries and the Office of Environment and Heritage, we provide impacted residents with tailored, precautionary dietary advice to help them reduce any exposure to PFAS.

Current investigations are focused on sites where it is likely that large quantities of PFAS have been used. The EPA is currently investigating PFAS at these sites:

Map view | List view

Clear filters

☐ Only show sites within current map view

Showing 0 of 50 sites

Organisation	Address	Status
filter by organisation	Wyee	☑ PFAS investigation site

Tags: PFAS

Search results

Your search for: **POEO Licences** with the following criteria

Suburb - Wyee

returned 2 results

Export to excel 1 of 1 Pages Search Again

Number	Name	Location	Type	Status	Issued date
11470	DULUXGROUP (AUSTRALIA) PTY LTD	34 WYEE ROAD, WYEE, NSW 2259	POEO licence	Issued	02 Jul 2002
1502	FLYASH AUSTRALIA PTY LIMITED	GOROKAN ROAD, WYEE, NSW 2259	POEO licence	Surrendered	01 Nov 2000

11 October 2023

APPENDIX E: SITE PHOTPGRAPHS

SITE PHOTOGRAPHS

Client:	High Line Projects Pty Ltd
Project:	PSI
Site Location:	106 Wyee Road & 1496 Hue Hue Road, Wyee NSW
Job No.:	E3124

FOUNDATION EARTH SCIENCES

Photo 1

View of the site near BH1
looking north west
Inspected 12.10.2023

Photo 2

View of the site near BH3
looking north west
Inspected 12.10.2023

Photo 3

Looking west near BH2
Inspected 12.10.2023

Photo 4

Looking east near BH6
Inspected 12.10.2023

APPENDIX F: BOREHOLE LOGS

FOUNDATION EARTH SCIENCES

BOREHOLE : BH1

CLIENT NAME: High Line Projects Pty Ltd **JOB NUMBER:** E3124

SITE ADDRESS: 106 Wyee Road & 1496 Hue Hue Road, Wyee NSW **PROJECT:** PSI

Date Started : 13/10/2023 **Completed :** 13/10/2023 **Logged By :** RW **Checked By :** MS

Borehole Location : Refer to Site Plan **Surface RL :** --- **Datum :** m AHD

Equipment : 5 Tonne Excavator **Borehole Size :** 2m x 0.5m **Slope :** -90°

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Moisture	Consistence	Samples Tests Remarks	Additional Observations	Depth (m)
E	Not encountered		0.5			TOPSOIL, Silty Clay, low plasticity, yellow/brown, with vegetable matter	M	S	0.3-0.4	- No HC smell, No Staining or No fibro fragments observed	0.5
			0.50		CH	Silty CLAY, medium to high plasticity, white/red/yellow, with some rocks	M	St-Vst	-	Residual Soil	
			1.0								1.0
			1.5								1.5
			2.0								2.0
			2.5								2.5
			2.80		CH	Silty CLAY, medium to high plasticity, white/red/yellow, with ironstone bands	M	St-Vst			
			3.0								3.0
			3.00			Borehole BH1 terminated at 3.00m					
			3.5								3.5
			4.0								4.0

Comments:

D - Dry, M - Moist, W - Wet

VS - Very Soft, S - Soft, F - Firm, St - Stiff, VSt - Very Stiff, H - Hard

VL - Very Loose, L - Loose, MD - Medium Dense, D - Dense, VD - Very Dense

FOUNDATION EARTH SCIENCES

BOREHOLE : BH2

CLIENT NAME: High Line Projects Pty Ltd **JOB NUMBER:** E3124

SITE ADDRESS: 106 Wyee Road & 1496 Hue Hue Road, Wyee NSW **PROJECT:** PSI

Date Started : 13/10/2023 **Completed :** 13/10/2023 **Logged By :** RW **Checked By :** MS

Borehole Location : Refer to Site Plan **Surface RL :** --- **Datum :** m AHD

Equipment : 5 Tonne Excavator **Borehole Size :** 2m x 0.5m **Slope :** -90°

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Moisture	Consistence	Samples Tests Remarks	Additional Observations	Depth (m)
E	Not encountered		0.40			TOPSOIL, Silty Clay, low plasticity, yellow/brown, with vegetable matter and rocks	M	S	0.2-0.3	- No HC smell, No Staining or No fibro fragments observed	0.5
			1.30		CH	Silty CLAY, medium plasticity, white/orange	M	St	-	Residual Soil	1.0
			2.80		CH	Silty CLAY, medium to high plasticity, white/red/yellow, with some rocks	M	St-Vst		Residual Soil	1.5
			3.00		CH	Silty CLAY, medium to high plasticity, white/red/yellow, with ironstone bands	M	St-Vst		Residual Soil	2.0
						Borehole BH2 terminated at 3.00m					2.5
											3.0
											3.5
											4.0

Comments:

D - Dry, M - Moist, W - Wet

VS - Very Soft, S - Soft, F - Firm, St - Stiff, VSt - Very Stiff, H - Hard

VL - Very Loose, L - Loose, MD - Medium Dense, D - Dense, VD - Very Dense

FOUNDATION EARTH SCIENCES

BOREHOLE : BH3

CLIENT NAME: High Line Projects Pty Ltd **JOB NUMBER:** E3124

SITE ADDRESS: 106 Wyee Road & 1496 Hue Hue Road, Wyee NSW **PROJECT:** PSI

Date Started : 13/10/2023 **Completed :** 13/10/2023 **Logged By :** RW **Checked By :** MS

Borehole Location : Refer to Site Plan **Surface RL :** --- **Datum :** m AHD

Equipment : 5 Tonne Excavator **Borehole Size :** 2m x 0.5m **Slope :** -90°

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Moisture	Consistence	Samples Tests Remarks	Additional Observations	Depth (m)
						FILL, Silty Clay, low plasticity, light brown, with sand	M	S		-	
									0.1-0.2, D1/SS1	No HC smell, No Staining or No fibro fragments observed	
			0.20			FILL: Silty CLAY, low to medium plasticity, dark grey, with some rocks	M	S-F		-	
			0.5								0.5
			0.70		CH	Silty CLAY, high plasticity, orange/white	M	St-Vst		Residual Soil	
			1.0								1.0
E	Not encountered		1.5						-		1.5
			2.0								2.0
			2.40		CH	Silty CLAY, high plasticity, orange/white, with ironstone bands	M	St-Vst		Residual Soil	
			2.5								2.5
			3.0								3.0
			3.00			Borehole BH3 terminated at 3.00m					
			3.5								3.5
			4.0								4.0

Comments:

D - Dry, M - Moist, W - Wet

VS - Very Soft, S - Soft, F - Firm, St - Stiff, VSt - Very Stiff, H - Hard

VL - Very Loose, L - Loose, MD - Medium Dense, D - Dense, VD - Very Dense

FOUNDATION EARTH SCIENCES

BOREHOLE : BH4

CLIENT NAME: High Line Projects Pty Ltd **JOB NUMBER:** E3124

SITE ADDRESS: 106 Wyee Road & 1496 Hue Hue Road, Wyee NSW **PROJECT:** PSI

Date Started : 13/10/2023 **Completed :** 13/10/2023 **Logged By :** RW **Checked By :** MS

Borehole Location : Refer to Site Plan **Surface RL :** --- **Datum :** m AHD

Equipment : 5 Tonne Excavator **Borehole Size :** 2m x 0.5m **Slope :** -90°

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Moisture	Consistence	Samples Tests Remarks	Additional Observations	Depth (m)
E	Not encountered					FILL, Silty Clay, low plasticity, light brown, with sand	M	S		-	
			0.30 0.5			FILL: Silty CLAY, low to medium plasticity, dark grey, with some rocks	M	S-F	0.3-0.4	- No HC smell, No Staining or No fibro fragments observed	0.5
			0.70 1.0		CH	Silty CLAY, high plasticity, orange/white	M	St-Vst	-	Residual Soil	1.0
			1.5								1.5
			2.0								2.0
			2.5								2.5
			2.50 3.0		CH	Silty CLAY, high plasticity, orange/white, with ironstone bands	M	St-Vst		Residual Soil	3.0
			3.00 3.5			Borehole BH4 terminated at 3.00m					3.5
			4.0								4.0

Comments:

D - Dry, M - Moist, W - Wet

VS - Very Soft, S - Soft, F - Firm, St - Stiff, VSt - Very Stiff, H - Hard

VL - Very Loose, L - Loose, MD - Medium Dense, D - Dense, VD - Very Dense

FOUNDATION EARTH SCIENCES

BOREHOLE : BH5

CLIENT NAME: High Line Projects Pty Ltd **JOB NUMBER:** E3124

SITE ADDRESS: 106 Wyee Road & 1496 Hue Hue Road, Wyee NSW **PROJECT:** PSI

Date Started : 13/10/2023 **Completed :** 13/10/2023 **Logged By :** RW **Checked By :** MS

Borehole Location : Refer to Site Plan **Surface RL :** --- **Datum :** m AHD

Equipment : 5 Tonne Excavator **Borehole Size :** 2m x 0.5m **Slope :** -90°

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Moisture	Consistence	Samples Tests Remarks	Additional Observations	Depth (m)
E	Not encountered		0.00			TOPSOIL, Silty Clay, low plasticity, light brown, with sand	M	S		-	0.0
									0.2-0.3	No HC smell, No Staining or No fibro fragments observed	
			0.5								0.5
			0.50		CH	Silty CLAY, medium to high plasticity, orange/white	M	St-Vst		Residual Soil	
			1.0								1.0
			1.5								1.5
			1.50		CH	Silty CLAY, high plasticity, orange/white, with ironstone bands	M	St-Vst	-	Residual Soil	
			2.0								2.0
			2.5								2.5
			3.0								3.0
			3.00			Borehole BH5 terminated at 3.00m					
			3.5								3.5
			4.0								4.0

Comments:

D - Dry, M - Moist, W - Wet

VS - Very Soft, S - Soft, F - Firm, St - Stiff, VSt - Very Stiff, H - Hard

VL - Very Loose, L - Loose, MD - Medium Dense, D - Dense, VD - Very Dense

FOUNDATION EARTH SCIENCES

BOREHOLE : BH6

CLIENT NAME: High Line Projects Pty Ltd **JOB NUMBER:** E3124

SITE ADDRESS: 106 Wyee Road & 1496 Hue Hue Road, Wyee NSW **PROJECT:** PSI

Date Started : 13/10/2023 **Completed :** 13/10/2023 **Logged By :** RW **Checked By :** MS

Borehole Location : Refer to Site Plan **Surface RL :** --- **Datum :** m AHD

Equipment : 5 Tonne Excavator **Borehole Size :** 2m x 0.5m **Slope :** -90°

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Moisture	Consistence	Samples Tests Remarks	Additional Observations	Depth (m)
E	Not encountered		0.5			TOPSOIL, Silty Clay, low plasticity, light brown, with sand	M	S	0.2-0.3	- No HC smell, No Staining or No fibro fragments observed	0.5
			0.60 1.0		CH	Silty CLAY, medium to high plasticity, orange/white	M	St-Vst		Residual Soil	1.0
			1.30 1.5 2.0 2.5 3.0		CH	Silty CLAY, high plasticity, orange/white, with ironstone bands	M	St-Vst	-	Residual Soil	1.5 2.0 2.5 3.0
			3.00 3.5 4.0			Borehole BH6 terminated at 3.00m					3.5 4.0

Comments:

D - Dry, M - Moist, W - Wet

VS - Very Soft, S - Soft, F - Firm, St - Stiff, VSt - Very Stiff, H - Hard

VL - Very Loose, L - Loose, MD - Medium Dense, D - Dense, VD - Very Dense

APPENDIX G: SUMMARY TABLES

Table G1

Sample Information				Heavy Metals (mg/kg)								TRH (mg/kg)						BTEX (mg/kg)					PAH (mg/kg)				OCP (mg/kg)											OPP (mg/kg)			
Label	Depth (m BGL)	Date	Soil Type	ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	NICKEL	ZINC	F1 (C_6-C_{10}) [2]	F2 (>C_{10}-C_{16}) [3]	F1 (C_6-C_{10})	F2 (>C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (C_{34}-C_{40})	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES	NAPHTHALENE	BENZO(A)PYRENE	CARINOGENIC PAHs (as Bap TEQ)	TOTAL PAH	NAPHTHALENE	DDT + DDD + DDE	ALDRIN + DIELDRIN	CHLORDANE	ENDOSULFAN	ENDRIN	HEPTACHLOR	HCB	METHOXYCHLOR	DDT	CHLORPYRIFOS	OTHER OPP	TOTAL PCB	Asbestos ID
FES PSI 2023																																								
BH1	0.3-0.4	12.10.2023	Silty Clay	<4	<0.4	5	<1	2	<0.1	<1	1	<25	<25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
BH1 Triplicate	0.3-0.4	12.10.2023	Silty Clay	8	<0.4	19	<1	6	<0.1	<1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2	0.2-0.3	12.10.2023	Silty Clay	<4	<0.4	3	<1	3	<0.1	<1	5	<25	<25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	ND
BH3	0.1-0.2	12.10.2023	Silty Clay	<4	<0.4	3	2	11	<0.1	1	28	<25	<25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	0.72	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
BH4	0.3-0.4	12.10.2023	Silty Clay	<4	<0.4	1	<1	1	<0.1	<1	<1	<25	<25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	ND
BH5	0.2-0.3	12.10.2023	Silty Clay	<4	<0.4	2	<1	2	<0.1	<1	<1	<25	<25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	ND
BH6	0.2-0.3	12.10.2023	Silty Clay	<4	<0.4	1	<1	1	<0.1	<1	<1	<25	<25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
D1	-	12.10.2023	Silty Clay	<4	<0.4	3	1	10	<0.1	<1	18	<25	<25	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
SS1	-	12.10.2023	Silty Clay	<1	<0.3	2.1	1.6	9	<0.05	0.5	19	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.2	<1.7	<1	-
Limit of Resolution (LOR)				4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			0.1	0.1
NEPM (2013) HIL D				**3000**	**900**	**3,600**	**240,000**	**1,500**	**730**	**6,000**	**400,000**													**40**	**4000**		**3600**	**45**	**530**	**2000**	**100**	**50**	**80**	**2500**		**2000**		**7**	
NEPM (2013) EIL & ESLs [1]				160																		370											640					
BH1 (0.3-0.4m)						670	140	1800		55	360																												
NEPM (2013) ESLs - (Coarse Grain Soil - Clay / Silt) [1]												215	170			2,500	6,600	95	135	185	95		1.4															
NEPM (2013) HSL D (CLAY)																																						
0m to <1m												310	NL					4	NL	NL	NL	NL																
Soil Saturation Concentration (Csat)												850	560					430	630	68	330	10																
NEPM (2013) Management Limit (Fine Grain Soil)														700	1,000	3,500	10,000																				
NEPM (2013) HSL - Asbestos																																						Detected

Notes

1 Commerical and industrial is broadly equivalent to the HIL-D land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.
2 To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.
3 To obtain F2 subtract naphthalene from the >C_{10}-C_{16} fraction.
NL Calculated HSL is Non Limiting per NEPM (2013)
ND Not detected

APPENDIX H: NATA ACCREDITED LABORATORY RESULTS

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
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www.envirolab.com.au

CERTIFICATE OF ANALYSIS 335236

Client Details

Client	Foundation Earth Sciences Pty Ltd
Attention	Ben Buckley, Michael Silk
Address	PO Box 4405, East Gosford, NSW, 2250

Sample Details

Your Reference	**E3124, Wyee**
Number of Samples	9 Soil
Date samples received	13/10/2023
Date completed instructions received	12/10/2023

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	20/10/2023
Date of Issue	20/10/2023

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Lucy Zhu
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Diego Bigolin, Inorganics Supervisor
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Liam Timmins, Organics Supervisor
Nick Sarlamis, Assistant Operation Manager
Nyovan Moonean, Asbestos Approved Identifier/Counter
Steven Luong, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		335236-1	335236-2	335236-3	335236-4	335236-5
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		0.3-0.4	0.2-0.3	0.1-0.2	0.3-0.4	0.2-0.3
Date Sampled		12/10/2023	12/10/2023	12/10/2023	12/10/2023	12/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/10/2023	16/10/2023	16/10/2023	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023	17/10/2023	17/10/2023	17/10/2023
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	102	101	105	107	107

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		335236-6	335236-7	335236-8	335236-9
Your Reference	UNITS	BH6	D1	TS1	TB1
Date Sampled		0.2-0.3	-	-	-
Date Sampled		12/10/2023	12/10/2023	12/10/2023	12/10/2023
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	16/10/2023	16/10/2023	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023	17/10/2023	17/10/2023
TRH C_6 - C_9	mg/kg	<25	<25	[NA]	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	[NA]	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	[NA]	<25
Benzene	mg/kg	<0.2	<0.2	94%	<0.2
Toluene	mg/kg	<0.5	<0.5	94%	<0.5
Ethylbenzene	mg/kg	<1	<1	94%	<1
m+p-xylene	mg/kg	<2	<2	93%	<2
o-Xylene	mg/kg	<1	<1	93%	<1
Naphthalene	mg/kg	<1	<1	[NA]	<1
Total +ve Xylenes	mg/kg	<1	<1	[NA]	<1
Surrogate aaa-Trifluorotoluene	%	98	94	96	104

svTRH (C10-C40) in Soil						
Our Reference		335236-1	335236-2	335236-3	335236-4	335236-5
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		0.3-0.4	0.2-0.3	0.1-0.2	0.3-0.4	0.2-0.3
Date Sampled		12/10/2023	12/10/2023	12/10/2023	12/10/2023	12/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/10/2023	16/10/2023	16/10/2023	16/10/2023	16/10/2023
Date analysed	-	19/10/2023	19/10/2023	19/10/2023	19/10/2023	19/10/2023
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	%	79	81	84	82	81

svTRH (C10-C40) in Soil			
Our Reference		335236-6	335236-7
Your Reference	UNITS	BH6	D1
Date Sampled		0.2-0.3	-
Date Sampled		12/10/2023	12/10/2023
Type of sample		Soil	Soil
Date extracted	-	16/10/2023	16/10/2023
Date analysed	-	19/10/2023	19/10/2023
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	%	80	82

PAHs in Soil						
Our Reference		335236-1	335236-2	335236-3	335236-4	335236-5
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		0.3-0.4	0.2-0.3	0.1-0.2	0.3-0.4	0.2-0.3
Date Sampled		12/10/2023	12/10/2023	12/10/2023	12/10/2023	12/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/10/2023	16/10/2023	16/10/2023	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023	17/10/2023	17/10/2023	17/10/2023
Naphthalene	mg/kg	<0.1	<0.1	0.7	<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	0.72	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	94	96	97	97	94

PAHs in Soil			
Our Reference		335236-6	335236-7
Your Reference	UNITS	BH6	D1
Date Sampled		0.2-0.3	-
Date Sampled		12/10/2023	12/10/2023
Type of sample		Soil	Soil
Date extracted	-	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023
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	%	97	98

Organochlorine Pesticides in soil						
Our Reference		335236-1	335236-2	335236-3	335236-4	335236-5
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		0.3-0.4	0.2-0.3	0.1-0.2	0.3-0.4	0.2-0.3
Date Sampled		12/10/2023	12/10/2023	12/10/2023	12/10/2023	12/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/10/2023	16/10/2023	16/10/2023	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023	17/10/2023	17/10/2023	17/10/2023
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
Mirex	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	%	93	95	96	96	93

Organochlorine Pesticides in soil			
Our Reference		335236-6	335236-7
Your Reference	UNITS	BH6	D1
Date Sampled		0.2-0.3	-
Date Sampled		12/10/2023	12/10/2023
Type of sample		Soil	Soil
Date extracted	-	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023
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
Mirex	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	96	94

Organophosphorus Pesticides in Soil					
Our Reference		335236-1	335236-3	335236-6	335236-7
Your Reference	UNITS	BH1	BH3	BH6	D1
Date Sampled		0.3-0.4	0.1-0.2	0.2-0.3	-
Date Sampled		12/10/2023	12/10/2023	12/10/2023	12/10/2023
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	16/10/2023	16/10/2023	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023	17/10/2023	17/10/2023
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Mevinphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Phorate	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
Disulfoton	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion-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
Fenthion	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
Methidathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenamiphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Phosalone	mg/kg	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Coumaphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	93	96	96	94

PCBs in Soil						
Our Reference		335236-1	335236-2	335236-3	335236-4	335236-5
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		0.3-0.4	0.2-0.3	0.1-0.2	0.3-0.4	0.2-0.3
Date Sampled		12/10/2023	12/10/2023	12/10/2023	12/10/2023	12/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/10/2023	16/10/2023	16/10/2023	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023	17/10/2023	17/10/2023	17/10/2023
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	%	93	95	96	96	93

PCBs in Soil			
Our Reference		335236-6	335236-7
Your Reference	UNITS	BH6	D1
Date Sampled		0.2-0.3	-
Date Sampled		12/10/2023	12/10/2023
Type of sample		Soil	Soil
Date extracted	-	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023
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	%	96	94

Acid Extractable metals in soil						
Our Reference		335236-1	335236-2	335236-3	335236-4	335236-5
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		0.3-0.4	0.2-0.3	0.1-0.2	0.3-0.4	0.2-0.3
Date Sampled		12/10/2023	12/10/2023	12/10/2023	12/10/2023	12/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	16/10/2023	16/10/2023	16/10/2023	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023	17/10/2023	17/10/2023	17/10/2023
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	5	3	3	1	2
Copper	mg/kg	<1	<1	2	<1	<1
Lead	mg/kg	2	3	11	1	2
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	<1	1	<1	<1
Zinc	mg/kg	1	5	28	<1	<1

Acid Extractable metals in soil				
Our Reference		335236-6	335236-7	335236-10
Your Reference	UNITS	BH6	D1	BH1 - [TRIPLICATE]
Date Sampled		0.2-0.3	-	0.3-0.4
Date Sampled		12/10/2023	12/10/2023	12/10/2023
Type of sample		Soil	Soil	Soil
Date prepared	-	16/10/2023	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023	17/10/2023
Arsenic	mg/kg	<4	<4	8
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	1	3	19
Copper	mg/kg	<1	1	<1
Lead	mg/kg	1	10	6
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	<1	<1
Zinc	mg/kg	<1	18	2

Moisture						
Our Reference		335236-1	335236-2	335236-3	335236-4	335236-5
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		0.3-0.4	0.2-0.3	0.1-0.2	0.3-0.4	0.2-0.3
Date Sampled		12/10/2023	12/10/2023	12/10/2023	12/10/2023	12/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	16/10/2023	16/10/2023	16/10/2023	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023	17/10/2023	17/10/2023	17/10/2023
Moisture	%	7.7	5.2	6.4	7.7	9.1

Moisture			
Our Reference		335236-6	335236-7
Your Reference	UNITS	BH6	D1
Date Sampled		0.2-0.3	-
Date Sampled		12/10/2023	12/10/2023
Type of sample		Soil	Soil
Date prepared	-	16/10/2023	16/10/2023
Date analysed	-	17/10/2023	17/10/2023
Moisture	%	8.0	12

Asbestos ID - soils						
Our Reference		335236-1	335236-2	335236-3	335236-4	335236-5
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Date Sampled		0.3-0.4	0.2-0.3	0.1-0.2	0.3-0.4	0.2-0.3
Date Sampled		12/10/2023	12/10/2023	12/10/2023	12/10/2023	12/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	20/10/2023	20/10/2023	20/10/2023	20/10/2023	20/10/2023
Sample mass tested	g	Approx. 65g	Approx. 60g	Approx. 25g	Approx. 35g	Approx. 35g
Sample Description	-	Brown coarse-grained soil & rocks	Brown sandy soil & rock	Brown sandy soil & rock	Grey sandy soil & rock	Grey sandy soil & rock
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils		
Our Reference		335236-6
Your Reference	UNITS	BH6
Date Sampled		0.2-0.3
Date Sampled		12/10/2023
Type of sample		Soil
Date analysed	-	20/10/2023
Sample mass tested	g	Approx. 35g
Sample Description	-	Grey sandy soil & rock
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected

CEC		
Our Reference		335236-1
Your Reference	UNITS	BH1
Date Sampled		0.3-0.4
Date Sampled		12/10/2023
Type of sample		Soil
Date prepared	-	19/10/2023
Date analysed	-	19/10/2023
Exchangeable Ca	meq/100g	1.2
Exchangeable K	meq/100g	<0.1
Exchangeable Mg	meq/100g	0.2
Exchangeable Na	meq/100g	<0.1
Cation Exchange Capacity	meq/100g	1.5

Clay 50-120g		
Our Reference		335236-1
Your Reference	UNITS	BH1
Date Sampled		0.3-0.4
Date Sampled		12/10/2023
Type of sample		Soil
Date prepared	-	17/10/2023
Date analysed	-	18/10/2023
Clay in soils <2µm	% (w/w)	11

Misc Inorg - Soil		
Our Reference		335236-1
Your Reference	UNITS	BH1
Date Sampled		0.3-0.4
Date Sampled		12/10/2023
Type of sample		Soil
Date prepared	-	17/10/2023
Date analysed	-	17/10/2023
pH 1:5 soil:water	pH Units	6.5

Method ID	Methodology Summary
AS1289.3.6.3	Particle Size Distribution using in house method INORG-107 by way of sieving and/or hydrometer sedimentation testing. Clay fraction at <2µm reported.
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.
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.
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-OES analytical finish.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
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-022/025	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.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			16/10/2023	1	16/10/2023	16/10/2023		16/10/2023	[NT]
Date analysed	-			17/10/2023	1	17/10/2023	17/10/2023		17/10/2023	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	128	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	128	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	123	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	125	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	122	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	134	[NT]
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	132	[NT]
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	105	1	102	89	14	107	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			16/10/2023	1	16/10/2023	16/10/2023		16/10/2023	[NT]
Date analysed	-			19/10/2023	1	19/10/2023	19/10/2023		19/10/2023	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	111	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	101	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	114	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	111	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	101	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	114	[NT]
Surrogate o-Terphenyl	%		Org-020	83	1	79	79	0	89	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			16/10/2023	1	16/10/2023	16/10/2023		16/10/2023	[NT]
Date analysed	-			17/10/2023	1	17/10/2023	17/10/2023		17/10/2023	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	83	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	96	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	98	1	94	96	2	88	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			16/10/2023	1	16/10/2023	16/10/2023		16/10/2023	[NT]
Date analysed	-			17/10/2023	1	17/10/2023	17/10/2023		17/10/2023	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	75	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	73	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	80	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	88	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Mirex	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	96	1	93	95	2	92	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			16/10/2023	1	16/10/2023	16/10/2023		16/10/2023	[NT]
Date analysed	-			17/10/2023	1	17/10/2023	17/10/2023		17/10/2023	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	[NT]
Mevinphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Phorate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Disulfoton	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Parathion-Methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	[NT]
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	89	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	[NT]
Fenthion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	91	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Methidathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fenamiphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	[NT]
Phosalone	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Coumaphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	96	1	93	95	2	92	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			16/10/2023	1	16/10/2023	16/10/2023		16/10/2023	[NT]
Date analysed	-			17/10/2023	1	17/10/2023	17/10/2023		17/10/2023	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	102	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	96	1	93	95	2	92	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date prepared	-			16/10/2023	1	16/10/2023	16/10/2023		16/10/2023	[NT]
Date analysed	-			17/10/2023	1	17/10/2023	17/10/2023		17/10/2023	[NT]
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	108	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	101	[NT]
Chromium	mg/kg	1	Metals-020	<1	1	5	13	89	110	[NT]
Copper	mg/kg	1	Metals-020	<1	1	<1	<1	0	109	[NT]
Lead	mg/kg	1	Metals-020	<1	1	2	4	67	122	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	110	[NT]
Nickel	mg/kg	1	Metals-020	<1	1	<1	<1	0	101	[NT]
Zinc	mg/kg	1	Metals-020	<1	1	1	1	0	102	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			19/10/2023	[NT]	[NT]	[NT]	[NT]	19/10/2023	[NT]
Date analysed	-			19/10/2023	[NT]	[NT]	[NT]	[NT]	19/10/2023	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date prepared	-			17/10/2023	[NT]	[NT]	[NT]	[NT]	17/10/2023	[NT]
Date analysed	-			17/10/2023	[NT]	[NT]	[NT]	[NT]	17/10/2023	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 335236-1 for Cr. Therefore a triplicate result has been issued as laboratory sample number 335236-10.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos according to ASB-001 asbestos subsampling procedure. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab/MPL recommends supplying 40-60g or 500ml of sample in its own container.
Note: Samples 335236-1-6 were sub-sampled from bags provided by the client.

COC 13/10/23
1000

FOUNDATION EARTH SCIENCES

Chain of Custody Record

Client Details:
Foundation Earth Sciences
PO Box 4405, East Gosford NSW 2250
email: ben@foundationes.com.au
michael@foundationes.com.au; reece@foundationes.com.au
ph: +61466 385 221

Delivery Details:
Envirolab Pty Ltd
12 Ashley Street, Chatswood NSW 2067
email: ahle@envirolab.com.au
ph: +612 9910 6200

Project Manager: Michael Silk
Sampled By: RW
Purchase Order # N/A
Page #: 1 of 1

Project #: E3124
Project Name: Wyee
Quote #:
Turnaround: Standard

#	Sample ID	Depth	Date Sampled	Matrix	Analytes														Sample Comments
					ph	CEC	%CLAY	Heavy Metals (8)	TRH	BTEXN	PAH			OPP	Asbestos ID	TRH C6-C10 & BTEXN	OCP PCB	Envirolab Suites	
1 1	BH1	0.3-0.4	12.10.2023	Soil	x	x	x	X	X	X	X			X	X		X	Combo 6a	Keep
2 2	BH2	0.2-0.3	12.10.2023	Soil				X	X	X	X				X		X	Combo 5a	Keep
3 3	BH3	0.1-0.2	12.10.2023	Soil				X	X	X	X			X	X		X	Combo 6a	Keep
4 4	BH4	0.3-0.4	12.10.2023	Soil				X	X	X	X				X		X	Combo 5a	Keep
5 5	BH5	0.2-0.3	12.10.2023	Soil				X	X	X	X				X		X	Combo 5a	Keep
6 6	BH6	0.2-0.3	12.10.2023	Soil				X	X	X	X			x	X		X	Combo 6a	Keep
7 14	D1	-	12.10.2023	Soil				X	X	X	X			x			X	Combo 6	Keep
8 15	TS1	-	-	Soil												X			
9 16	TB1	-	-	Soil												X			

Special Directions and Coments:

Relinquished by	RW	Received By	Emily W
Signature	RW	Signature	EW
Date	12.10.2023	Date	1730

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

Job No: 335236
Date Received: 12/10/23
Time Received: 1730
Received By: EW
Temp: Cool/Ambient
Cooling: Ice/Icepack 10°C
Security: Intact/Broken/None

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	Foundation Earth Sciences Pty Ltd
Attention	Ben Buckley, Michael Silk

Sample Login Details

Your reference	E3124, Wyee
Envirolab Reference	335236
Date Sample Received	13/10/2023
Date Instructions Received	12/10/2023
Date Results Expected to be Reported	20/10/2023

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	9 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	10
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

COC received 13/10/2023 at 1000

All samples labelled "TP" instead of "BH" as per COC, correct job number on all samples

Two bags labelled "TP1", one matched to sample #1 and one matched to sample #2, based on appearance)no bag labelled "TP2"

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	PCBs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils	CEC	Clay 50-120g	Misc Inorg - Soil
BH1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BH2	✓	✓	✓	✓		✓	✓	✓			
BH3	✓	✓	✓	✓	✓	✓	✓	✓			
BH4	✓	✓	✓	✓		✓	✓	✓			
BH5	✓	✓	✓	✓		✓	✓	✓			
BH6	✓	✓	✓	✓	✓	✓	✓	✓			
D1	✓	✓	✓	✓	✓	✓	✓				
TS1	✓										
TB1	✓										

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.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Ben Buckley
Client	FOUNDATION EARTH SCIENCES PTY LTD
Address	UNIT 119/14 LOYALTY ROAD NORTH ROCKS NSW 2151
Telephone	(Not specified)
Facsimile	(Not specified)
Email	ben@foundationes.com.au
Project	**E3124 - Wyee**
Order Number	**E3124**
Samples	1

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE255132 R0**
Date Received	12/10/2023
Date Reported	20/10/2023

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Akheeqar BENIAMEEN	**Dong LIANG**	**Ly Kim HA**	**Shane MCDERMOTT**
Chemist	Metals/Inorganics Team Leader	Organic Section Head	Inorganic/Metals Chemist

VOC's in Soil [AN433] Tested: 18/10/2023

PARAMETER	UOM	LOR	SS1 SOIL - 12/10/2023 SE255132.001
Benzene	mg/kg	0.1	<0.1
Toluene	mg/kg	0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2
o-xylene	mg/kg	0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6
Naphthalene (VOC)*	mg/kg	0.1	<0.1

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 18/10/2023

PARAMETER	UOM	LOR	SS1 SOIL - 12/10/2023 SE255132.001
TRH C6-C9	mg/kg	20	<20
Benzene (F0)	mg/kg	0.1	<0.1
TRH C6-C10	mg/kg	25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 17/10/2023

PARAMETER	UOM	LOR	SS1 SOIL - 12/10/2023 SE255132.001
TRH C10-C14	mg/kg	20	<20
TRH C15-C28	mg/kg	45	<45
TRH C29-C36	mg/kg	45	<45
TRH C37-C40	mg/kg	100	<100
TRH >C10-C16	mg/kg	25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120
TRH C10-C36 Total	mg/kg	110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 17/10/2023

PARAMETER	UOM	LOR	SS1 SOIL - 12/10/2023 SE255132.001
Naphthalene	mg/kg	0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1
1-methylnaphthalene	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)fluoranthene	mg/kg	0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0*	TEQ (mg/kg)	0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	TEQ (mg/kg)	0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8

OC Pesticides in Soil [AN420] Tested: 17/10/2023

PARAMETER	UOM	LOR	SS1 SOIL - 12/10/2023 SE255132.001
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1
Lindane (gamma BHC)	mg/kg	0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1
Aldrin	mg/kg	0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1
o,p'-DDE*	mg/kg	0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2
Endrin	mg/kg	0.2	<0.2
o,p'-DDD*	mg/kg	0.1	<0.1
o,p'-DDT*	mg/kg	0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1
Endrin aldehyde	mg/kg	0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1
Endrin ketone	mg/kg	0.1	<0.1
Isodrin	mg/kg	0.1	<0.1
Mirex	mg/kg	0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1
Total OC VIC EPA	mg/kg	1	<1

OP Pesticides in Soil [AN420] Tested: 17/10/2023

PARAMETER	UOM	LOR	SS1 SOIL - 12/10/2023 SE255132.001
Dichlorvos	mg/kg	0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2
Malathion	mg/kg	0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2
Methidathion	mg/kg	0.5	<0.5
Ethion	mg/kg	0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7

PCBs in Soil [AN420] Tested: 17/10/2023

PARAMETER	UOM	LOR	SS1 SOIL - 12/10/2023 SE255132.001
Arochlor 1016	mg/kg	0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 18/10/2023

PARAMETER	UOM	LOR	SS1 SOIL - 12/10/2023 SE255132.001
Arsenic, As	mg/kg	1	<1
Cadmium, Cd	mg/kg	0.3	<0.3
Chromium, Cr	mg/kg	0.5	2.1
Copper, Cu	mg/kg	0.5	1.6
Lead, Pb	mg/kg	1	9
Nickel, Ni	mg/kg	0.5	0.5
Zinc, Zn	mg/kg	2	19

Mercury in Soil [AN312] Tested: 18/10/2023

PARAMETER	UOM	LOR	SS1 SOIL - 12/10/2023 SE255132.001
Mercury	mg/kg	0.05	<0.05

Moisture Content [AN002] Tested: 18/10/2023

PARAMETER	UOM	LOR	SS1 SOIL - 12/10/2023 SE255132.001
% Moisture	%w/w	1	12.9

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by AAS or ICP as per USEPA Method 200.8.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid , mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser . Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC /MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Si) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup /fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D). Total PAH calculated from individual analyte detections at or above the limit of reporting .
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS /ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		
***	Indicates that both * and ** apply.				

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

STATEMENT OF QA/QC PERFORMANCE

SE255132 R0

CLIENT DETAILS

Contact	Ben Buckley
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Email	ben@foundationes.com.au
Project	**E3124 - Wyee**
Order Number	**E3124**
Samples	1

LABORATORY DETAILS

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SGS Reference	**SE255132 R0**
Date Received	12 Oct 2023
Date Reported	20 Oct 2023

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Duplicate	Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES	3 items
Matrix Spike	Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES	1 item

SAMPLE SUMMARY

Sample counts by matrix	1 Soil	Date documentation received	13/10/2023@8:08AI
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	8.0°C	Turnaround time requested	Standard
Sample cooling method	Ice Bricks		

HOLDING TIME SUMMARY

SE255132 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Mercury in Soil — Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE255132.001	LB293936	12 Oct 2023	12 Oct 2023	09 Nov 2023	18 Oct 2023	09 Nov 2023	20 Oct 2023

Moisture Content — Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE255132.001	LB293924	12 Oct 2023	12 Oct 2023	26 Oct 2023	18 Oct 2023	23 Oct 2023	20 Oct 2023

OC Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE255132.001	LB293798	12 Oct 2023	12 Oct 2023	26 Oct 2023	17 Oct 2023	26 Nov 2023	20 Oct 2023

OP Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE255132.001	LB293798	12 Oct 2023	12 Oct 2023	26 Oct 2023	17 Oct 2023	26 Nov 2023	20 Oct 2023

PAH (Polynuclear Aromatic Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE255132.001	LB293798	12 Oct 2023	12 Oct 2023	26 Oct 2023	17 Oct 2023	26 Nov 2023	20 Oct 2023

PCBs in Soil — Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE255132.001	LB293798	12 Oct 2023	12 Oct 2023	26 Oct 2023	17 Oct 2023	26 Nov 2023	20 Oct 2023

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES — Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE255132.001	LB293933	12 Oct 2023	12 Oct 2023	09 Apr 2024	18 Oct 2023	09 Apr 2024	20 Oct 2023

TRH (Total Recoverable Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE255132.001	LB293798	12 Oct 2023	12 Oct 2023	26 Oct 2023	17 Oct 2023	26 Nov 2023	20 Oct 2023

VOC's in Soil — Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE255132.001	LB293918	12 Oct 2023	12 Oct 2023	26 Oct 2023	18 Oct 2023	26 Oct 2023	20 Oct 2023

Volatile Petroleum Hydrocarbons in Soil — Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE255132.001	LB293918	12 Oct 2023	12 Oct 2023	26 Oct 2023	18 Oct 2023	26 Oct 2023	20 Oct 2023

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	SS1	SE255132.001	%	60 - 130%	91

OP Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	SS1	SE255132.001	%	60 - 130%	93
d14-p-terphenyl (Surrogate)	SS1	SE255132.001	%	60 - 130%	97

PAH (Polynuclear Aromatic Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	SS1	SE255132.001	%	70 - 130%	93
d14-p-terphenyl (Surrogate)	SS1	SE255132.001	%	70 - 130%	97
d5-nitrobenzene (Surrogate)	SS1	SE255132.001	%	70 - 130%	112

PCBs in Soil — Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
TCMX (Surrogate)	SS1	SE255132.001	%	60 - 130%	95

VOC's in Soil — Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	SS1	SE255132.001	%	60 - 130%	69
d4-1,2-dichloroethane (Surrogate)	SS1	SE255132.001	%	60 - 130%	80
d8-toluene (Surrogate)	SS1	SE255132.001	%	60 - 130%	87

Volatile Petroleum Hydrocarbons in Soil — Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	SS1	SE255132.001	%	60 - 130%	69
d4-1,2-dichloroethane (Surrogate)	SS1	SE255132.001	%	60 - 130%	80
d8-toluene (Surrogate)	SS1	SE255132.001	%	60 - 130%	87

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil — Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB293936.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB293798.001		Alpha BHC	mg/kg	0.1	<0.1
		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Lindane (gamma BHC)	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Isodrin	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
		Alpha Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		Endrin aldehyde	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endrin ketone	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	80

OP Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB293798.001		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5
		Dichlorvos	mg/kg	0.5	<0.5
		Dimethoate	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Fenitrothion	mg/kg	0.2	<0.2
		Malathion	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	91
		d14-p-terphenyl (Surrogate)	%	-	97

PAH (Polynuclear Aromatic Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB293798.001	Naphthalene	mg/kg	0.1	<0.1
	2-methylnaphthalene	mg/kg	0.1	<0.1
	1-methylnaphthalene	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(a)pyrene	mg/kg	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued) — Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB293798.001		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH (18)	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	101
		2-fluorobiphenyl (Surrogate)	%	-	91
		d14-p-terphenyl (Surrogate)	%	-	97

PCBs in Soil — Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB293798.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	TCMX (Surrogate)	%	-	85

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES — Method: ME-(AU)-[ENV]AN040/AN320

Sample Number		Parameter	Units	LOR	Result
LB293933.001		Arsenic, As	mg/kg	1	<1
		Cadmium, Cd	mg/kg	0.3	<0.3
		Chromium, Cr	mg/kg	0.5	<0.5
		Copper, Cu	mg/kg	0.5	<0.5
		Nickel, Ni	mg/kg	0.5	<0.5
		Lead, Pb	mg/kg	1	<1
		Zinc, Zn	mg/kg	2	<2.0

TRH (Total Recoverable Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result
LB293798.001		TRH C10-C14	mg/kg	20	<20
		TRH C15-C28	mg/kg	45	<45
		TRH C29-C36	mg/kg	45	<45
		TRH C37-C40	mg/kg	100	<100
		TRH C10-C36 Total	mg/kg	110	<110

VOC's in Soil — Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB293918.001	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1
	Hydrocarbons	Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene (VOC)*	mg/kg	0.1	<0.1
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	105
		d8-toluene (Surrogate)	%	-	114
		Bromofluorobenzene (Surrogate)	%	-	84
	Totals	Total BTEX*	mg/kg	0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil — Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB293918.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	105

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE255132.001	LB293936.022	Mercury	mg/kg	0.05	<0.05	<0.05	200	0
SE255157.004	LB293936.014	Mercury	mg/kg	0.05	0.22	0.23	52	2

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE255132.001	LB293924.022	% Moisture	%w/w	1	12.9	12.5	38	3
SE255157.003	LB293924.011	% Moisture	%w/w	1	10.8	11.1	39	3

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE255132.001	LB293798.022		Alpha BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	200	0
			Beta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Lindane (gamma BHC)	mg/kg	0.1	<0.1	<0.1	200	0
			Delta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor	mg/kg	0.1	<0.1	<0.1	200	0
			Aldrin	mg/kg	0.1	<0.1	<0.1	200	0
			Isodrin	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			o,p'-DDE*	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Dieldrin	mg/kg	0.2	<0.2	<0.2	200	0
			Endrin	mg/kg	0.2	<0.2	<0.2	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			o,p'-DDD*	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin aldehyde	mg/kg	0.1	<0.1	<0.1	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDT*	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin ketone	mg/kg	0.1	<0.1	<0.1	200	0
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	200	0
			Mirex	mg/kg	0.1	<0.1	<0.1	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	200	0
			Total CLP OC Pesticides	mg/kg	1	<1	<1	200	0
			Total OC VIC EPA	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.14	0.13	30	5
SE255157.004	LB293798.014		Alpha BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	200	0
			Beta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Lindane (gamma BHC)	mg/kg	0.1	<0.1	<0.1	200	0
			Delta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor	mg/kg	0.1	<0.1	<0.1	200	0
			Aldrin	mg/kg	0.1	<0.1	<0.1	200	0
			Isodrin	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			o,p'-DDE*	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Dieldrin	mg/kg	0.2	<0.2	<0.2	200	0
			Endrin	mg/kg	0.2	<0.2	<0.2	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			o,p'-DDD*	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

OC Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE255157.004	LB293798.014		Endrin aldehyde	mg/kg	0.1	<0.1	<0.1	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDT*	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin ketone	mg/kg	0.1	<0.1	<0.1	200	0
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	200	0
			Mirex	mg/kg	0.1	<0.1	<0.1	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	200	0
			Total CLP OC Pesticides	mg/kg	1	<1	<1	200	0
			Total OC VIC EPA	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.13	0.14	30	4

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE255132.001	LB293798.022		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
			Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
			Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
			Ethion	mg/kg	0.2	<0.2	<0.2	200	0
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
			Malathion	mg/kg	0.2	<0.2	<0.2	200	0
			Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
			Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	3
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	0
SE255157.004	LB293798.014		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
			Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
			Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
			Ethion	mg/kg	0.2	<0.2	<0.2	200	0
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
			Malathion	mg/kg	0.2	<0.2	<0.2	200	0
			Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
			Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	1
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	0

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE255132.001	LB293798.022	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
		Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
		Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued) — Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE255132.001	LB293798.022		Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0*	mg/kg	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	mg/kg	0.2	<0.2	<0.2	175	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR*	mg/kg	0.3	<0.3	<0.3	134	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.6	0.6	30	1
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	3
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	0
SE255157.004	LB293798.014		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	<0.1	197	0
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	0.2	0.3	67	16
			Anthracene	mg/kg	0.1	<0.1	<0.1	169	0
			Fluoranthene	mg/kg	0.1	0.8	0.8	42	10
			Pyrene	mg/kg	0.1	0.7	0.7	44	10
			Benzo(a)anthracene	mg/kg	0.1	0.3	0.3	60	8
			Chrysene	mg/kg	0.1	0.4	0.4	54	9
			Benzo(b&j)fluoranthene	mg/kg	0.1	0.5	0.5	50	9
			Benzo(k)fluoranthene	mg/kg	0.1	0.2	0.2	78	8
			Benzo(a)pyrene	mg/kg	0.1	0.4	0.4	53	8
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.3	0.3	61	9
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	0.3	0.3	64	9
			Carcinogenic PAHs, BaP TEQ <LOR=0*	mg/kg	0.2	0.6	0.6	45	8
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	mg/kg	0.2	0.6	0.6	42	7
			Carcinogenic PAHs, BaP TEQ <LOR=LOR*	mg/kg	0.3	0.7	0.7	54	7
			Total PAH (18)	mg/kg	0.8	4.1	4.5	32	9
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	30	1
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	1
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	0

PCBs in Soil — Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE255132.001	LB293798.022		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates	TCMX (Surrogate)	mg/kg	-	0	0	30	5
SE255157.004	LB293798.014		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates	TCMX (Surrogate)	mg/kg	-	0	0	30	3

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES — Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate		Parameter	Units	LOR

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued) — Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE255132.001	LB293933.022	Arsenic, As	mg/kg	1	<1	<1	190	0
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.5	2.1	2.1	53	1
		Copper, Cu	mg/kg	0.5	1.6	1.5	62	4
		Nickel, Ni	mg/kg	0.5	0.5	<0.5	128	5
		Lead, Pb	mg/kg	1	9	9	42	2
		Zinc, Zn	mg/kg	2	19	20	40	6
SE255157.004	LB293933.014	Arsenic, As	mg/kg	1	8	8	43	1
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	164	0
		Chromium, Cr	mg/kg	0.5	13	11	34	13
		Copper, Cu	mg/kg	0.5	47	32	31	37 ②
		Nickel, Ni	mg/kg	0.5	4.0	3.8	43	3
		Lead, Pb	mg/kg	1	290	200	30	35 ②
		Zinc, Zn	mg/kg	2	170	120	31	32 ②

TRH (Total Recoverable Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE255132.001	LB293798.022		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	167	0
			TRH C29-C36	mg/kg	45	<45	<45	140	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	171	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0
SE255157.004	LB293798.014		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0

VOC's in Soil — Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE255132.001	LB293918.033	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene (VOC)*	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	8.0	7.3	50	10
			d8-toluene (Surrogate)	mg/kg	-	8.7	7.8	50	11
			Bromofluorobenzene (Surrogate)	mg/kg	-	6.9	6.9	50	0
		Totals	Total BTEX*	mg/kg	0.6	<0.6	<0.6	200	0
			Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0
SE255157.002	LB293918.015	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene (VOC)*	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	7.3	7.6	50	5
			d8-toluene (Surrogate)	mg/kg	-	8.3	9.1	50	10
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.8	7.1	50	20
		Totals	Total BTEX*	mg/kg	0.6	<0.6	<0.6	200	0
			Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE255132.001	LB293918.033		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	8.0	7.3	50	10
			d8-toluene (Surrogate)	mg/kg	-	8.7	7.8	50	11
			Bromofluorobenzene (Surrogate)	mg/kg	-	6.9	6.9	50	0
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE255157.002	LB293918.015		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	7.3	7.6	50	5
			d8-toluene (Surrogate)	mg/kg	-	8.3	9.1	50	10
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.8	7.1	50	20
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB293936.002	Mercury	mg/kg	0.05	0.21	0.2	80 - 120	104

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB293798.002		Delta BHC	mg/kg	0.1	0.1	0.2	60 - 140	72
		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	79
		Aldrin	mg/kg	0.1	0.1	0.2	60 - 140	73
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	77
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	72
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	82
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.12	0.15	40 - 130	80

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB293798.002		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	1.6	2	60 - 140	82
		Diazinon (Dimpylate)	mg/kg	0.5	1.7	2	60 - 140	84
		Dichlorvos	mg/kg	0.5	1.3	2	60 - 140	64
		Ethion	mg/kg	0.2	1.6	2	60 - 140	80
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	98

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB293798.002		Naphthalene	mg/kg	0.1	3.7	4	60 - 140	92
		Acenaphthylene	mg/kg	0.1	3.5	4	60 - 140	87
		Acenaphthene	mg/kg	0.1	3.9	4	60 - 140	96
		Phenanthrene	mg/kg	0.1	3.8	4	60 - 140	94
		Anthracene	mg/kg	0.1	3.7	4	60 - 140	92
		Fluoranthene	mg/kg	0.1	3.6	4	60 - 140	89
		Pyrene	mg/kg	0.1	3.8	4	60 - 140	96
		Benzo(a)pyrene	mg/kg	0.1	3.6	4	60 - 140	91
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	98
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	98

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB293798.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	97

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB293933.002	Arsenic, As	mg/kg	1	350	318.22	80 - 120	111
	Cadmium, Cd	mg/kg	0.3	4.2	4.81	70 - 130	88
	Chromium, Cr	mg/kg	0.5	40	38.31	80 - 120	104
	Copper, Cu	mg/kg	0.5	330	290	80 - 120	115
	Nickel, Ni	mg/kg	0.5	190	187	80 - 120	104
	Lead, Pb	mg/kg	1	95	89.9	80 - 120	105
	Zinc, Zn	mg/kg	2	290	273	80 - 120	106

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB293798.002		TRH C10-C14	mg/kg	20	46	40	60 - 140	115
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	109
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	98
	TRH F Bands	TRH >C10-C16	mg/kg	25	45	40	60 - 140	114
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	102
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	105

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB293918.002	Monocyclic	Benzene	mg/kg	0.1	4.1	5	60 - 140	83
	Aromatic	Toluene	mg/kg	0.1	4.1	5	60 - 140	82
		Ethylbenzene	mg/kg	0.1	4.0	5	60 - 140	79
		m/p-xylene	mg/kg	0.2	7.9	10	60 - 140	79
		o-xylene	mg/kg	0.1	4.0	5	60 - 140	80
	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	7.6	10	70 - 130	76
		d8-toluene (Surrogate)	mg/kg	-	8.2	10	70 - 130	82
		Bromofluorobenzene (Surrogate)	mg/kg	-	9.4	10	70 - 130	94

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB293918.002		TRH C6-C10	mg/kg	25	77	92.5	60 - 140	83
		TRH C6-C9	mg/kg	20	67	80	60 - 140	83
	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	7.6	10	70 - 130	76
		Bromofluorobenzene (Surrogate)	mg/kg	-	9.4	10	70 - 130	94
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	53	62.5	60 - 140	85

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE255160.001	LB293798.004		Alpha BHC	mg/kg	0.1	<0.1	0	-	-
			Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	0.00026329147	-	-
			Beta BHC	mg/kg	0.1	<0.1	0.00028611538	-	-
			Lindane (gamma BHC)	mg/kg	0.1	<0.1	0	-	-
			Delta BHC	mg/kg	0.1	0.2	0.00070599352	0.2	77
			Heptachlor	mg/kg	0.1	0.2	0	0.2	85
			Aldrin	mg/kg	0.1	0.2	0	0.2	78
			Isodrin	mg/kg	0.1	<0.1	0.00037167130	-	-
			Heptachlor epoxide	mg/kg	0.1	<0.1	0	-	-
			Gamma Chlordane	mg/kg	0.1	<0.1	0.01288846923	-	-
			Alpha Chlordane	mg/kg	0.1	<0.1	0	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	0	-	-
			o,p'-DDE*	mg/kg	0.1	<0.1	0	-	-
			p,p'-DDE	mg/kg	0.1	<0.1	0.00033102789	-	-
			Dieldrin	mg/kg	0.2	<0.2	0.00022908287	0.2	81
			Endrin	mg/kg	0.2	<0.2	0.00059943189	0.2	76
			Beta Endosulfan	mg/kg	0.2	<0.2	0.00042291919	-	-
			o,p'-DDD*	mg/kg	0.1	<0.1	0.00941672315	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	0.00035594191	-	-
			Endrin aldehyde	mg/kg	0.1	<0.1	0	-	-
			Endosulfan sulphate	mg/kg	0.1	<0.1	0	-	-
			o,p'-DDT*	mg/kg	0.1	<0.1	0	-	-
			p,p'-DDT	mg/kg	0.1	0.2	0.00021217108	0.2	87
			Endrin ketone	mg/kg	0.1	<0.1	0.00019973948	-	-
			Methoxychlor	mg/kg	0.1	<0.1	0	-	-
			Mirex	mg/kg	0.1	<0.1	0	-	-
			trans-Nonachlor	mg/kg	0.1	<0.1	0	-	-
			Total CLP OC Pesticides	mg/kg	1	<1	0	-	-
			Total OC VIC EPA	mg/kg	1	<1	0	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.13	0.13102497244	-	87

OP Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE255160.001	LB293798.004		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	0	-	-
			Bromophos Ethyl	mg/kg	0.2	<0.2	0	-	-
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	1.7	0.00084304294	2	83
			Diazinon (Dimpylate)	mg/kg	0.5	1.7	0	2	85
			Dichlorvos	mg/kg	0.5	1.4	0	2	68
			Dimethoate	mg/kg	0.5	<0.5	0	-	-
			Ethion	mg/kg	0.2	1.6	0.00314573435	2	82
			Fenitrothion	mg/kg	0.2	<0.2	0.00051647625	-	-
			Malathion	mg/kg	0.2	<0.2	0.00217500477	-	-
			Methidathion	mg/kg	0.5	<0.5	0	-	-
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	0	-	-
			Total OP Pesticides*	mg/kg	1.7	6.4	0	-	-
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.46120598748	-	92
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.48134140220	-	97

PAH (Polynuclear Aromatic Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE255160.001	LB293798.004	Naphthalene	mg/kg	0.1	3.7	0.00402314672	4	92
		2-methylnaphthalene	mg/kg	0.1	<0.1	0.00213666822	-	-
		1-methylnaphthalene	mg/kg	0.1	<0.1	0.00167347288	-	-
		Acenaphthylene	mg/kg	0.1	3.5	0.01086624446	4	87
		Acenaphthene	mg/kg	0.1	3.8	0.00200735455	4	96
		Fluorene	mg/kg	0.1	<0.1	0.00174181468	-	-
		Phenanthrene	mg/kg	0.1	3.8	0.01166137107	4	95
		Anthracene	mg/kg	0.1	3.8	0.00712441541	4	94
		Fluoranthene	mg/kg	0.1	3.6	0.01722959474	4	90
		Pyrene	mg/kg	0.1	3.8	0.02895794104	4	94
		Benzo(a)anthracene	mg/kg	0.1	<0.1	0.01753404429	-	-
		Chrysene	mg/kg	0.1	<0.1	0.01617592812	-	-

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued) — Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE255160.001	LB293798.004		Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	0.02056193029	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	0.00774758972	-	-
			Benzo(a)pyrene	mg/kg	0.1	3.7	0.02443161591	4	93
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0.02132911164	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	0.00473660855	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	0.03668693918	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0*	TEQ (mg/kg)	0.2	3.7	0	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	TEQ (mg/kg)	0.2	3.8	0.121	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR*	TEQ (mg/kg)	0.3	3.9	0.242	-	-
			Total PAH (18)	mg/kg	0.8	30	0	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.52319026477	-	103
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.46120598748	-	92
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.48134140220	-	97

PCBs in Soil — Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE255160.001	LB293798.004		Arochlor 1016	mg/kg	0.2	<0.2	0	-	-
			Arochlor 1221	mg/kg	0.2	<0.2	0	-	-
			Arochlor 1232	mg/kg	0.2	<0.2	0	-	-
			Arochlor 1242	mg/kg	0.2	<0.2	0	-	-
			Arochlor 1248	mg/kg	0.2	<0.2	0	-	-
			Arochlor 1254	mg/kg	0.2	<0.2	0	-	-
			Arochlor 1260	mg/kg	0.2	0.4	0	0.4	105
			Arochlor 1262	mg/kg	0.2	<0.2	0	-	-
			Arochlor 1268	mg/kg	0.2	<0.2	0	-	-
			Total PCBs (Arochlors)	mg/kg	1	<1	0	-	-
		Surrogates	TCMX (Surrogate)	mg/kg	-	0	0.13794820044	-	92

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES — Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE255160.001	LB293933.004		Arsenic, As	mg/kg	1	49	3.53640869233	50	90
			Cadmium, Cd	mg/kg	0.3	43	0.45657643919	50	85
			Chromium, Cr	mg/kg	0.5	61	8.84559664506	50	105
			Copper, Cu	mg/kg	0.5	57	11.75112466641	50	91
			Nickel, Ni	mg/kg	0.5	56	10.96835684330	50	90
			Lead, Pb	mg/kg	1	100	56.3263438810	50	95
			Zinc, Zn	mg/kg	2	200	32.5276401067	50	215 ⑨

TRH (Total Recoverable Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE255160.001	LB293798.004		TRH C10-C14	mg/kg	20	50	1.85717225766	40	119
			TRH C15-C28	mg/kg	45	47	3.30383480825	40	109
			TRH C29-C36	mg/kg	45	48	11.46353845096	40	91
			TRH C37-C40	mg/kg	100	<100	8.48898950401	-	-
			TRH C10-C36 Total	mg/kg	110	140	0	-	-
			TRH >C10-C40 Total (F bands)	mg/kg	210	<210	0	-	-
		TRH F	TRH >C10-C16	mg/kg	25	49	1.78911984633	40	119
		Bands	TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	49	0	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	10.30225698017	40	92
			TRH >C34-C40 (F4)	mg/kg	120	<120	12.93215339233	-	-

VOC's in Soil — Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE255160.001	LB293918.005	Monocyclic	Benzene	mg/kg	0.1	4.1	0.00604836929	5	82
		Aromatic	Toluene	mg/kg	0.1	4.2	0.00797326069	5	84
			Ethylbenzene	mg/kg	0.1	4.2	0.00757110967	5	83
			m/p-xylene	mg/kg	0.2	8.5	0.01611755868	10	84
			o-xylene	mg/kg	0.1	4.3	0.00921919243	5	86
		Polycyclic	Naphthalene (VOC)*	mg/kg	0.1	<0.1	0.02130554305	-	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	7.9	7.40214267928	10	79
			d8-toluene (Surrogate)	mg/kg	-	8.0	7.66067756765	10	80
			Bromofluorobenzene (Surrogate)	mg/kg	-	9.7	7.95551674683	10	97
		Totals	Total BTEX*	mg/kg	0.6	25	0	-	-

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE255160.001	LB293918.005	Totals	Total Xylenes*	mg/kg	0.3	13	0.02533675112	-	-

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE255160.001	LB293918.005		TRH C6-C10	mg/kg	25	94	0.47235748877	92.5	101
			TRH C6-C9	mg/kg	20	81	0.40724357979	80	101
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	7.9	7.40214267928	10	79
			d8-toluene (Surrogate)	mg/kg	-	8.0	7.66067756765	10	80
			Bromofluorobenzene (Surrogate)	mg/kg	-	9.7	7.95551674683	-	97
		VPH F	Benzene (F0)	mg/kg	0.1	4.1	0.00604836929	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	68	0.47235748877	62.5	109

MATRIX SPIKE DUPLICATES

SE255132 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the

QC Sample	Sample Number	Parameter	Units	LOR

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
***	Indicates that both * and ** apply.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.

E-MAILED
13/10 @ 8.08 a

SGS EHS Sydney COC
SE255132

FOUNDATION EARTH SCIENCES

Chain of Custody Record

Client Details:	Foundation Earth Sciences PO Box 4405, East Gosford NSW 2250 email: ben@foundationes.com.au michael@foundationes.com.au; reece@foundationes.com.au ph: +61466 385 221	**Project Manager:**	Michael Silk	**Project #:** E3124	
		Sampled By:	RW	**Project Name:** Wyee	
Delivery Details:	SGS Laboratories Pty Ltd Unit 16, 33 Maddox Street, Alexandria NSW 2015 email: au.samplereceipt@sgs.com ph: +612 8594 0400	**Purchase Order #:**	N/A	**Quote #:**	
		Page #:	1	**Turnaround:** Standard	

#	Sample ID	Depth	Date Sampled	Matrix	Analytes														Sample Comments
					ph	CEC	%CLAY	Heavy Metals	TRH	BTEXN	PAH	OC	PCB	EC	Asbestos %w/w (NEPM /WA)	PH	OPP	Suites	
1	SS1	-	12.10.2023	Soil				X	X	X	X	x	x				x	CL17	Keep

Special Directions and Coments:

Relinquished by	RW	**Received By**	
Signature	RW	**Signature**	
Date	12.10.2023	**Date**	12.10.23 5:95 Pm

SAMPLE RECEIPT ADVICE

SE255132

CLIENT DETAILS

Contact	Ben Buckley
Client	FOUNDATION EARTH SCIENCES PTY LTD
Address	UNIT 119/14 LOYALTY ROAD NORTH ROCKS NSW 2151
Telephone	(Not specified)
Facsimile	(Not specified)
Email	ben@foundationes.com.au
Project	**E3124 - Wyee**
Order Number	**E3124**
Samples	1

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Thu 12/10/2023
Report Due	Fri 20/10/2023
SGS Reference	**SE255132**

SUBMISSION DETAILS

This is to confirm that 1 sample was received on Thursday 12/10/2023. Results are expected to be ready by COB Friday 20/10/2023. Please quote SGS reference SE255132 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	1 Soil	Date documentation received	13/10/2023@8:08AM
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	8.0°C	Turnaround time requested	Standard
Sample cooling method	Ice Bricks		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

SAMPLE RECEIPT ADVICE

SE255132

CLIENT DETAILS

Client FOUNDATION EARTH SCIENCES PTY LTD

Project E3124 - Wyee

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Recoverable Elements in Soil/Waste	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	SS1	30	14	26	11	7	10	11	7

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE255132

CLIENT DETAILS

Client FOUNDATION EARTH SCIENCES PTY LTD

Project E3124 - Wyee

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury in Soil	Moisture Content
001	SS1	1	1

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

APPENDIX I: DPI (OFFICE OF WATER) DATABASE RECORDS

WaterNSW
Work Summary

GW015275

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): GENERAL USE

Work Type: Well
Work Status:
Construct.Method:
Owner Type: Private

Commenced Date:
Completion Date: 01/12/1956
Final Depth: 4.50 m
Drilled Depth: 4.60 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description: Fresh
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	NORTHUMBERLAND	MORRI	320
Licensed:			

Region: 20 - Hunter
River Basin: 211 - MACQUARIE - TUGGERAH LAKES
Area/District:
CMA Map: 9131-1S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6327914.000
Easting: 356866.000
Latitude: 33°10'41.3"S
Longitude: 151°27'53.1"E

GS Map: -
MGA Zone: 56
Coordinate Source: PR.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Brick	0.00	0.00	1066			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
4.50	4.50	0.00	Unconsolidated	3.90		0.15			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	4.57	4.57	Soil Nominal	Soil	
4.57	4.58	0.01	Clay Water Supply	Clay	
0.00	4.57	4.57	Clay White Nominal	Clay	
0.00	4.57	4.57	Sand Nominal	Sand	

***** End of GW015275 *****

WaterNSW
Work Summary

GW053092

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): IRRIGATION

Work Type: Excavation
Work Status: Supply Obtained
Construct.Method: < 100 sq.m.
Owner Type: Private

Commenced Date:
Completion Date: 01/01/1981
Final Depth:
Drilled Depth: 4.00 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m):
Salinity Description: Brackish
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	NORTHUMBERLAND	MORRISSETT	404
Licensed:			

Region: 20 - Hunter
River Basin: 211 - MACQUARIE - TUGGERAH LAKES
Area/District:
CMA Map: 9131-1S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6327205.000
Easting: 356798.000
Latitude: 33°11'04.3"S
Longitude: 151°27'50.1"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	3.00	3.00	Clay	Clay	
3.00	4.00	1.00	Sand Water Bearing	Sand	

Remarks

28/02/1983: EXCAVATION FILLED IN

***** End of GW053092 *****

WaterNSW
Work Summary

GW064662

Licence: 20WA215475
Licence Status: CURRENT

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): DOMESTIC

Work Type: Bore
Work Status:
Construct.Method: Rotary
Owner Type: Private

Commenced Date:
Completion Date: 01/12/1987
Final Depth: 24.00 m
Drilled Depth: 24.00 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property: N/A NSW
GWMA: -
GW Zone: -
Standing Water Level (m):
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	NORTHUMBERLAND	MORRI	L192 DP8005 (220)
Licensed:	NORTHUMBERLAND	MORISSET	Whole Lot 192//8005

Region: 20 - Hunter
River Basin: 212 - HAWKESBURY RIVER
Area/District:
CMA Map: 9131-1S
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)
Northing: 6327028.000
Easting: 359443.000
Latitude: 33°11'11.3"S
Longitude: 151°29'32.1"E

GS Map: -
MGA Zone: 56
Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	P.V.C.	0.00	6.00	150			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
7.00	10.00	3.00	Consolidated	7.00					

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	4.00	4.00	Soil Clay	Soil	
4.00	7.00	3.00	Sandstone Yellow	Sandstone	
7.00	15.00	8.00	Sandstone Grey Water Supply	Sandstone	
15.00	24.00	9.00	Conglomerate	Conglomerate	

***** End of GW064662 *****

WaterNSW
Work Summary

GW078214

Licence: 20WA216070 **Licence Status:** CURRENT

Authorised Purpose(s): STOCK,DOMESTIC
Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore
Work Status:
Construct.Method: Rotary
Owner Type:

Commenced Date:
Completion Date: 03/03/1999
Final Depth: 36.00 m
Drilled Depth: 36.00 m

Contractor Name: PAUL JOHN ISELT
Driller: Paul John Iselt
Assistant Driller:

Property: N/A NSW
GWMA: -
GW Zone: -
Standing Water Level (m):
Salinity Description: Fresh
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	NORTHUMBERLAND	MORRI	502/788556
Licensed:	NORTHUMBERLAND	MORISSET	Whole Lot 502//788556

Region: 20 - Hunter
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6330799.000
Easting: 360811.000
Latitude: 33°09'09.5"S
Longitude: 151°30'27.0"E

GS Map: -
MGA Zone: 56
Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	17.50	210			Down Hole Hammer
1		Hole	Hole	17.50	36.00	150			Down Hole Hammer
1	1	Casing	Pvc Class 9	-0.50	17.50	150			Seated on Bottom, Screwed and Glued

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
9.80	20.70	10.90	Unknown	12.00	25.00	0.63	25.00		
28.80	29.90	1.10	Unknown	9.00	25.00	2.00	36.00	02:00:00	

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.10	0.10	Topsoil	Topsoil	
0.10	3.10	3.00	Clay Red	Clay	
3.10	15.80	12.70	Sandy Clays Grey/Red/Yellow	Invalid Code	
15.80	19.80	4.00	Sandstone Grey	Sandstone	
19.80	20.70	0.90	Sandstone Grey WB	Sandstone	
20.70	28.80	8.10	Sandstone/Clays Grey	Sandstone	
28.80	29.90	1.10	Fractured Sandstone Grey	Invalid Code	
29.90	36.00	6.10	Sandstone Grey	Sandstone	

***** End of GW078214 *****

WaterNSW
Work Summary

GW200380

Licence:
Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status:
Construct.Method: Rotary Air
Owner Type:

Commenced Date:
Completion Date: 07/11/2005
Final Depth: 6.00 m
Drilled Depth: 6.00 m

Contractor Name: INTERTEC DRILLING SERVICES
Driller: William Crump
Assistant Driller:

Property:
GWMA:
GW Zone:
Standing Water Level (m): 5.000
Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	NORTHUMBERLAND	MUNMO	168/705480
Licensed:			

Region: 20 - Hunter
River Basin: - Unknown
Area/District:
CMA Map:
Grid Zone:
Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown
Northing: 6324782.000
Easting: 357960.000
Latitude: 33°12'23.5"S
Longitude: 151°28'33.6"E

GS Map: -
MGA Zone: 56
Coordinate Source: Map Interpre

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	6.00	152			Rotary Air
1	1	Casing	Pvc Class 18	-1.00	3.00	60			Other, Screwed
1	1	Opening	Screen - Gauze/Mesh	3.00	6.00	60		0	PVC Class 18, Screwed, A: 0.50mm

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	6.00	6.00	clay	Clay	

Remarks

07/11/2005: Form A Remarks:
Gravel pack used but no depth given. Grain size 1mm - 2mm, 117L.

***** End of GW200380 *****

APPENDIX J: BUREAU OF METEOROLOGY

Summary statistics for all years

Move mouse over highest daily rainfall to view dates.

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	89.0	128.1	151.6	127.5	98.9	126.2	83.2	72.7	66.7	88.5	94.4	84.1
Median	88.3	122.2	122.6	118.0	68.5	111.3	49.2	53.6	62.5	72.9	93.7	79.6
Highest Daily	119.6	112.2	102.4	111.0	78.2	215.4	*110.0*	129.6	114.0	116.0	113.0	128.0

Plot statistics and this year

Monthly Rainfall (millimetres)

GOROKAN (GOOBARABAH ST)

Station Number: 061387 · State: NSW · Opened: 1996 · Status: Open · Latitude: 33.24°S · Longitude: 151.51°E · Elevation: 12 m

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1996							31.4	142.0	115.8	31.2	95.0	62.0	
1997	116.6	156.6	43.8	30.8	167.4	116.2	171.2	37.2	84.2	54.4	21.0	45.9	1045.3
1998	79.3	53.8	12.2	121.2	405.4	143.6	140.6	331.2	59.6	71.2	110.4	43.6	1572.1
1999	107.8	200.1	71.8	317.4	26.0	125.8	91.0	55.4	46.0	110.9		78.4	
2000	100.4	54.0	283.4	77.8	34.6	44.0	47.0	27.8	48.2		123.8	52.0	
2001	44.6	137.6	199.4	147.0	387.2	7.6		41.0	29.8	48.4	114.4	95.2	
2002			156.6	137.4	103.3	20.0	43.5	78.0	44.0	5.0	28.4	153.6	
2003	7.2	70.8	176.0	185.2		50.0	76.0	28.8	0.0	76.3	104.0	31.8	
2004	83.4	140.2	53.4	10.0	14.8	16.4		94.4	117.8	254.8	92.4	91.8	
2005	127.8	130.4	211.8	33.2	140.0	99.0	43.1	0.0	47.6	67.4	77.8	38.0	1016.1
2006	82.6	32.0	102.4	11.2	88.6	154.2	107.4	64.2	136.2	32.8	64.8	79.6	956.0
2007	52.8	72.0	119.2	223.8	35.2	525.8	47.8	167.2	69.4	16.4	95.0	172.4	1597.0
2008	115.6	187.2	63.2	356.2	6.6		50.6	35.2	113.6	72.0	111.2	83.0	
2009	9.8	146.6	49.4	93.8	141.4	92.6	46.0	2.2	13.4	134.0	17.2	81.2	827.6
2010	92.0	66.8	126.4	35.0	164.2	119.6	88.0	51.8	92.0	93.6	199.4	85.2	1214.0
2011	32.4	66.2	187.0	229.4	162.0	195.8	215.0	73.4	176.8	73.8	186.2	203.0	1801.0
2012	97.2	145.0	114.4	160.4	40.6	161.4	62.8	37.4	32.6	13.8	92.0	60.8	1018.4
2013	206.4	180.8	122.6	129.2	77.8	167.4	33.8	22.4	22.6	47.0	260.0	33.8	1303.8
2014	11.6	211.6	110.8	156.8	51.2	106.4	19.2	186.2	65.4	80.0	31.2	91.8	1122.2
2015	194.2	90.0	132.2	333.8	151.0	64.0	22.6	32.0	81.8	86.4	119.2	139.4	1446.6
2016	266.6	30.8	117.0	65.6	14.0	263.4	64.6	99.2	72.0	56.2	41.0	81.8	1172.2
2017	58.2	123.0	342.6	83.6	42.6	201.8	8.6	14.6	12.4	108.4	55.2	65.8	1116.8
2018	19.6	120.0	48.0	118.0	12.4	251.0	7.2	11.4	70.4	201.4	130.4	55.8	1045.6
2019	86.6	75.8	161.2	79.2	8.2	152.0	41.6	185.4	84.0	*76.6*	25.2	0.8	*976.6*
2020	47.4	*384.8*	146.6	42.8	*99.6*	*96.0*	228.4	55.8	30.8	*204.0*	46.2	175.8	*1558.2*
2021	*92.6*	*118.6*	*486.8*	16.4	31.8	71.6	45.4	61.6	58.6	64.2	183.8	*115.8*	*1347.2*
2022	90.0	214.2	*368.0*	*164.2*	105.4	23.0	*350.4*	41.2	*133.6*	*221.6*	30.4	*51.2*	*1793.2*
2023	92.2	*121.4*	*87.8*	*83.4*	*59.2*	*12.8*	*78.8*	*57.6*	*9.2*				

Quality control: 12.3 Done & acceptable, *12.3* Not completed or unknown

Monthly Rainfall (millimetres)

GOROKAN (GOOBARABAH ST)

Station Number: 061387 · State: NSW · Opened: 1996 · Status: Open · Latitude: 33.24°S · Longitude: 151.51°E · Elevation: 12 m

Statistics for this station calculated over all years of data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	89.0	128.1	151.6	127.5	98.9	126.2	83.2	72.7	66.7	88.5	94.4	84.1	1259.5
Lowest	7.2	30.8	12.2	10.0	6.6	7.6	7.2	0.0	0.0	5.0	17.2	0.8	827.6
5th percentile	10.2	37.5	45.1	12.8	9.2	13.7	11.2	5.4	10.3	14.4	22.0	32.4	943.2
10th percentile	15.6	53.9	48.8	25.0	13.2	18.2	20.9	13.6	13.1	23.8	26.8	36.3	972.5
Median	88.3	122.2	122.6	118.0	68.5	111.3	49.2	53.6	62.5	72.9	93.7	79.6	1172.2
90th percentile	161.0	205.9	307.1	264.6	165.8	226.4	193.1	172.7	122.5	202.7	185.0	161.1	1636.2
95th percentile	203.4	213.6	360.4	328.9	332.2	260.3	225.1	185.9	135.3	217.2	196.1	174.8	1794.0
Highest	266.6	384.8	486.8	356.2	405.4	525.8	350.4	331.2	176.8	254.8	260.0	203.0	1801.0

1) Calculation of statistics

Summary statistics, other than the Highest and Lowest values, are only calculated if there are at least 20 years of data available.

2) Gaps and missing data

Gaps may be caused by a damaged instrument, a temporary change to the site operation, or due to the absence or illness of an observer.

3) Further information

http://www.bom.gov.au/climate/cdo/about/about-rain-data.shtml.

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