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UNO CONSTRUCTIONS PTY LTD

Detailed Site Investigation

41-43 Forbes Street, Liverpool NSW

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Executive Summary

Background

Uno Constructions Pty Ltd engaged EI Australia (EI) to conduct a Detailed Site Investigation (DSI) for the former industrial property located at 41-43 Forbes Street, Liverpool NSW ('the site').

This investigation follows on from the Preliminary Site Investigation previously prepared by EI in a report titled "*Stage 1 Environmental Site Assessment, 41-43 Forbes Street, Liverpool, NSW*" (EI Report No. E1379.1 dated 30 May 2011). This report was prepared in support of a Development Application (DA) to Liverpool City Council, for the purpose of enabling the developer to meet its obligations under the Contaminated Land Management Act 1997 (CLM Act), for the assessment and management of contaminated soil.

Based on the proposed development plans provided by the client (**Appendix B**), site redevelopment involves the construction of a multi-storey mixed commercial and residential apartment building overlying a two level basement car park.

Objectives

The primary objectives of this investigation were to:

- Evaluate the potential for site contamination on the basis of historical land uses, anecdotal and documentary evidence of possible pollutant sources; and
- To investigate the degree of any potential contamination by means of intrusive sampling and laboratory analysis, for relevant contaminants of concern.

A further objective, should site contamination be confirmed, was to make recommendations for the appropriate management of any contaminated soils.

Findings

The work was conducted with reference to the regulatory framework outlined in **Section 1.3** of this report and assessment findings indicated the following:

- The site had mainly been used for residential purposes since 1950s.
- During the site inspection on the 27 June 2019 all former structures had been demolished and the site was vacant land. Asbestos fragments were observed across the site surface and were likely sourced from former building structures.
- The sub-surface layers observed at six test borehole locations across of the site during this investigation comprised of fill materials (max. thickness 0.3m), overlying residual clays and silt.
- Laboratory results for soil samples collected reported concentrations below the adopted SILs, with the exception of asbestos in sample BH106_0.1-0.2.

Conclusions

Based on the findings of this DSI and with consideration of the Statement of Limitations (**Section 12**), EI concluded that surficial asbestos contamination was identified. The site can be made suitable for the proposed development, subject to implementing the recommendations specified in **Section 11**.

Recommendations

In view of the findings of this investigation and in accordance with the NEPC (2013) guidelines, it is considered that the site can be made suitable for the proposed mixed commercial and residential development on completion of the following recommendations:

- Asbestos Containing Material (ACM) was found across the surface of the site and in shallow fill at BH106. In light of this finding and the thin nature of fill soils identified (max. thickness 0.3m), site wide fill should be classified in accordance with the NSW EPA (2014) Waste Classification Guidelines, excavated and disposed of to an appropriately licensed landfill. Prior to removal preparation of an Asbestos Removal Management Plan must be prepared by the environmental consultant and followed by the excavation contractor to ensure all asbestos impacted fill soils are safely removed from the site and appropriately management;
- Following offsite disposal of site wide fill, a site walkover inspection and subsequent surface validation is required to validate the site is free of fill material and natural clay exposed;
- Preparation of an asbestos clearance report by a suitably qualified environmental consultant, certifying that all asbestos impacted fill soils have been removed from the site.
- Any soil materials being removed from site (including virgin excavated natural materials or VENM) be classified for off-site disposal in accordance the EPA (2014) *Waste Classification Guidelines*;
- Any material being imported to the site should be assessed for potential contamination, in accordance with NSW EPA guidelines, as being suitable for the intended use or be classified as virgin excavated natural material (VENM); and
- Should unexpected finds (contamination) be encountered during redevelopment works a qualified environmental consultant be engaged to inspect the finds and offer the appropriate guidance.

1. Introduction

1.1 Background and Purpose

Uno Constructions Pty Ltd engaged EI Australia Pty Ltd (EI) to conduct a Detailed Site Investigation (DSI) at 41-43 Forbes Street, Liverpool NSW ('the site').

The site is located approximately 26 km southwest of the Sydney central business district (**Figure 1**). It comprises two lots (Lot 4 and Lot 5 in DP37806), situated within the Local Government Area of Liverpool City Council, and covers a total area of 1,189m^2 (**Figure 2**). At the time of conducting this DSI, the land was vacant land.

This investigation follows on from the Preliminary Site Investigation previously prepared by EI in a report titled "*Stage 1 Environmental Site Assessment, 41-43 Forbes Street, Liverpool, NSW*" (EI Report No. E1379.1 dated 30 May 2011). This report was prepared in support of a Development Application (DA) to Liverpool City Council, for the purpose of enabling the developer to meet its obligations under the Contaminated Land Management Act 1997 (CLM Act), for the assessment and management of contaminated soil.

1.2 Proposed Development

Based on the proposed development plans provided by the client (**Appendix B**), site redevelopment involves the construction of a multi-storey mixed commercial and residential apartment building overlying a two level basement car park.

1.3 Regulatory Framework

The following regulatory framework and guidelines were considered during the preparation of this report:

- EPA (2017) *Guidelines for the NSW Site Auditor Scheme* (3rd Edition);
- EPA (1995) *Sampling Design Guidelines*;
- NEPC (2013) *Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater*;
- NEPC (2013) *Schedule B(2) Guideline on Site Characterisation*;
- Contaminated Land Management Act 1997;
- State Environment Protection Policy 55 (SEPP 55) – Remediation of Land;
- Liverpool Local Environmental Plan 2008; and
- OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites*.

1.4 Project Objectives

The main objectives of this investigation were therefore to:

- Evaluate the potential for site contamination on the basis of historical land uses, anecdotal and documentary evidence of possible pollutant sources; and
- To investigate the degree of any potential contamination by means of intrusive sampling and laboratory analysis, for relevant contaminants of concern.

A further objective, should site contamination be confirmed, was to make recommendations for the appropriate management of any contaminated soils.

1.5 Scope of Works

In order to achieve the above objectives and in keeping the project cost-effective while generally complying with the OEH (2011) guidelines for consultants reporting on contaminated sites, the scope of works was as follows:

1.5.1 Desktop Study

- A review of relevant topographical, geological, hydrogeological and soil landscape maps for the project area;
- Review of all previous environmental reports;
- A search of NSW EPA Land Information records under the Contaminated Land Management Act (1997) and Protection of the Environment Operations Act (1997);
- A review of existing underground services on site.

1.5.2 Field Work & Laboratory Analysis

- A detailed site walkover inspection;
- Drilling of boreholes at six locations (BH101 to BH106) across the site in a grid like pattern, in accordance with the minimum sampling protocol recommended under EPA (1995);
- Multiple level soil sampling within fill and natural soils at each test bore; and
- Laboratory analysis of selected soil samples for relevant analytical parameters as determined from the site history survey and field observations during the investigation programme.

1.5.3 Data Analysis and Reporting

This DSI report has been prepared to document desk study findings, the conceptual site model, data quality objectives, investigation methodologies and results. The report also provides a record of observations made during the detailed site walkover inspection, borehole logs and a discussion of laboratory analytical results in regards to potential risks to human health, the environment and the aesthetic uses of the land.

2. Site Description

2.1 Property Identification, Location and Physical Setting

The site identification details and associated information are presented in **Table 2-1**, while the site locality is shown in **Figure 1**.

Table 2-1 Site Identification, Location and Zoning

Attribute	Description
Street Address	41-43 Forbes Street, Liverpool NSW
Location Description	Approximately 26 km southwest of Sydney CBD, bounded by unit building (north and west), Forbes Street (east) and Central District Ambulance Liverpool Branch (south).
Coordinates	Northeast corner of site: GDA94-MGA55 Easting: 308675.673 Northing: 6245032.485 (Source: http://maps.six.nsw.gov.au)
Site Area	1,189m^2
Site Owner	Uno Constructions Pty Ltd
Lot and Deposited Plan (DP)	Lot 4 & 5 in DP37806
State Survey Marks	Two Permanent Mark (PM) are situated in close proximity (<100 m) to the site: PM52192 on the Goulburn Street; and PM51958 on the corner of Campbell Street and Forbes Street (Source: http://maps.six.nsw.gov.au)
Local Government Authority	Liverpool City Council
Parish	St Luke
County	Cumberland
Current Zoning	R4 – High Density Residential (Liverpool Local Environmental Plan 2008)
Current Land Uses	Vacant land.

2.2 Surrounding Land Use

The site is situated within an area of High Density Residential (R4) land zoning. Current uses of surrounding land are described in **Table 2-2**.

Table 2-2 Surrounding Land Uses

Direction Relative to Site	Land Use Description	Sensitive Land Receptors
North	Medium to high density residential properties, followed by St Raphael Church.	Residential properties (adjacent to north) Church staff and user (<70m)

Direction Relative to Site	Land Use Description	Sensitive Land Receptors
South	Central District Ambulance Liverpool Branch (abandoned during this investigation) followed a medical research centre (Ingham Institute) and Liverpool Hospital.	Medical research centre staff (<20m) Hospital staff and patients (<75m)
West	Medium to high density residential properties, followed by Goulburn Street.	Residential properties (adjacent to west)
East	Forbes Street, followed by Liverpool Girls High School	School staff and students (<20m)

2.3 Regional Setting

Regional topography, geology, soil landscape and hydrogeological information are summarised in **Table 2-3**.

Table 2-3 Regional Setting Information

Attribute	Description
Topography	Based on the provided survey plan, the site declines towards Forbes Street, from RL 13.8m AHD at north-western portion, to RL 11.65m AHD at south-eastern corner of the site (Ref. GEOMAP SERVICES PTY LTD). According to Chapman and Murphy, the reginal topography includes gently undulating rises with local relief between 10-30m. Slopes are generally <5% but occasionally up to 10%. Crests and ridges are broad (200-600m) and rounder with convex upper slopes grading into concave lower slopes and broad drainage depressions and valley flats. Rock outcrop is absent.
Site Drainage	As most areas of the site comprise exposed soils, rain water is expected to infiltrate directly into the sub-soils. Any stormwater / flood overflow is likely to flow towards the east consistent, with the general slope of the site.
Regional Geology	Information on regional sub-surface conditions, referenced from the Department of Mineral Resources geological map Penrith 1:100,000 Geological Series Sheet 9030 (DMR, 1991), indicated that the site overlies Wianamatta group Bringelly Shale (Rwb).
Soil Landscapes	The Soil Conservation Service of NSW Soil Landscapes of the Penrith 1:100,000 Sheet (Hazelton, Bannerman and Tillie, 1989), indicated that the site overlies a Residual Landscape – Blacktown (bt). Soils are shallow to moderately deep (<100cm) Red Podzolic Soils and Brown Podzolic Soils on crests, upper slopes and well-drained areas and deep (150-300cm) Yellow Podzolic Soils and Soloths on lower slopes and in drainage depressions and localised areas of poor drainage. Limitations include moderately reactive highly plastic subsoil, low soil fertility and poor soil drainage.
Acid Sulfate Soil Risk	With reference to the Prospect / Parramatta River Acid Sulfate Soil Risk Map (1:25,000 scale; Murphy, 1997), the subject land lies within the map class description of '*No Known Occurrence*'. With reference to the Liverpool Local Environmental Plan 2008 Acid Sulfate Soils (ASS) map (ASS-011) the site is mapped as *Class 5* Acid Sulfate Soils. In such cases, acid sulfate soils (ASS) are not known or expected to occur and

Attribute	Description
	"land management activities are not likely to be affected by ASS materials."
Nearest Surface Water Feature	The nearest watercourse is Georges River located approximately 500 metres south-east of the site, which flows into Botany Bay.
Groundwater Flow Direction	Groundwater flow direction in the vicinity of the site is inferred to be south-east towards the Georges River.

2.4 Groundwater Bore Records and Groundwater Use

An online search for registered groundwater bores was conducted by EI on the 2 July 2019 through the NSW Office of Water (Ref. http:// realtimedata.water.nsw.gov.au/water.stm). There were no registered bores within 500m of the site as shown in **Appendix E**.

2.5 Site Walkover Inspection

Site observations were recorded during a site walkover inspection of the site conducted on 27 June 2019. The summary of site observations is detailed below.

With reference to the photographs taken during the inspection (Ref. **Appendix D**), pertinent site observations were summarised as follows:

- The site was a vacant land. The site was covered by overgrown grass.
- Fibre-cement pieces were observed on the surface across the site.
- Surrounding land uses was mainly residential to the north and west, high school to the east and medical research centre to the south.
- No unusual odours were detected during the inspection.
- No evidence that an underground petroleum storage system (UPSS) was observed.

3. Previous Investigations

3.1 Available documents

Previous environmental investigation:

- Stage 1 Environmental Site Assessment, 41-43 Forbes Street, Liverpool, NSW, by Environmental Investigation, (Ref. No. E1379.1 dated 30 May 2011).

3.2 Site History Overview

Historical aerial photography indicate the site appeared to have been bushland/vacant land until sometime between 1951 and 1961 when residential dwellings were constructed on the site with associated driveways and yards. The surrounding properties to the north, south and west appeared to have been established for residential or light commercial use at various stages in time.

Land titles search indicate the site to have been owned by a number of individuals since 1898 and mainly used for residential purposes.

The site or sites in close proximity were free of statutory notices issued by the NSW Environment Protection Authority (EPA) under the Contaminated Land Management Act 1997 and the Protection of the Environment Operations Act 1997.

3.3 Findings and Recommendation

On the basis of site history information collected and the site walkover inspection during Stage 1 Environmental Site Assessment, potential Areas of Environmental Concern (AEC) and Contaminants of Concern were identified as:

- The entire site where some hazardous building demolition rubble and asbestos fragments may located in surface soils (AEC1); and
- Imported fill across the site for levelling purposes (AEC 2).

In view of the findings of the Stage 1 ESA, it was concluded that further assessment (Stage 2 ESA) is required to confirm that the site soils would not pose a risk to users of the site.

4. Conceptual Site Model

In accordance with NEPC (2013) *Schedule B2 – Guideline on Site Characterisation* and to aid in the assessment of data collection for the site, EI developed a preliminary conceptual site model (CSM) assessing plausible pollutant linkages between potential contamination sources, migration pathways and receptors. The CSM provides a framework for the review of the reliability and useability of the data collected and to identify data gaps in the existing site characterisation.

4.1 Subsurface Conditions

Based on the site visit on 27 June 2019, the subsurface conditions of the site were expected to be a fill layer, over residual soils.

4.2 Potential Contamination Sources

On the basis of site history and search findings (described in **Section 3**), EI considered the potential chemical hazards and onsite contamination sources to be as follows:

- Imported fill soils of unknown origin distributed across the site; and
- Hazardous materials, including potential asbestos-containing materials (ACM), from the demolished buildings.

4.3 Chemicals of Concern

Based on the findings of the site contamination appraisal, the chemicals of concern (COC) at the site were considered to be:

- Soil – heavy metals (HM), total recoverable hydrocarbons (TRH), the monocyclic aromatic hydrocarbon compounds benzene, toluene, ethyl-benzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), organochlorine and organophosphorus pesticides (OCP/ OPP), polychlorinated biphenyls (PCB) and asbestos.

4.4 Potential Sources, Exposure Pathways and Receptors

Potential contamination sources, exposure pathways and human and environmental receptors that were considered relevant for this investigation are summarised in **Table 4-1**, along with a qualitative assessment of the potential risks posed by complete exposure pathways.

Table 4-1 Preliminary Conceptual Site Model

Site Area	Subsurface Profile	Potential Sources	Potential Contaminants	Media	Sensitive Receptor	Migration & Exposure Pathways	Potential Risk of Complete Exposure Pathway
Site footprint	Potentially impacted fill over the residual clay soils.	Imported filling	Heavy Metals, TRH, BETX, PAH, OCP, OPP and Asbestos	Soils	Future residents, construction workers	Seepage into the subsurface soils. Dermal Contact Ingestion Inhalation	H
Site footprint	Surface soil	Building demolition rubble from the former buildings	Asbestos	near surface soils	Future residents, construction workers	Dermal Contact Ingestion Inhalation	H

Note 1 L = Low Risk; M = Moderate Risk; H = High Risk

4.5 Data Gaps

Based on information from the site walkover inspection, previous environmental investigations and site history review, EI considered a programme of intrusive investigation was warranted to conduct targeted sampling at locations of known, potential sources of contamination (as listed in **Section 4.2**), with systematic sampling coverage in site areas where operational site history was not documented.

5. Sampling, Analytical and Quality Plan (SAQP)

The SAQP ensured that the data collected during intrusive works at the site were representative and provided a robust basis for site assessment decisions. The SAQP included the following:

- Data quality objectives, including a summary of the objectives of the DSI;
- Investigation (sampling) methodology, including the media to be sampled, details of analytes and parameters to be monitored and a description of intended sampling points;
- Field screening methods;
- Laboratory analysis methods;
- Sample handling, preservation and storage; and
- Analytical QA/QC.

5.1 Data Quality Objectives (DQO)

In accordance with the USEPA (2006) *Data Quality Assessment* and the EPA (2017) *Guidelines for the NSW Site Auditor Scheme*, the process of developing Data Quality Objectives (DQO) was used by the EI assessment team to determine the appropriate level of data quality needed for the specific data requirements of the project. The DQO process that was applied for this investigation is documented in **Table 5-1**.

Table 5-1 Summary of Project Data Quality Objectives

DQO Steps	Details	Comments (changes during investigation)
1. State the Problem Summarise the contamination problem that will require new environmental data, and identify the resources available to resolve the problem; develop a conceptual site model	• The site is to be redeveloped into a residential apartment building. • Previous investigation, historical information and site inspection observations identified the potential for contamination due to various, possible sources, as listed in **Section 5**. • The investigation must provide supportive information on the environmental conditions of the site to determine the site's suitability for the proposed use.	-
2. Identify the Goal of the Study (Identify the decisions) Identify the decisions that need to be made on the contamination problem and the new environmental data required to make them	Based on the objectives outlined in **Section 1.4,** the following decisions are needed: • Has the site been adequately characterised with sufficient and appropriate sampling coverage (vertical and lateral) to assess for the presence of potential contamination sources? • Has the nature, source and extent of any onsite impacts (soil and/or groundwater) been defined? • What influence do site-specific, geologic and hydrogeological conditions have on the fate and transport of any impacts that may be identified? • Does the degree of impacts coupled with the fate and transport of identified contaminants represent an unacceptable risk to identified human and/or environmental receptors on or offsite? • Does the collected data provide sufficient information to allow the selection and design of an appropriate remedial strategy, assuming remedial action is necessary? If not, what are the remaining data gaps requiring closure?	-
3. Identify Information Inputs (Identify inputs to decision) Identify the information needed to support any decision and specify which inputs require new environmental measurements	Inputs to the decision making process include: • Proposed development plans and intended land use; • Previous investigation presented in **Section 3**. • Areas of concern identified during the site inspection, prior to intrusive investigations. • National (NEPC, 2013) and State-based (NSW EPA, various) environmental guidelines. • Investigation results to verify the presence of onsite contamination and to evaluate the risks posed to potential, sensitive receptors. • Relevant COPCs (discussed in **Section 4.3**), to be used for laboratory analysis of selected soil and creek water samples.	-
4. Define the Boundaries of the Study Specify the spatial and temporal aspects of the environmental media that the data must represent to support decision	• Lateral – The investigation will be conducted within the cadastral site boundaries, which define the extent of the investigation, as indicated on **Figure 2**. • Vertical – Investigations will be advanced to the depth of residual soils or bedrock. • Temporal – The findings of this assessment will hold true for as long as the site use remains passive in nature; that is, for as long as the site is used for the proposed use and there are no activities taking place onsite or on immediately adjacent (upgrading) properties that may	-

DQO Steps	Details	Comments (changes during investigation)
	compromise onsite environmental conditions.	
5. Develop the Analytic Approach (Develop a decision rule) To define the parameter of interest, specify the action level, and integrate previous DQO outputs into a single statement that describes a logical basis for choosing from alternative actions	The decision rules for the investigation were: • If the concentrations of contaminants in the soil data exceed the adopted criteria; then assess the need to further investigate the extent of impacts onsite. • Decision criteria for QA/QC measures are defined by the Data Quality Indicators (DQI) in **Table 5-2**.	-
6. Specify Performance or Acceptance Criteria (Specify limits on decision errors) Specify the decision-maker's acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainties in the data	Specific limits for this project were in accordance with National and NSW EPA guidance, and appropriate indicators of data quality and standard procedures for field sampling and handling. This included the following points to quantify tolerable limits: • The null hypothesis for the investigation is that: – The 95% Upper Confidence Limit (UCL) of the mean for chemicals of concern exceed land use criteria (presented in **Section 6.2**). • Sampling on a 10 m grid will allow detection of a circular hotspot with a nominal diameter of 12 m with 95% certainty. • The acceptance of the site was based on the probability that: – The 95% UCL of the mean will satisfy the given site criterion. Therefore a limit on the decision error was 5% that a conclusive statement may be incorrect. – The standard deviation of the results was less than 50% of the relevant remediation acceptance criterion. – No single result exceeded the land use criteria by 250% or more. • Soil concentrations for chemicals of concern that were below investigation criteria made or approved by the NSW EPA were treated as acceptable and indicative of suitability for the proposed land use(s).	-
7. Develop the Detailed Plan for Obtaining Data (Optimise the design for obtaining data) Identify the most resource-effective sampling and analysis design for general data that are expected to satisfy the DQOs	• 6 soil sampling locations, distributed in a systematic pattern across the site. • An upper soil profile sample was collected at each borehole location and tested for chemicals of concern, to assess the environmental condition of the fill layer, and for potential impacts from historical, above-ground activities. Further sampling was also performed in deeper soil layers. Samples were selected for analytical testing based on field observations (including visual and olfactory evidence).	-

5.2 Data Quality Indicators

To ensure that the investigation data were of an acceptable quality, the investigation data set was assessed against the data quality indicators (DQI) outlined in **Table 5-2**, which related to both field and laboratory-based procedures. The assessment of data quality is discussed in **Section 7**.

Table 5-2 Data Quality Indicators

Data Quality Objective	Data Quality Indicator	Acceptable Range
Accuracy	Field – Trip blank (laboratory prepared) Laboratory – Laboratory control spike and matrix spike	< laboratory limit of reporting (LOR) Prescribed by the laboratories
Precision	Field – Blind replicate and spilt duplicate Laboratory – Laboratory duplicate and matrix spike duplicate	< 30 % relative percentage difference (RPD [%]) Prescribed by the laboratories
Representativeness	Field – Trip blank (laboratory prepared) Laboratory – Method blank	< laboratory limit of reporting (LOR) Prescribed by the laboratories
Completeness	Completion (%)	-

6. Assessment Methodology

6.1 Sampling Rationale

With reference to the preliminary CSM described in **Section 4**, soil investigation works were planned in accordance with the following rationale:

- Sampling from 6 test bore locations, located using systematic sampling pattern, to characterise *in situ* soils; and
- Laboratory analysis of representative soil samples for the identified chemicals of concern.

6.2 Assessment Criteria

The criteria adopted for this project are outlined in **Table 6-1**. These were selected from published guidelines that are endorsed by national and state regulatory authorities, with due consideration of the exposure scenario that is expected for various parts of the site, the likely exposure pathways and the identified potential receptors.

Table 6-1 Adopted Investigation Levels for Soil

Environmental Media	Adopted Guidelines	Rationale
Soil	NEPC (2013) Soil HILs, HSLs, EILs/ESLs and Management Limits for TRHs	**Soil Health-based Investigation Levels (HILs)** All samples were assessed against the NEPC (2013) HIL-B thresholds for residential sites with minimal opportunities for soil access. **Soil Health-based Screening Levels (HSLs)** The NEPC (2013) Soil HSL-D thresholds for commercial and industrial sites for vapour intrusion were applied, to assess potential human health impacts from residual vapours resulting from petroleum, BTEX and naphthalene. Soils asbestos results were assessed against the NEPC (2013) Soil HSL thresholds for “all forms of asbestos”. **Ecological Investigation Levels (EILs) / Ecological Screening Levels (ESLs)** EILs / ESLs were considered relevant for any retained deep soils on the site. EILs / ESLs only apply to the top 2 m (root zone). The derived EIL criteria presented by EI are based on the addition of site specific Added Contaminant Limit (ACL) criteria and the Ambient Background Concentration (ABC) for an old low traffic residential suburb. The adopted ESL criteria presented by EI are based on conservative fine grained criteria. **Management Limits for Petroleum Hydrocarbons** Where the HSLs were exceeded for petroleum hydrocarbons, soil samples were assessed against the NEPC (2013) *Management Limits* for the TRH fractions F1 – F4 to assess propensity for phase-separated hydrocarbons (PSH), fire and explosive hazards and adverse effects on buried infrastructure.

For the purposes of this investigation, the adopted soil assessment criteria are referred to as the Soil Investigation Levels (SILs). SILs are presented alongside the analytical results in the corresponding summary tables, which are discussed in **Section 8**.

6.3 Soil Investigation

The soil investigation works conducted at the site are described in **Table 6-2**. Test bore locations are illustrated in **Figure 2**.

Table 6-2 Summary of Soil Investigation Methodology

Activity/Item	Details
Fieldwork	The field work was conducted on 27 June 2019 and comprised 6 test bores.
Drilling Method and Investigation Depth	The test bores were drilled using a hand auger. Final bore depths ranged from 0.5 mBGL to 0.7 mBGL.
Soil Logging	Drilled soils were classified in the field with respect to lithological characteristics and evaluated on a qualitative basis for odour and visual signs of contamination. Soil classifications and descriptions were based on Unified Soil Classification System (USCS) and Australian Standard (AS) 4482.1-2005. Bore logs are presented in **Appendix F**.
Field Observations (including visual and olfactory signs of potential contamination)	A summary of field observations is provided, as follows: ▪ Fibre cement sheet fragments were observed on the surface. ▪ No signs of ash or charcoal materials were detected in any of the drilled boreholes. ▪ No visual signs of oil staining were observed. ▪ No suspicious odours were detected during any stage of the field investigation programme.
Soil Sampling	Soil samples were collected using a dry grab method (unused, dedicated nitrile gloves) and placed into laboratory-supplied, acid-washed, solvent-rinsed glass jars. Blind field duplicates were separated from the primary samples and placed into glass jars. A small amount of duplicate was collected from each soil sample and placed into a zip-lock bag for Photo-ionisation Detector (PID) screening. A small amount of duplicate was separated from all fill samples and placed into a zip-lock bag for asbestos analysis.
Sample Preservation	Samples were stored in a refrigerated (ice-filled) chest, whilst on-site and in transit to the laboratory. All samples were submitted and analysed within the required holding period, as documented in laboratory reports discussed in a later section.
Management of Soil Cuttings	Soil cuttings were used as backfill for completed boreholes.
Quality Control and Laboratory Analysis	Soil samples were submitted for analysis of previously-identified COPC by SGS Laboratories (SGS). QA/QC testing comprised intra-laboratory duplicates ('field duplicates') tested blind by SGS and an inter-laboratory split field duplicate tested by Envirolab Services (Envirolab). All samples were transported under strict Chain-of-Custody (COC) conditions and COC certificates and laboratory sample receipt documentation were provided to EI for confirmation purposes, as discussed in **Section 8**.
Soil Vapour Screening	Screening for potential VOCs in collected soil samples was conducted using a Photo-ionisation Detector (PID), fitted with a 10.9 eV lamp, which was calibrated

Activity/Item	Details
	immediately prior to sampling. PID results were low, ranging from 0.0 to 0.2 ppm. PID readings for each sample from the test boreholes are presented in the test borehole logs (**Appendix F**). The PID calibration certificate is included **Appendix G**.

7. Data Quality Assessment

The assessment of data quality is defined as the scientific and statistical evaluation of environmental data to determine if these data meet the objectives of the project (Ref. USEPA 2006). Data quality assessment includes an evaluation of the compliance of the field sampling and laboratory analytical procedures and an assessment of the accuracy and precision of these data from the laboratory quality control measurements obtained.

The data quality assessment process for this assessment included a review of analytical procedures to confirm compliance with established laboratory protocols and an assessment of the accuracy and precision of analytical data from a range of quality control measurements. The QC measures generated from the field sampling and analytical program were as follows:

- suitable records of fieldwork observations including borehole logs;
- relevant and appropriate sampling plan (density, type, and location);
- use of approved and appropriate sampling methods;
- preservation and storage of samples upon collection and during transport to the laboratory;
- complete field and analytical laboratory sample COC procedures and documentation;
- sample holding times within acceptable limits;
- use of appropriate analytical procedures and NATA-accredited laboratories; and
- required LOR (to allow for comparison with adopted IL);
- frequency of conducting quality control measurements;
- laboratory blanks;
- field duplicates;
- laboratory duplicates;
- matrix spike/matrix spike duplicates (MS/MSDs);
- surrogates (or System Monitoring Compounds);
- analytical results for replicated samples, including field and laboratory duplicates and inter-laboratory duplicates, expressed as Relative Percentage Difference (RPD); and
- checking for the occurrence of apparently unusual or anomalous results, e.g. laboratory results that appear to be inconsistent with field observations or measurements.

The findings of the data quality assessment in relation to the soil investigations at the site are discussed in detail in **Appendix J**. QA/QC policies and DQOs are presented in **Appendix K**.

On the basis of the analytical data validation procedure employed the overall quality of the soil analytical data produced for the site were considered to be of an acceptable standard for interpretive use.

8. Results

8.1 Soil Investigation Results

8.1.1 Site Geology and Subsurface Conditions

The general site lithology encountered during the drilling of the boreholes may be described as a layer of anthropogenic filling overlying residual clay and silt. The geological information obtained during the investigation is summarised in **Table 8-1** and borehole logs from these works are presented in **Appendix F**.

Table 8-1 Generalised Subsurface Profile (m bgl)

Layer	Description	Depth to top and bottom of layer (m bgl)
Fill	Silty Clay, medium plasticity, grey, with rootlets, no odour.	0.0 – 0.3
	Reworked Silty Clay, high plasticity, brown, no odour.	0.0 – 0.2
Residual soils	Clayey silt, low plasticity, pale brown, with ironstone fragments, no odour.	0.2 – 0.7+
	Silty Clay, high plasticity, brown, no odour.	0.1 – 0.7+

Note 1 + Termination depth of borehole.

8.1.2 Field Observations and PID Results

Soil samples were obtained from the test bores at various depths ranging between 0.0m to 0.5mBGL. All examined soil samples were evaluated on a qualitative basis for odour and visual signs of contamination (e.g. hydrocarbon odours, oil staining, petrochemical filming, asbestos fragments, ash, and charcoal) and the following observations were noted:

- No visual or olfactory evidence of hydrocarbon impacts were noted at any of the borehole locations;
- Low VOC readings were identified by the PID screening of the soil headspace samples, ranging from 0.0 to 0.2 parts per million (ppm). The PID results are shown in the borehole logs (**Appendix F**).

8.2 Laboratory Analytical Results

A summary of laboratory results showing test sample quantities, minimum/maximum analyte concentrations and samples found to exceed the SILs, is presented in **Table 8-2**. More detailed tabulation of results showing the tested concentrations for individual samples alongside the adopted soil criteria are presented in **Tables T1** at the end of this report.

Table 8-2 Summary of Soil Analytical Results

No. of primary samples	Analyte	Min. Conc. (mg/kg)	Max. Conc. (mg/kg)	Sample locations exceeding investigation levels
Priority Metals				
8	Arsenic	5	9	None
8	Cadmium	<0.3	<0.3	None
8	Chromium (Total)	9	12	None
8	Copper	9.6	60	None
8	Lead	10	76	None
8	Nickel	0.9	3.8	None
8	Zinc	10	120	None
8	Mercury	<0.05	0.3	None
TRHs (including BTEX)				
8	TRH C_6-C_{10} minus BTEX (F1)	<25	<25	None
8	TRH >C_{10}-C_{16} (F2) minus Naphthalene	<25	<25	None
8	TRH >C_{16}-C_{34} (F3)	<90	<90	None
8	TRH >C_{34}-C_{40} (F4)	<120	<120	None
8	Benzene	<0.1	<0.1	None
8	Toluene	<0.1	<0.1	None
8	Ethylbenzene	<0.1	<0.1	None
8	Total Xylenes	<0.3	<0.3	None
PAHs				
8	Benzo(α)pyrene	<0.1	<0.1	None
8	Carcinogenic PAHs	<0.3	<0.3	None
8	Naphthalene	<0.1	<0.1	None
8	Total PAHs	<0.8	<0.8	None
OCPs				
6	OCPs	<1	1	None
OPPs				
6	OPPs	<1.7	<1.7	None
PCBs				
6	PCBs	<1	<1	None
Asbestos (presence/absence)				
6	Asbestos	ND	Detected	BH106_0.1-0.2

With reference to **Table T1**, all tested soil results were below the corresponding health based SILs for residential sites with minimal opportunities for soil access use, with the exception of asbestos detected in shallow fill at BH106.

9. Site Characterisation

9.1 Review of Conceptual Site Model

On the basis of investigation findings, the CSM discussed in **Section 4** was considered to appropriately identify contamination sources, migration mechanisms and exposure pathways, as well as potential onsite and offsite receptors. Data gaps outlined in **Section 4.5** have largely been addressed.

9.2 Soil Impacts

Contaminant concentrations in soils were found to be below the adopted human health-based criteria for residential land use settings (with minimal soil access), with the exception of non-respirable asbestos identified in shallow fill at BH106. Asbestos fragments were identified across the site surface and the asbestos identified in shallow fill at BH106 was likely resultant of asbestos fragments getting tracked over by machinery during demolition or former structures.

As asbestos fragments were identified across the surface of the site and the thin nature of fill soils identified (max. thickness 0.3m), it is recommended that site wide fill soils (including those in setback areas) are excavated and removed from the site. Following all fill removal it is recommended that the underlying natural soils surface is inspected and surface validation samples are collected to confirm the effective removal of all asbestos containing material.

10. Conclusions

The property located at 41-43 Forbes Street, Liverpool NSW was the subject of a Detailed Site Investigation, which was conducted in order to assess the nature and degree of on-site contamination associated with current and former site uses of the land. Based on the findings of this DSI it was concluded that:

- The site had mainly been used for residential purposes since 1950s.
- During the site inspection on the 27 June 2019 all former structures had been demolished and the site was vacant land. Asbestos fragments were observed across the site surface and were likely sourced from former building structures.
- The sub-surface layers observed at six test borehole locations across of the site during this investigation comprised of fill materials (max. thickness 0.3m), overlying residual clays and silt.
- Laboratory results for soil samples collected reported concentrations below the adopted SILs, with the exception of asbestos in fill sample BH106_0.1-0.2.

Based on the findings of this DSI and with consideration of the Statement of Limitations (**Section 12**), EI concluded that surficial asbestos contamination was identified. The site can be made suitable for the proposed development, subject to implementing the recommendations specified in **Section 11**.

11. Recommendations

In view of the findings of this investigation and in accordance with the NEPC (2013) guidelines, it is considered that the site can be made suitable for the proposed mixed commercial and residential development on completion of the following recommendations:

- Asbestos Containing Material (ACM) was found across the surface of the site and in shallow fill at BH106. In light of this finding and the thin nature of fill soils identified (max. thickness 0.3m), site wide fill should be classified in accordance with the NSW EPA (2014) Waste Classification Guidelines, excavated and disposed of to an appropriately licensed landfill. Prior to removal preparation of an Asbestos Removal Management Plan must be prepared by the environmental consultant and followed by the excavation contractor to ensure all asbestos impacted fill soils are safely removed from the site and appropriately management;
- Following offsite disposal of site wide fill, a site walkover inspection and subsequent surface validation is required to validate the site is free of fill material and natural clay exposed;
- Preparation of an asbestos clearance report by a suitably qualified environmental consultant, certifying that all asbestos impacted fill soils have been removed from the site.
- Any soil materials being removed from site (including virgin excavated natural materials or VENM) be classified for off-site disposal in accordance the EPA (2014) *Waste Classification Guidelines*;
- Any material being imported to the site should be assessed for potential contamination, in accordance with NSW EPA guidelines, as being suitable for the intended use or be classified as virgin excavated natural material (VENM); and
- Should unexpected finds (contamination) be encountered during redevelopment works a qualified environmental consultant be engaged to inspect the finds and offer the appropriate guidance.

12. Statement of Limitations

The findings presented in this report are the result of discrete and specific sampling methodologies used in accordance with best industry practices and standards. Due to the site-specific nature of soil sampling from point locations, it is considered likely that all variations in subsurface conditions across a site cannot be fully defined, no matter how comprehensive the field investigation program.

While normal assessments of data reliability have been made, EI assumes no responsibility or liability for errors in any data obtained from previous assessments conducted on site, regulatory agencies (e.g. Council, EPA), statements from sources outside of EI, or developments resulting from situations outside the scope of works of this project.

Despite all reasonable care and diligence, the ground conditions encountered and concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. In addition, site characteristics may change at any time in response to variations in natural conditions, chemical reactions and other events, e.g. groundwater movement and or spillages of contaminating substances. These changes may occur subsequent to EI's investigations and assessment.

EI's assessment is necessarily based upon the result of the site investigation and the restricted program of surface and subsurface sampling, screening and chemical testing which was set out in the proposal. Neither EI, nor any other reputable consultant, can provide unqualified warranties nor does EI assume any liability for site conditions not observed or accessible during the time of the investigations.

This report was prepared for the above named client and no responsibility is accepted for use of any part of this report in any other context or for any other purpose or by other third parties. This report does not purport to provide legal advice.

This report and associated documents remain the property of EI subject to payment of all fees due for this assessment. The report shall not be reproduced except in full and with prior written permission by EI.

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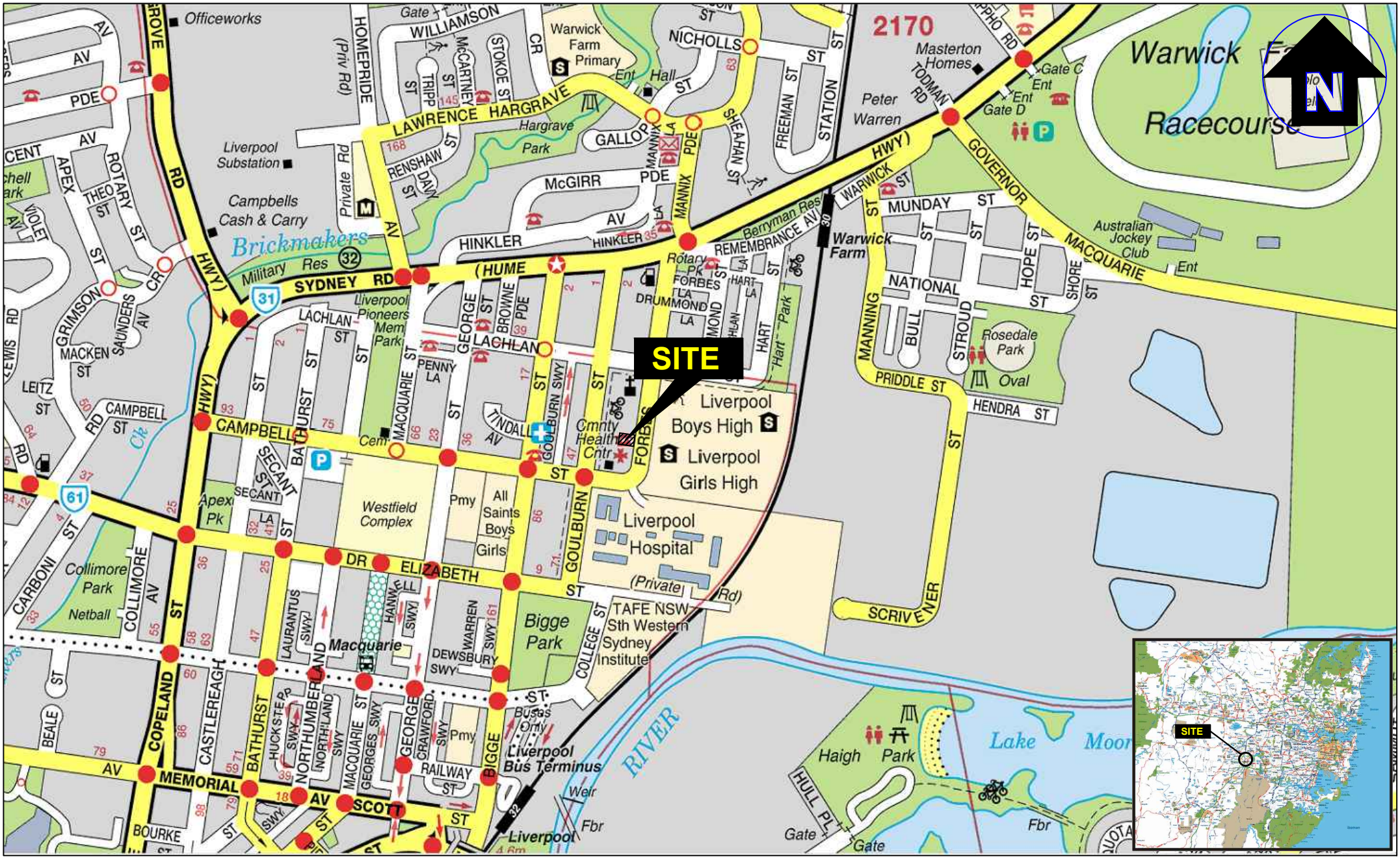
Abbreviations

ACM	Asbestos-containing materials
ASS	Acid sulfate soils
AST	Above-Ground Storage Tank
ANZECC	Australian and New Zealand Environment Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
B(a)P	Benzo(a)Pyrene (a PAH compound), - B(a)P TEQ Toxicity Equivalent Quotient
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
COC	Chain of Custody
DA	Development Application
DP	Deposited Plan
EPA	Environment Protection Authority NSW
F1	TRH C_6 – C_{10} less the sum of BTEX concentrations (Ref. NEPM 2013, Schedule B1)
F2	TRH >C_{10} – C_{16} less the concentration of naphthalene (Ref. NEPM 2013, Schedule B1)
HIL	Health-based Investigation Level
HSL	Health-based Screening Level
km	Kilometres
EIL	Ecological Investigation Level
ESL	Ecological Screening Level
m	Metres
m AHD	Metres Australian Height Datum
m BGL	Metres Below Ground Level
mg/m^3	Milligrams per cubic metre
mV	Millivolts
NATA	National Association of Testing Authorities, Australia
NEPC	National Environmental Protection Council
NSW	New South Wales
OEH	Office of Environment and Heritage, NSW (formerly DEC, DECC, DECCW)
PAHs	Polycyclic Aromatic Hydrocarbons
pH	Measure of the acidity or basicity of an aqueous solution
PQL	Practical Quantitation Limit (limit of detection for respective laboratory instruments)
QA/QC	Quality Assurance / Quality Control
RAP	Remediation Action Plan
SRA	Sample receipt advice (document confirming laboratory receipt of samples)
TCLP	Toxicity Characteristics Leaching Procedure
TPH	Total Petroleum Hydrocarbons (superseded term equivalent to TRH)
TRH	Total Recoverable Hydrocarbons (non-specific analysis of organic compounds)
UCL	Upper Confidence Limit of the mean
USEPA	United States Environmental Protection Agency
UPSS	Underground Petroleum Storage System
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds (specific organic compounds which are volatile)

Appendix A - Figures



Drawn:	L.Y.	
Approved:	E.W.	
Date:	04-07-19	
Scale:	Not To Scale	

Uno Constructions Pty Ltd

Detailed Site Investigation

41-43 Forbes Street, Liverpool NSW

Site Locality Plan

Figure: 1

Project: E24270.E02_Rev0

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Ph (02) 9516 0722 Fax (02) 9518 5088

LEGEND

- Approximate site boundary
- Approximate borehole location
- Approximate proposed deep soil area

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Ph (02) 9516 0722 Fax (02) 9518 5088

Drawn:	L.Y.
Approved:	E.W.
Date:	04-07-19

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Detailed Site Investigation

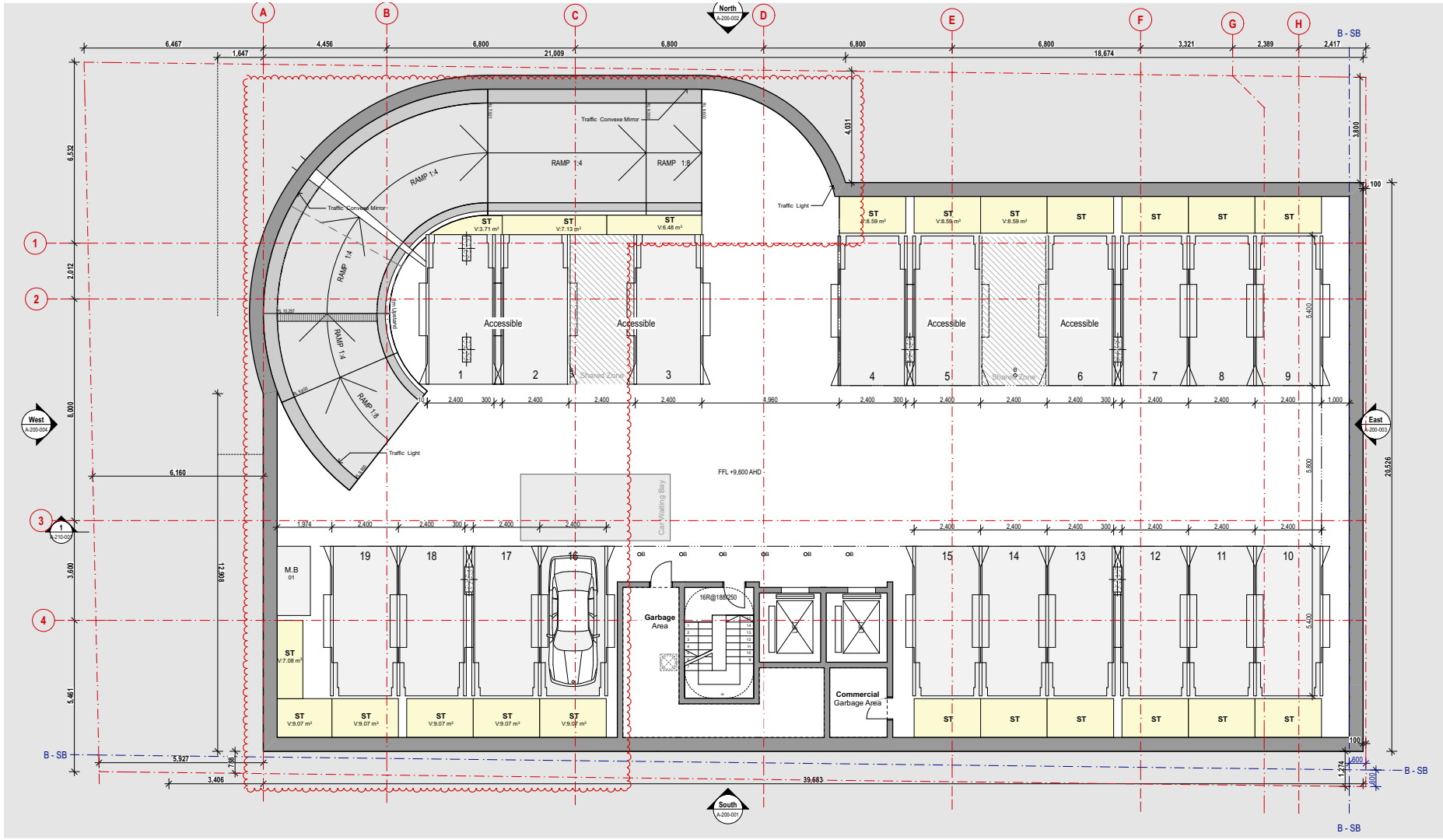
41-43 Forbes Street, Liverpool NSW

Sampling Location Plan

Figure: 2

Project: E24270.E02_Rev0

Appendix B - Proposed Development Plans



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Rev	Description	Drawn	Date
A	DA Submission	VA / CJ	18/06/22
B	DA Additional information	VA / CJ	18/07/09
C	For DA changes as clouded	PL / CJ	19/03/26

ALL LEVELS TO AUSTRALIAN HEIGHT DATUM.

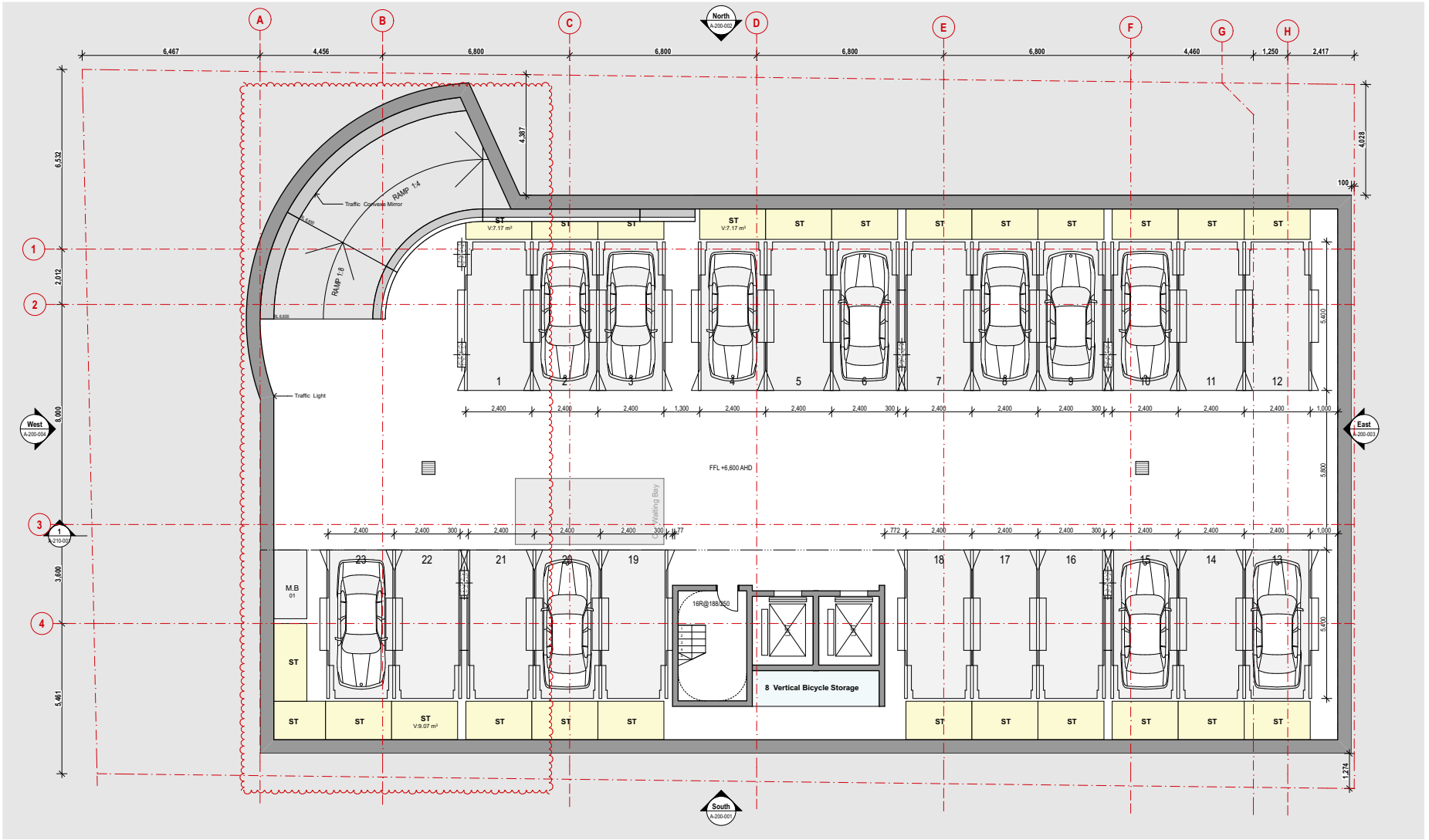
IT IS THE CONTRACTORS RESPONSIBILITY TO CONFIRM ALL MEASUREMENTS ON SITE PRIOR TO COMMENCEMENT OF WORK. DRAWINGS SHOULD NOT BE SCALED. WRITTEN DIMENSIONS ONLY SHOULD BE TAKEN FROM DRAWINGS. ALL DIMENSIONING IS TO SUBSTRATE BRICKWORK / BLOCKWORK UNLESS OTHERWISE NOTED.

Project
41-43 Forbes Street

Title
Basement 1

Job No.	1803
Scale	1:150 @ A3
Date	18/07/09
Drawn/Checked	VA / CJ

Dwg No. **A-110 -001** Rev. **C**



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Rev	Description	Drawn	Date
A	DA Submission	VA / CJ	18/06/22
B	DA Additional information	VA / CJ	18/07/09
C	For DA changes as clouded	PL / CJ	19/03/26

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41-43 Forbes Street

Title
Basement 2

Job No.	1803
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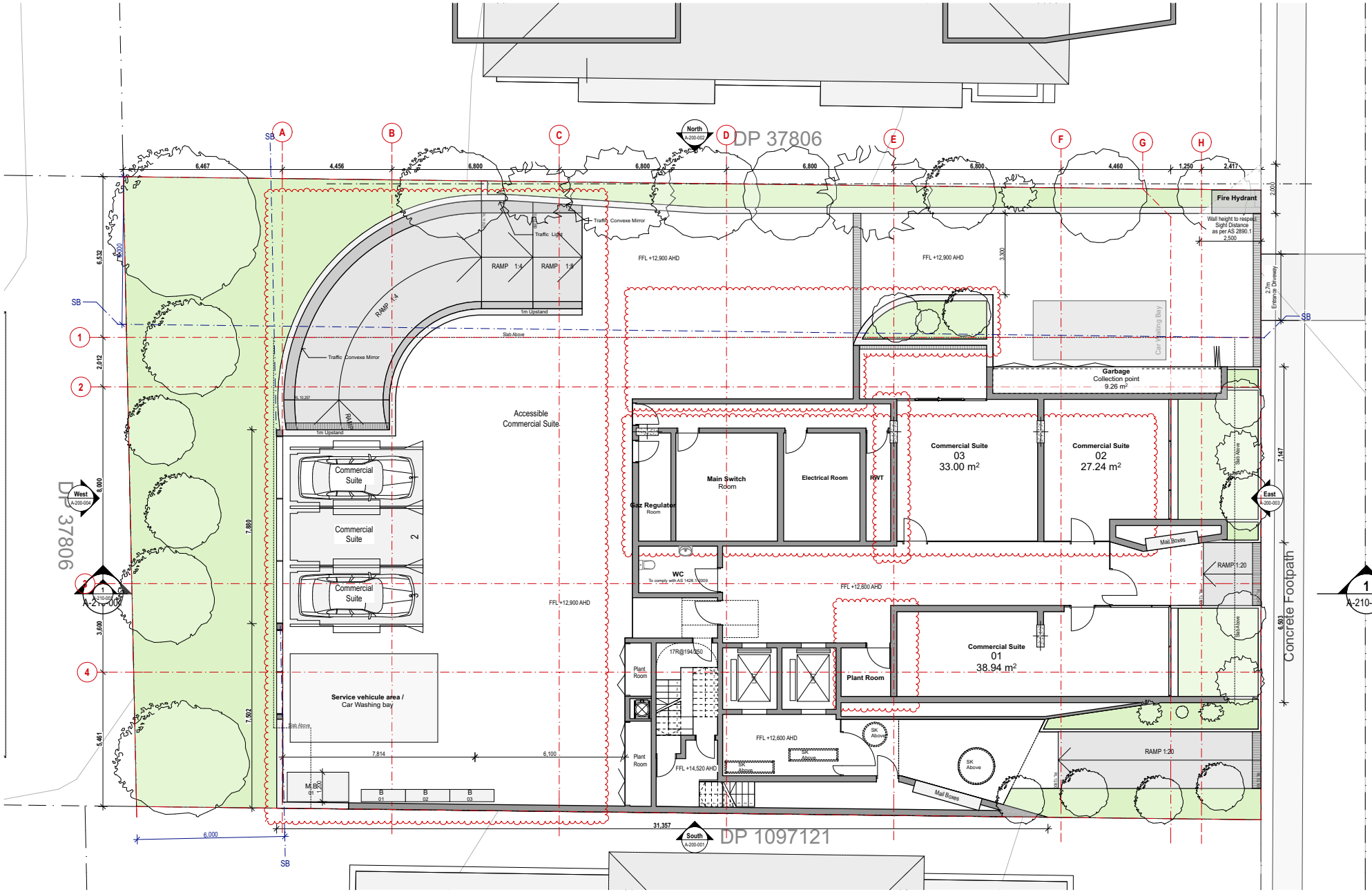
Date	18/07/09
Drawn/Checked	VA / CJ

Dwg No. **A-110 -000** Rev. **C**



All room dimension are in Meter

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Rev	Description	Drawn	Date
A	DA Submission	VA / CJ	18/06/22
B	DA Additional information	VA / CJ	18/07/09
C	For DA changes as clouded	PL / CJ	19/03/26
D	For DA changes as clouded	SR / CJ	29/04/29

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Project
41-43 Forbes Street

Title
Ground Level

Job No.	1803
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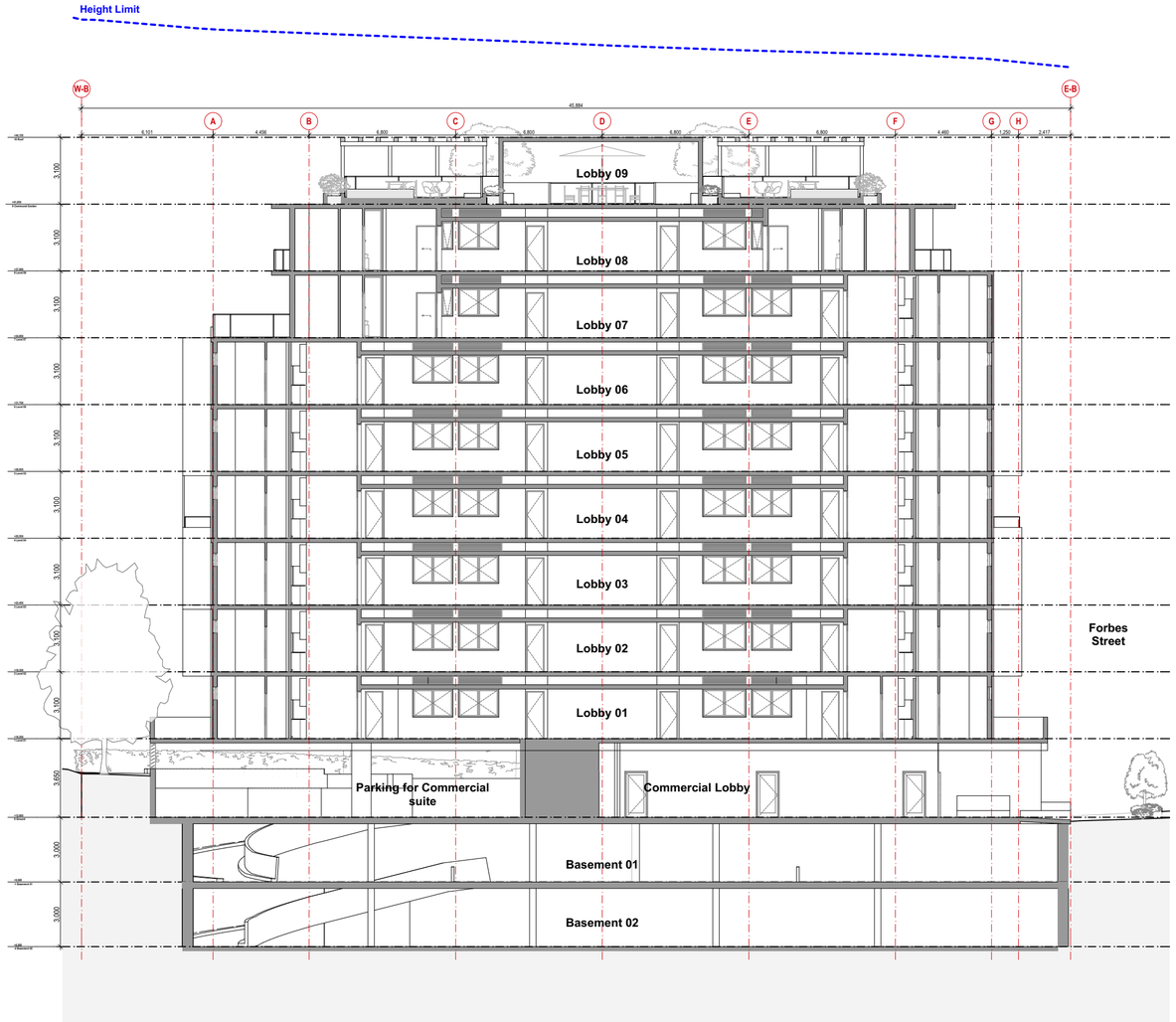
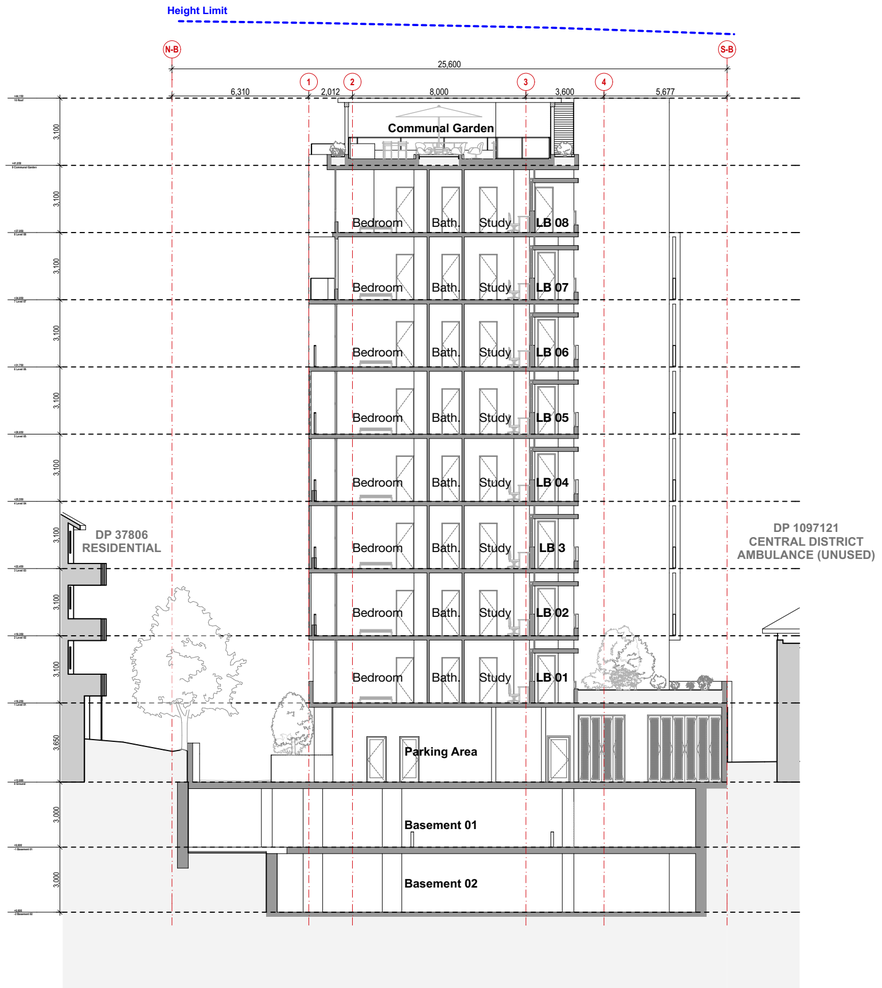
Date	29/04/2019
Drawn/Checked	SR/CJ

Dwg No. **A-110 -002** Rev. **D**



Section AA



Section BB

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Client
Clempton Holdings Pty Ltd

Rev	Description	Drawn	Date
A	DA Sudmission	VA / CJ	18/06/22

ALL LEVELS TO AUSTRALIAN HEIGHT DATUM.

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Project
41-43 Forbes Street

Title
Sections

Job No.	1803
Scale	1:200 @ A2
Date	18/06/22
Drawn/Checked	VA / CJ

Dwg No. **A-210-001** Rev. **A**

Appendix C - Summary Table

Table T1 - Summary of Soil Analytical Results

Sample ID	Sampling Date	Heavy Metals								PAHs				BTEX				TRH				Pesticides		PCBs	Asbestos
		As	Cd	Cr#	Cu	Pb	Hg	Ni	Zn	Carcinogenic PAHs (as B(a)P TEQ)	Benzo(a)pyrene	Total PAHs	Naphthalene	Benzene	Toluene	Ethylbenzene	Total Xylenes	F1	F2	F3	F4	OCPs	OPPs	Total PCB	Presence / Absence
BH101_0.1-0.2	27/06/2019	6	<0.3	11	19	59	0.24	3.6	69	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	1	<1.7	<1	No
BH101_0.3-0.4		5	<0.3	11	11	32	0.15	2.8	12	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	NA	NA	NA	NA
BH102_0.1-0.2		5	<0.3	9	12	43	0.13	2.7	32	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH103_0.1-0.2		5	<0.3	11	60	76	0.22	3.8	120	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH104.0.1-0.2		6	<0.3	11	11	57	0.3	3.2	18	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH105_0-0.1		5	<0.3	12	15	43	0.26	2.4	30	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	No
BH105_0.2-0.3		6	<0.3	11	9.6	10	<0.05	0.9	10	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	NA	NA	NA	NA
BH106_0.1-0.2		7	<0.3	11	18	32	0.26	2.5	22	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	<1	<1.7	<1	Yes
Statistic Summary																									
Maximium		7	<0.3	12	60	76	0.3	3.8	120	<0.3	<0.1	<0.8	<0.1	<0.1	<0.1	<0.1	<0.3	<25	<25	<90	<120	1	<1.7	<1	Yes
SILs																									
HIL B - *Residential*		500	150	500 Cr(VI)	30,000	1,200	120	1,200	60,000	4		400										600		1	
HSL D - *Industrial/commercial* Clay [1]		Source depths (0 m to <1 m. BGL)											NL	4	NL	NL	NL	310	NL						
		Source depths (1 m to <2 m. BGL)											NL	6	NL	NL	NL	480	NL						
		Source depths (2 m to <4 m. BGL)											NL	9	NL	NL	NL	NL	NL						
		Source depths (4 m + BGL)											NL	20	NL	NL	NL	NL	NL						
EILs / ESLs - Urban Residential and Public Open Space [1] [2]		100		408	150	1,100		245	495		0.7		170	65	105	125	45	180	120	1300	5600	180			
Management Limits – *Commercial/Industrial* [1]																		800	1000	3500	10000				
Asbestos contamination HSL – D (*Commercial / Industrial*) Bonded ACM (%w/w)																									Presence / Absence

Notes:

All results are recorded in mg/kg except TCLP with µg/L

Highlighted values indicates concentration exceeds Human Health Based Soil Criteria (HIL B / HSL D)□

Highlighted indicates NEPM 2013 criteria exceeded

HIL B	NEPC 1999 Amendment 2013 'HIL B' - Health based Residential with minimal garden/accessible soil, also includes dwellings with fully and permanenetly paved yard space such as high-rise buildings and apartments.
HSL D	NEPC 1999 Amendment 2013 'HSL D' Health Based Screening Levels applicable for vapour intrusion values applicable for commercial / industrial settings.
#	Thresholds are for Chromium VI.
NR	No current published criterion.
NL	Not Limiting' If the derived soil vapour limit exceeds the soil concentration at which the pore water phase cannot dissolve any more of the individual chemical
ND	'Not detected' i.e. all concentrations of the compounds within the analyte group were found to be below the laboratory limits of detection.
NA	'Not Analysed' i.e. the sample was not analysed.
1	Fine Grained soil values were applied, being the most conservative of the material types.
2	EIL criteria is derived from a site specific Added Contaminant Limit (ACL) with the Ambient Background Concentration (ABC) for an old NSW and low traffic suburb. In lack of physiochemical properties for soils across the site, a site specific ACL criteria for heavy metals based on averaged physiochemical properties presented in Chapman and Murphy (1989) for the Blacktown (bt) soil landscape.
F1	To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.
F2	To obtain F2 subtract naphthalene from the >C10-C16 fraction.
F3	(>C16-C34)
F4	(>C34-C40)

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Appendix D - Site Photography

Photo 1: Site condition, looking south-west

Photo 2: Site condition, looking west

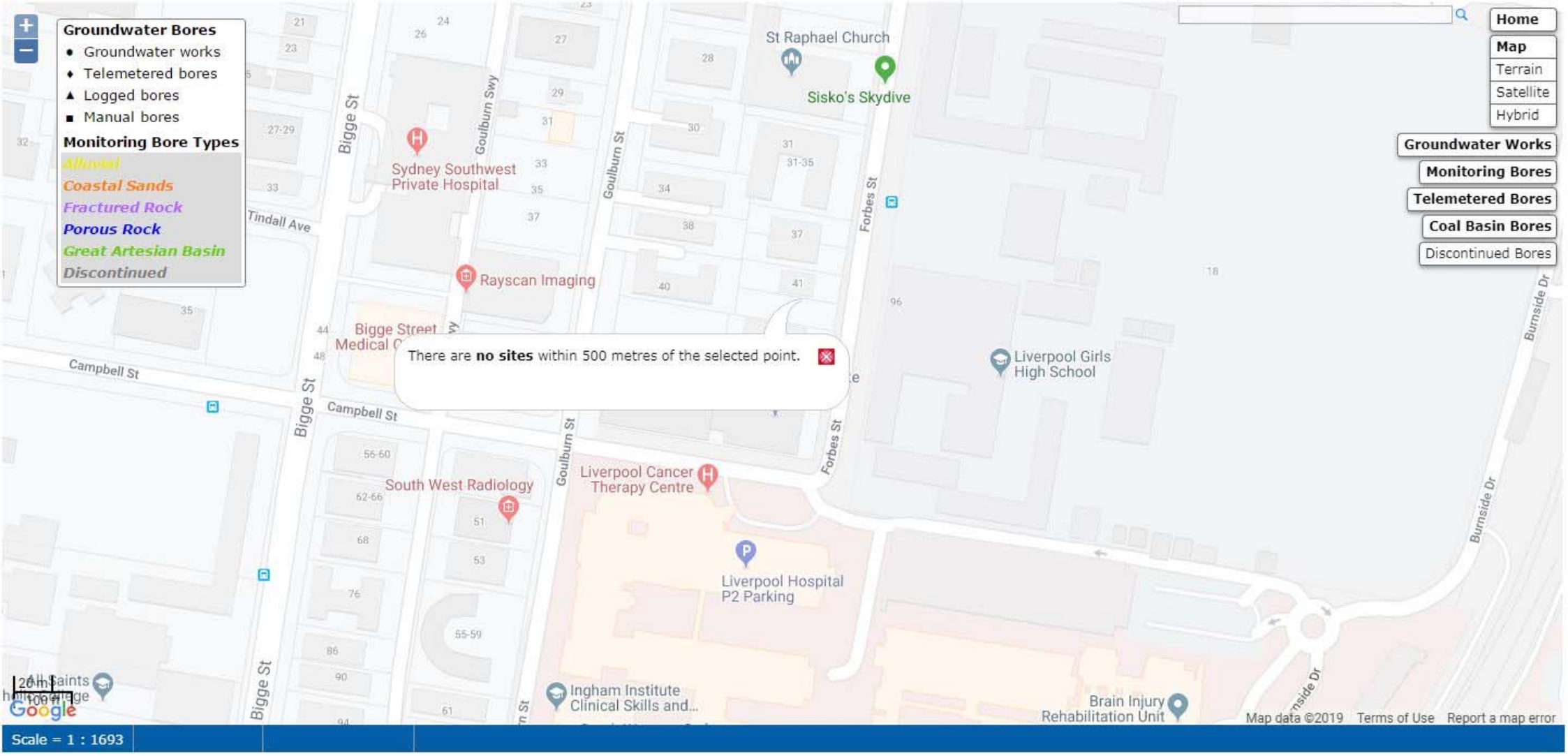
Photo 3: Site condition, looking east

Photo 4: Asbestos fragments observed on the surface of the site

Photo 5: Natural silty clay encountered in test bores

Photo 6: General look of site fill and natural clayey silt encountered in test bores

Appendix E - Groundwater Bore Search


Groundwater Bores
Groundwater works
Telemetered bores
Logged bores
Manual bores
Monitoring Bore Types
Alluvial
Coastal Sands
Fractured Rock
Porous Rock
Great Artesian Basin
Discontinued
Home
Map
Terrain
Satellite
Hybrid
Groundwater Works
Monitoring Bores
Telemetered Bores
Coal Basin Bores
Discontinued Bores
There are no sites within 500 metres of the selected point.
St Raphael Church
Sisko's Skydive
Sydney Southwest Private Hospital
Rayscan Imaging
Bigge Street Medical C
Liverpool Girls High School
South West Radiology
Liverpool Cancer Therapy Centre
Liverpool Hospital P2 Parking
Ingham Institute Clinical Skills and...
Brain Injury Rehabilitation Unit
All Saints
Bigge St
Goulburn Swy
Goulburn St
Forbes St
Tindall Ave
Campbell St
Burnside Dr
20 m
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Scale = 1 : 1693

Appendix F - Borehole Logs

BOREHOLE: BH101

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Project	Detailed Site Investigation			Sheet	1 OF 1
Location	41-43 Forbes Street, Liverpool NSW			Date Started	27/6/19
Position	Refer to Figure 2			Date Completed	27/6/19
Job No.	E24270	Contractor		Logged	LY
Client	Uno Constructions Pty Ltd	Drill Rig	Hand Auger	Checked	EW
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	-	GWNE	0	0.20	BH101_0.1-0.2 ES PID = 0.1 ppm BH101_0.3-0.4 ES PID = 0 ppm			-	FILL: Silty CLAY; medium plasticity, grey, with rootlets, no odour.	M	-	FILL
				0.70					Clayey Silt; low plasticity, pale brown, with ironstone fragments, no odour.	D		RESIDUAL SOIL
			1						Hole Terminated at 0.70 m Target Depth Reached. Backfilled with Drilling Spoil.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH102

eiaustralia
Contamination | Remediation | Geotechnical

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	41-43 Forbes Street, Liverpool NSW			Date Started	27/6/19
Position	Refer to Figure 2			Date Completed	27/6/19
Job No.	E24270	Contractor		Logged	LY
Client	Uno Constructions Pty Ltd	Drill Rig	Hand Auger	Checked	EW
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	-	GWNE	0	0.30	BH102_0.1-0.2 ES PID = 0.2 ppm			-	FILL: Silty CLAY; medium plasticity, grey, with rootlets, no odour.	M	-	FILL
				0.50	BH102_0.4-0.5 ES PID = 0 ppm			CH	Silty CLAY; high plasticity, brown, no odour.	D		RESIDUAL SOIL
			1						Hole Terminated at 0.50 m Target Depth Reached. Backfilled with Drilling Spoil.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH103

eiaustralia
Contamination | Remediation | Geotechnical

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	41-43 Forbes Street, Liverpool NSW			Date Started	27/6/19
Position	Refer to Figure 2			Date Completed	27/6/19
Job No.	E24270	Contractor		Logged	LY
Client	Uno Constructions Pty Ltd	Drill Rig	Hand Auger	Checked	EW
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	-	GWNE	0	0.30	BH103_0.1-0.2 ES PID = 0.1 ppm			-	FILL: Silty CLAY; medium plasticity, grey, with rootlets, no odour.	M	-	FILL
				0.50	BH103_0.4-0.5 ES PID = 0 ppm				Clayey Silt; low plasticity, pale brown, with ironstone fragments, no odour.	D		RESIDUAL SOIL
			1						Hole Terminated at 0.50 m Target Depth Reached. Backfilled with Drilling Spoil.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH104

eiaustralia
Contamination | Remediation | Geotechnical

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	41-43 Forbes Street, Liverpool NSW			Date Started	27/6/19
Position	Refer to Figure 2			Date Completed	27/6/19
Job No.	E24270	Contractor		Logged	LY
Client	Uno Constructions Pty Ltd	Drill Rig	Hand Auger	Checked	EW
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	-	GWNE	0	0.30	BH104_0.1-0.2 ES PID = 0.1 ppm			-	FILL: Silty CLAY; medium plasticity, grey, with rootlets, no odour.	M	-	FILL
				0.70	BH104_0.4-0.5 ES PID = 0 ppm			CH	Silty CLAY; high plasticity, brown, no odour.	D		RESIDUAL SOIL
			1						Hole Terminated at 0.70 m Target Depth Reached. Backfilled with Drilling Spoil.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH105

eiaustralia
Contamination | Remediation | Geotechnical

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	41-43 Forbes Street, Liverpool NSW			Date Started	27/6/19
Position	Refer to Figure 2			Date Completed	27/6/19
Job No.	E24270	Contractor		Logged	LY
Client	Uno Constructions Pty Ltd	Drill Rig	Hand Auger	Checked	EW
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	-	GWNE	0	0.10	BH105_0-0.1 ES PID = 0 ppm			-	FILL: Silty CLAY; high plasticity, brown, reworked, no odour.			FILL
								CH	Silty CLAY; high plasticity, brown, no odour.	M	-	RESIDUAL SOIL
				0.50	BH105_0.2-0.3 ES PID = 0 ppm				Hole Terminated at 0.50 m Target Depth Reached. Backfilled with Drilling Spoil.			
			1									
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

BOREHOLE: BH106

eiaustralia
Contamination | Remediation | Geotechnical

Project	Detailed Site Investigation			Sheet	1 OF 1
Location	41-43 Forbes Street, Liverpool NSW			Date Started	27/6/19
Position	Refer to Figure 2			Date Completed	27/6/19
Job No.	E24270	Contractor		Logged	LY
Client	Uno Constructions Pty Ltd	Drill Rig	Hand Auger	Checked	EW
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	-	GWNE	0	0.20	BH106_0.1-0.2 ES PID = 0 ppm			-	FILL: Silty CLAY; high plasticity, brown, reworked, no odour.			FILL
				0.60	BH106_0.3-0.4 ES PID = 0 ppm			CH	Silty CLAY; high plasticity, brown, no odour.	M	-	RESIDUAL SOIL
			1						Hole Terminated at 0.60 m Target Depth Reached. Backfilled with Drilling Spoil.			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

This borehole log should be read in conjunction with EI Australia's accompanying standard notes.

EXPLANATION OF NOTES, ABBREVIATIONS & TERMS USED ON BOREHOLE AND TEST PIT LOGS

DRILLING/EXCAVATION METHOD

HA	Hand Auger	RD	Rotary blade or drag bit	NQ	Diamond Core - 47 mm
DTC	Diatube Coring	RT	Rotary Tricone bit	NMLC	Diamond Core - 52 mm
NDD	Non-destructive digging	RAB	Rotary Air Blast	HQ	Diamond Core - 63 mm
AS*	Auger Screwing	RC	Reverse Circulation	HMLC	Diamond Core - 63mm
AD*	Auger Drilling	PT	Push Tube	BH	Tractor Mounted Backhoe
*V	V-Bit	CT	Cable Tool Rig	EX	Tracked Hydraulic Excavator
*T	TC-Bit, e.g. ADT	JET	Jetting	EE	Existing Excavation
ADH	Hollow Auger	WB	Washbore or Bailer	HAND	Excavated by Hand Methods

PENETRATION/EXCAVATION RESISTANCE

L **Low resistance.** Rapid penetration/ excavation possible with little effort from equipment used.

M **Medium resistance.** Penetration/ excavation possible at an acceptable rate with moderate effort from equipment used.

H **High resistance.** Penetration/ excavation is possible but at a slow rate and requires significant effort from equipment used.

R **Refusal/ Practical Refusal.** No further progress possible without risk of damage or unacceptable wear to equipment used.

These assessments are subjective and are dependent on many factors, including equipment power and weight, condition of excavation or drilling tools and experience of the operator.

WATER

Water level at date shown

Water inflow

Partial water loss

Complete water loss

GROUNDWATER NOT OBSERVED — Observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave-in of the borehole/ test pit.

GROUNDWATER NOT ENCOUNTERED — Borehole/ test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/ test pit been left open for a longer period.

SAMPLING AND TESTING

SPT	Standard Penetration Test to AS1289.6.3.1-2004
4,7,11 N=18	4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following 150mm
seating 30/80mm	Where practical refusal occurs, the blows and penetration for that interval are reported
RW	Penetration occurred under the rod weight only
HW	Penetration occurred under the hammer and rod weight only
HB	Hammer double bouncing on anvil
Sampling	
DS	Disturbed Sample
BDS	Bulk disturbed Sample
GS	Gas Sample
WS	Water Sample
U63	Thin walled tube sample - number indicates nominal sample diameter in millimetres
Testing	
FP	Field Permeability test over section noted
FVS	Field Vane Shear test expressed as uncorrected shear strength (sv = peak value, sr = residual value)
PID	Photoionisation Detector reading in ppm
PM	Pressuremeter test over section noted
PP	Pocket Penetrometer test expressed as instrument reading in kPa
WPT	Water Pressure tests
DCP	Dynamic Cone Penetrometer test
CPT	Static Cone Penetration test
CPTu	Static Cone Penetration test with pore pressure (u) measurement

RANKING OF VISUALLY OBSERVABLE CONTAMINATION AND ODOUR (for specific soil contamination assessment

R = 0	No visible evidence of contamination	R = A	No non-natural odours identified
R = 1	Slight evidence of visible contamination	R = B	Slight non-natural odours identified
R = 2	Visible contamination	R = C	Moderate non-natural odours identified
R = 3	Significant visible contamination	R = D	Strong non-natural odours identified

ROCK CORE RECOVERY

TCR = Total Core Recovery (%)

$$= \frac{\text{Length of core recevered}}{\text{Lengh of core run}} \text{ x } 100$$

SCR = Solid Core Recovery (%)

$$= \frac{\Sigma \text{ Length ofcylindrical core recevered}}{\text{Lengh of core run}} \text{ x } 100$$

RQD = Rock Quality Designation (%)

$$= \frac{\Sigma \text{Axial Lenghts of core} > 100\text{mm}}{\text{Lengh of core run}} \text{ x } 100$$

MATERIAL BOUNDARIES

———— = inferred boundary

- - - - - - - - = probable boundary

— ?— ?— ?— ? = possible boundary

METHOD OF SOIL DESCRIPTION USED ON BOREHOLE AND TEST PIT LOGS

	FILL		ORGANIC SOILS (OL, OH or Pt)		CLAY (CL, CI or CH)
	COUBLES or BOULDERS		SILT (ML or MH)		SAND (SP or SW)
	GRAVEL (GP or GW)	Combinations of these basic symbols may be used to indicate mixed materials such as sandy clay			

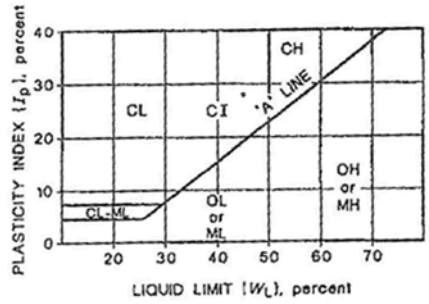
CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil is broadly classified and described in Borehole and Test Pit Logs using the preferred method given in AS1726 – 1993, (Amdt1 – 1994 and Amdt2 – 1994), Appendix A. Material properties are assessed in the field by visual/tactile methods.

PARTICLE SIZE CHARACTERISTICS

Major Division	Sub Division	Particle Size
BOULDERS		>200 mm
COBBLES		63 to 200 mm
GRAVEL	Coarse	20 to 63 mm
	Medium	6 to 20 mm
	Fine	2 to 6 mm
SAND	Coarse	0.6 to 2 mm
	Medium	0.2 to 0.6 mm
	Fine	0.075 to 0.2mm
SILT		0.002 to 0.075 mm
CLAY		<0.002 mm

PLASTICITY PROPERTIES



USCS SYMBOLS

Major Divisions		Symbol	Description
COARSE GRAINED SOILS More than 50% by dry mass less than 63mm is greater than 0.075mm	More than 50% of coarse grains are >2.mm	GW	Well graded gravel and gravel-sand mixtures, little or no fines.
		GP	Poorly graded gravel and gravel-sand mixtures, little or no fines.
		GM	Silty gravel, gravel-sand-silt mixtures.
		GC	Clayey gravel, gravel-sand-clay mixtures.
	More than 50% of coarse grains are <2 mm	SW	Well graded sand and gravelly sand, little or no fines.
		SP	Poorly graded sand and gravelly sand, little or no fines.
		SM	Silty sand, sand-silt mixtures.
		SC	Clayey sand, sandy-clay mixtures.
FINE GRAINED SOILS More than 50% by dry mass less than 63mm is less than 0.075mm	Liquid Limit less < 50%	ML	Inorganic silts of low plasticity, very fine sands, rock flour, silty or clayey fine sands.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
		OL	Organic silts and organic silty clays of low plasticity.
	Liquid Limit > than 50%	MH	Inorganic silts of high plasticity.
		CH	Inorganic clays of high plasticity.
		OH	Organic clays of medium to high plasticity.
		PT	Peat muck and other highly organic soils.

MOISTURE CONDITION

Symbol	Term	Description
D	Dry	Sands and gravels are free flowing. Clays & Silts may be brittle or friable and powdery.
M	Moist	Soils are darker than in the dry condition & may feel cool. Sands and gravels tend to cohere.
W	Wet	Soils exude free water. Sands and gravels tend to cohere.

Moisture content of cohesive soils may also be described in relation to plastic limit (WP) or liquid limit (WL) [» much greater than, > greater than, < less than, « much less than].

CONSISTENCY

Symbol	Term	Undrained Shear Strength
VS	Very Soft	0. to 12 kPa
S	Soft	12 to 25 kPa
F	Firm	25 to 50 kPa
St	Stiff	50 to 100 kPa
VSt	Very Stiff	100 to 200 kPa
H	Hard	Above 200 kPa

DENSITY

Symbol	Term	Density Index %	SPT "N" #
VL	Very Loose	< 15	0 to 4
L	Loose	15 to 35	4 to 10
MD	Medium Density	35 to 65	10 to 30
D	Dense	65 to 85	30 to 50
VD	Very Dense	Above 85	Above 50

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.
SPT correlations are not stated in AS1726 – 1993, and may be subject to corrections for overburden pressure and equipment type.

MINOR COMPONENTS

Term	Assessment Guide	Proportion by Mass
Trace	Presence just detectable by feel or eye but soil properties little or no different to general properties of primary component	Coarse grained soils: ≤ 5% Fine grained soil: ≤15%
Some	Presence easily detectable by feel or eye but soil properties little or no different to general properties of primary component	Coarse grained soils: 5 - 12% Fine grained soil: 15 - 30%

Appendix G - PID Calibration Sheet

EI Australia
Suite 6.01, 55 Miller Street
PYRMONT, NSW, 2009

ABN 33 102 449 507
E service@eiaustralia.com.au
W www.eiaustralia.com.au
T 02 9516 0722

CALIBRATION CERTIFICATE FOR PHOTO IONISATION DETECTOR

Instrument: Mini RAE 3000

Serial Number: 592-906667 - EI **PID02** ☑ **OR** 592-901345 - EI **PID03** ☐

Instrument Conditions: Fine

Calibration gas species: Isobutylene.

Calibration gas concentration: 100 ppm

Gas bottle number: 218055

This PID has been calibrated to Isobutylene gas with the span concentration displayed as

99 ppm at 100 ppm span setting (allowable range +/-10ppm from span setting).

The PID is initially zero calibrated in fresh air.

Remaining gas in bottle: 1250 psi (if reading is <250 psi, notify Equipment Manager to arrange new gas bottle order)

The above detector was calibrated in accordance with manufacturer's specifications.

Signed: [signature]

Date: 27.6.19

Time: 7:30 am

Appendix H - Chain of Custody and Sample Receipt Forms

E-MAILED 27/6/19 @ 5:45pm

Sheet 1 of 2

Site: 41-43 Forbes St, Liverpool.

Project No: E24270

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	Analysis: HM[A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM[A] /TRH/BTEX/PAHs	HM[A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS	Hold			TCLP HM[B] / PAH
BH101_0.1-0.2	1	J, ZB	27/6/19			X		X															
BH101_0.3-0.4	2	↓	↓			↓			X														
BH102_0.1-0.2	3							X															
BH102_0.4-0.5																			X				
BH103_0.1-0.2	4							X															
BH103_0.4-0.5									X										X				
BH104_0.1-0.2	5							X															
BH104_0.4-0.5																			X				
BH105_0-0.1	6							X															
BH105_0.2-0.3	7								X														
BH106_0.1-0.2	8							X															
BH106_0.3-0.4		↓	↓			↓													X				

Comments

HM[A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM[B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- ☐ Standard
- ☐ 24 Hours
- ☐ 48 Hours
- ☑ 72 Hours
- ☐ Other_____

Container Type:
J= solvent washed, acid rinsed,Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

eiaustralia
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC March 2018 FORM v.4 - SGS

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (SGS):
Print: Lan Ye	Print: Alex S
Signature:	Signature:
Date: 27/6/19	Date: 27/6 3.30

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

Sampler's Comments:

SGS Alexandria Environmental

SE194647 COC
Received: 27 – Jun – 2019

Sheet 2 of 2

Site: * As page 1

Project No: E24270

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS				TCLP HM [B] / PAH
Q01	9	J	27/6/19			X				X												

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- [ ] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [x] 72 Hours
- [ ] Other_____

Container Type:
J= solvent washed, acid rinsed,Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (SGS):
Print: Carlie	Print: Alex-S
Signature:	Signature:
Date: 27/6/19	Date: 27/6 3:30

Sampler's Comments:

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

Sheet 1 of 1

Site: 41-43 Forbes St, Liverpool

Project No: E24270

Laboratory: **Envirolab Services**
12 Ashley Street,
CHATSWOOD NSW 2067
P: 02 9910 6200

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	HM Δ /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM Δ /TRH/BTEX/PAHs	HM Δ /TRH/BTEX	BTEX	VOCs	Asbestos	Asbestos Quantification	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	Dewatering Suite	sPOCAS	PFAS				TCLP HM B / PAH
QT1	1	J	27/6/19			X				X													

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

Job No: 220638
Date Received: 28/6/19
Time Received: 17:10
Received by: RZ
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Comments

HM Δ
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM B
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

Dewatering Suite
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

LABORATORY TURNAROUND

- ☐ Standard
- ☐ 24 Hours
- ☐ ~~48 Hours~~
- ☑ 72 Hours
- ☐ Other_____

Container Type:
J= solvent washed, acid rinsed,Teflon sealed, glass jar
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

Sampler's Name (EI):	Received by (Envirolab)
Print: Lan Ye	Print: Kevin Ly
Signature:	Signature:
Date: 28/6/19	Date: 28/6/19

Sampler's Comments:

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

SAMPLE RECEIPT ADVICE

SE194647

CLIENT DETAILS

Contact	Lan Ye
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Lan.ye@eiaustralia.com.au
Project	**E24270 - 41-43 Forbes St, Liverpool**
Order Number	**E24270**
Samples	9

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 27/6/2019
Report Due	Tue 2/7/2019
SGS Reference	**SE194647**

SUBMISSION DETAILS

This is to confirm that 9 samples were received on Thursday 27/6/2019. Results are expected to be ready by COB Tuesday 2/7/2019. Please quote SGS reference SE194647 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	9 Soil
Date documentation received	27/6/2019	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	20°C	Sufficient sample for analysis	Yes
Turnaround time requested	Three Days		

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

4 soil sample has been placed on hold as no tests have been assigned for it. This sample will not be processed.

SAMPLE RECEIPT ADVICE

SE194647

CLIENT DETAILS

Client EI AUSTRALIA

Project E24270 - 41-43 Forbes St, Liverpool

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	BH101_0.1-0.2	29	14	26	11	7	10	12	8
002	BH101_0.3-0.4	-	-	26	-	7	10	12	8
003	BH102_0.1-0.2	29	14	26	11	7	10	12	8
004	BH103_0.1-0.2	29	14	26	11	7	10	12	8
005	BH104.0.1-0.2	29	14	26	11	7	10	12	8
006	BH105_0-0.1	29	14	26	11	7	10	12	8
007	BH105_0.2-0.3	-	-	26	-	7	10	12	8
008	BH106_0.1-0.2	29	14	26	11	7	10	12	8
009	QD1	-	-	-	-	7	10	12	8

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

SE194647

CLIENT DETAILS

Client EI AUSTRALIA

Project E24270 - 41-43 Forbes St, Liverpool

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil	Mercury in Soil	Moisture Content
001	BH101_0.1-0.2	2	1	1
002	BH101_0.3-0.4	-	1	1
003	BH102_0.1-0.2	2	1	1
004	BH103_0.1-0.2	2	1	1
005	BH104.0.1-0.2	2	1	1
006	BH105_0-0.1	2	1	1
007	BH105_0.2-0.3	-	1	1
008	BH106_0.1-0.2	2	1	1
009	QD1	-	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 - Laboratory Analytical Reports

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Lan Ye
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Lan.ye@eiaustralia.com.au
Project	**E24270 - 41-43 Forbes St, Liverpool**
Order Number	**E24270**
Samples	9

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	**SE194647 R0**
Date Received	27/6/2019
Date Reported	2/7/2019

COMMENTS

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

No respirable fibres detected in all soil samples using trace analysis technique.

Sample # 8: asbestos found as approx 6x3x2mm fibrous mass.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Bennet Lo
Senior Organic Chemist/Metals Chemist

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Ravee Sivasubramaniam
Hygiene Team Leader

VOC's in Soil [AN433] Tested: 28/6/2019

PARAMETER	UOM	LOR	BH101_0.1-0.2 SOIL - 27/6/2019 SE194647.001	BH101_0.3-0.4 SOIL - 27/6/2019 SE194647.002	BH102_0.1-0.2 SOIL - 27/6/2019 SE194647.003	BH103_0.1-0.2 SOIL - 27/6/2019 SE194647.004	BH104.0.1-0.2 SOIL - 27/6/2019 SE194647.005
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	BH105_0-0.1 SOIL - 27/6/2019 SE194647.006	BH105_0.2-0.3 SOIL - 27/6/2019 SE194647.007	BH106_0.1-0.2 SOIL - 27/6/2019 SE194647.008	QD1 SOIL - 27/6/2019 SE194647.009
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 28/6/2019

PARAMETER	UOM	LOR	BH101_0.1-0.2 SOIL - 27/6/2019 SE194647.001	BH101_0.3-0.4 SOIL - 27/6/2019 SE194647.002	BH102_0.1-0.2 SOIL - 27/6/2019 SE194647.003	BH103_0.1-0.2 SOIL - 27/6/2019 SE194647.004	BH104.0.1-0.2 SOIL - 27/6/2019 SE194647.005
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH105_0-0.1 SOIL - 27/6/2019 SE194647.006	BH105_0.2-0.3 SOIL - 27/6/2019 SE194647.007	BH106_0.1-0.2 SOIL - 27/6/2019 SE194647.008	QD1 SOIL - 27/6/2019 SE194647.009
TRH C6-C9	mg/kg	20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 28/6/2019

PARAMETER	UOM	LOR	BH101_0.1-0.2 SOIL - 27/6/2019 SE194647.001	BH101_0.3-0.4 SOIL - 27/6/2019 SE194647.002	BH102_0.1-0.2 SOIL - 27/6/2019 SE194647.003	BH103_0.1-0.2 SOIL - 27/6/2019 SE194647.004	BH104.0.1-0.2 SOIL - 27/6/2019 SE194647.005
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH105_0-0.1 SOIL - 27/6/2019 SE194647.006	BH105_0.2-0.3 SOIL - 27/6/2019 SE194647.007	BH106_0.1-0.2 SOIL - 27/6/2019 SE194647.008	QD1 SOIL - 27/6/2019 SE194647.009
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 28/6/2019

PARAMETER	UOM	LOR	BH101_0.1-0.2 SOIL - 27/6/2019 SE194647.001	BH101_0.3-0.4 SOIL - 27/6/2019 SE194647.002	BH102_0.1-0.2 SOIL - 27/6/2019 SE194647.003	BH103_0.1-0.2 SOIL - 27/6/2019 SE194647.004	BH104.0.1-0.2 SOIL - 27/6/2019 SE194647.005
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<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	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8

PARAMETER	UOM	LOR	BH105_0-0.1 SOIL - 27/6/2019 SE194647.006	BH105_0.2-0.3 SOIL - 27/6/2019 SE194647.007	BH106_0.1-0.2 SOIL - 27/6/2019 SE194647.008
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8

OC Pesticides in Soil [AN420] Tested: 28/6/2019

PARAMETER	UOM	LOR	BH101_0.1-0.2 SOIL - 27/6/2019 SE194647.001	BH102_0.1-0.2 SOIL - 27/6/2019 SE194647.003	BH103_0.1-0.2 SOIL - 27/6/2019 SE194647.004	BH104.0.1-0.2 SOIL - 27/6/2019 SE194647.005	BH105_0-0.1 SOIL - 27/6/2019 SE194647.006
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	**0.1**	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	**0.2**	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	**0.1**	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	**1.0**	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	**1**	<1	<1	<1	<1

OC Pesticides in Soil [AN420] Tested: 28/6/2019 (continued)

PARAMETER	UOM	LOR	BH106_0.1-0.2 SOIL - 27/6/2019 SE194647.008
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1
Lindane	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

OP Pesticides in Soil [AN420] Tested: 28/6/2019

PARAMETER	UOM	LOR	BH101_0.1-0.2 SOIL - 27/6/2019 SE194647.001	BH102_0.1-0.2 SOIL - 27/6/2019 SE194647.003	BH103_0.1-0.2 SOIL - 27/6/2019 SE194647.004	BH104.0.1-0.2 SOIL - 27/6/2019 SE194647.005	BH105_0-0.1 SOIL - 27/6/2019 SE194647.006
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7	<1.7

PARAMETER	UOM	LOR	BH106_0.1-0.2 SOIL - 27/6/2019 SE194647.008
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: 28/6/2019

PARAMETER	UOM	LOR	BH101_0.1-0.2 SOIL - 27/6/2019 SE194647.001	BH102_0.1-0.2 SOIL - 27/6/2019 SE194647.003	BH103_0.1-0.2 SOIL - 27/6/2019 SE194647.004	BH104.0.1-0.2 SOIL - 27/6/2019 SE194647.005	BH105_0-0.1 SOIL - 27/6/2019 SE194647.006
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

PARAMETER	UOM	LOR	BH106_0.1-0.2 SOIL - 27/6/2019 SE194647.008
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: 28/6/2019

PARAMETER	UOM	LOR	BH101_0.1-0.2 SOIL - 27/6/2019 SE194647.001	BH101_0.3-0.4 SOIL - 27/6/2019 SE194647.002	BH102_0.1-0.2 SOIL - 27/6/2019 SE194647.003	BH103_0.1-0.2 SOIL - 27/6/2019 SE194647.004	BH104.0.1-0.2 SOIL - 27/6/2019 SE194647.005
Arsenic, As	mg/kg	1	6	5	5	5	6
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	11	11	9.0	11	11
Copper, Cu	mg/kg	0.5	19	11	12	60	11
Lead, Pb	mg/kg	1	59	32	43	76	57
Nickel, Ni	mg/kg	0.5	3.6	2.8	2.7	3.8	3.2
Zinc, Zn	mg/kg	2	69	12	32	120	18

PARAMETER	UOM	LOR	BH105_0-0.1 SOIL - 27/6/2019 SE194647.006	BH105_0.2-0.3 SOIL - 27/6/2019 SE194647.007	BH106_0.1-0.2 SOIL - 27/6/2019 SE194647.008	QD1 SOIL - 27/6/2019 SE194647.009
Arsenic, As	mg/kg	1	5	6	7	4
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	12	11	11	9.2
Copper, Cu	mg/kg	0.5	15	9.6	18	19
Lead, Pb	mg/kg	1	43	10	32	67
Nickel, Ni	mg/kg	0.5	2.4	0.9	2.5	3.8
Zinc, Zn	mg/kg	2	30	10	22	69

Mercury in Soil [AN312] Tested: 28/6/2019

PARAMETER	UOM	LOR	BH101_0.1-0.2 SOIL - 27/6/2019 SE194647.001	BH101_0.3-0.4 SOIL - 27/6/2019 SE194647.002	BH102_0.1-0.2 SOIL - 27/6/2019 SE194647.003	BH103_0.1-0.2 SOIL - 27/6/2019 SE194647.004	BH104.0.1-0.2 SOIL - 27/6/2019 SE194647.005
Mercury	mg/kg	0.05	**0.24**	**0.15**	**0.13**	**0.22**	**0.30**

PARAMETER	UOM	LOR	BH105_0-0.1 SOIL - 27/6/2019 SE194647.006	BH105_0.2-0.3 SOIL - 27/6/2019 SE194647.007	BH106_0.1-0.2 SOIL - 27/6/2019 SE194647.008	QD1 SOIL - 27/6/2019 SE194647.009
Mercury	mg/kg	0.05	**0.26**	<0.05	**0.26**	**0.23**

Moisture Content [AN002] Tested: 28/6/2019

PARAMETER	UOM	LOR	BH101_0.1-0.2 SOIL - 27/6/2019 SE194647.001	BH101_0.3-0.4 SOIL - 27/6/2019 SE194647.002	BH102_0.1-0.2 SOIL - 27/6/2019 SE194647.003	BH103_0.1-0.2 SOIL - 27/6/2019 SE194647.004	BH104.0.1-0.2 SOIL - 27/6/2019 SE194647.005
% Moisture	%w/w	0.5	12	11	13	16	14

PARAMETER	UOM	LOR	BH105_0-0.1 SOIL - 27/6/2019 SE194647.006	BH105_0.2-0.3 SOIL - 27/6/2019 SE194647.007	BH106_0.1-0.2 SOIL - 27/6/2019 SE194647.008	QD1 SOIL - 27/6/2019 SE194647.009
% Moisture	%w/w	0.5	16	20	15	12

Fibre Identification in soil [AN602] Tested: 28/6/2019

PARAMETER	UOM	LOR	BH101_0.1-0.2 SOIL - 27/6/2019 SE194647.001	BH102_0.1-0.2 SOIL - 27/6/2019 SE194647.003	BH103_0.1-0.2 SOIL - 27/6/2019 SE194647.004	BH104.0.1-0.2 SOIL - 27/6/2019 SE194647.005	BH105_0-0.1 SOIL - 27/6/2019 SE194647.006
Asbestos Detected	No unit	-	No	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

PARAMETER	UOM	LOR	BH106_0.1-0.2 SOIL - 27/6/2019 SE194647.008
Asbestos Detected	No unit	-	Yes
Estimated Fibres*	%w/w	0.01	<0.01

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 ASS 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).
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.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

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.		

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.pv.sgsvr/en-gb/environment.

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ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

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Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Lan.ye@eiaustralia.com.au
Project	**E24270 - 41-43 Forbes St, Liverpool**
Order Number	**E24270**
Samples	6

LABORATORY DETAILS

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Laboratory	SGS Alexandria Environmental
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Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE194647 R0**
Date Received	27 Jun 2019
Date Reported	02 Jul 2019

COMMENTS

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

No respirable fibres detected in all soil samples using trace analysis technique.

Sample # 8: asbestos found as approx 6x3x2mm fibrous mass.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Bennet Lo
Senior Organic Chemist/Metals Chemis

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Ravee Sivasubramaniam
Hygiene Team Leader

RESULTS

Fibre Identification in soil — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w*
SE194647.001	BH101_0.1-0.2	Soil	94g Clay,Sand,Soil, Rocks	27 Jun 2019	No Asbestos Found	<0.01
SE194647.003	BH102_0.1-0.2	Soil	69g Clay,Sand,Soil, Rocks	27 Jun 2019	No Asbestos Found	<0.01
SE194647.004	BH103_0.1-0.2	Soil	134g Clay,Sand,Soil, Rocks	27 Jun 2019	No Asbestos Found	<0.01
SE194647.005	BH104.0.1-0.2	Soil	122g Clay,Sand,Soil, Rocks	27 Jun 2019	No Asbestos Found	<0.01
SE194647.006	BH105_0-0.1	Soil	174g Clay,Rocks	27 Jun 2019	No Asbestos Found	<0.01
SE194647.008	BH106_0.1-0.2	Soil	153g Clay,Rocks	27 Jun 2019	Chrysotile & Crocidolite Asbestos Found	<0.01

METHOD SUMMARY

SE194647 R0

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service .
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos -containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

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.pv.sgsvr/en-gb/environment.

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CERTIFICATE OF ANALYSIS 220638

Client Details

Client	EI Australia
Attention	Lab Email
Address	Suite 6.01, 55 Miller Street, Pyrmont, NSW, 2009

Sample Details

Your Reference	**E24270, Liverpool**
Number of Samples	1 soil
Date samples received	28/06/2019
Date completed instructions received	28/06/2019

Analysis Details

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

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

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

Report Details

Date results requested by	03/07/2019
Date of Issue	03/07/2019

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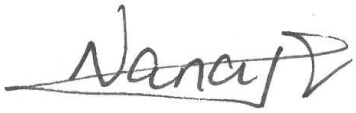
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Jaimie Loa-Kum-Cheung, Metals Supervisor
Steven Luong, Organics Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		220638-1
Your Reference	UNITS	QT1
Date Sampled		27/06/2019
Type of sample		soil
Date extracted	-	01/07/2019
Date analysed	-	03/07/2019
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<3
Surrogate aaa-Trifluorotoluene	%	112

svTRH (C10-C40) in Soil		
Our Reference		220638-1
Your Reference	UNITS	QT1
Date Sampled		27/06/2019
Type of sample		soil
Date extracted	-	01/07/2019
Date analysed	-	01/07/2019
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	91

Acid Extractable metals in soil		
Our Reference		220638-1
Your Reference	UNITS	QT1
Date Sampled		27/06/2019
Type of sample		soil
Date prepared	-	01/07/2019
Date analysed	-	01/07/2019
Arsenic	mg/kg	8
Cadmium	mg/kg	<0.4
Chromium	mg/kg	14
Copper	mg/kg	21
Lead	mg/kg	56
Mercury	mg/kg	0.2
Nickel	mg/kg	5
Zinc	mg/kg	74

Moisture		
Our Reference		220638-1
Your Reference	UNITS	QT1
Date Sampled		27/06/2019
Type of sample		soil
Date prepared	-	01/07/2019
Date analysed	-	02/07/2019
Moisture	%	13

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			01/07/2019	[NT]	[NT]	[NT]	[NT]	01/07/2019	[NT]
Date analysed	-			03/07/2019	[NT]	[NT]	[NT]	[NT]	03/07/2019	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	76	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	[NT]	[NT]	[NT]	[NT]	76	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	[NT]	[NT]	85	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	[NT]	[NT]	77	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	71	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	73	[NT]
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	72	[NT]
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	114	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			01/07/2019	[NT]	[NT]	[NT]	[NT]	01/07/2019	[NT]
Date analysed	-			01/07/2019	[NT]	[NT]	[NT]	[NT]	01/07/2019	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
Surrogate o-Terphenyl	%		Org-003	88	[NT]	[NT]	[NT]	[NT]	113	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			01/07/2019	[NT]	[NT]	[NT]	[NT]	01/07/2019	[NT]
Date analysed	-			01/07/2019	[NT]	[NT]	[NT]	[NT]	01/07/2019	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	103	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	102	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	109	[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.

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; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

Appendix J - QA/QC Assessment

J.1 Site location

J.1.1 Introduction

For the purpose of assessing the quality of data presented in this Contaminant Delineation Report, EI collected field QC samples for analysis. The primary laboratory, SGS Australia Pty Ltd (SGS) and secondary laboratory, Envirolab Services Pty Ltd (Envirolab) also prepared and analysed internal QC samples. Details of the field and laboratory QC samples, with the allowable data acceptance ranges are presented in **Table J-1**.

Table J.1 Sampling Data Quality Indicators

QA/QC Measures	Data Quality Indicators
Precision – A quantitative measure of the variability (or reproducibility) of data	Data precision would be assessed by reviewing the performance of blind field duplicate sample sets, through calculation of relative percentage differences (RPD). Data precision would be deemed acceptable if RPDs are found to be less than 30%. RPDs that exceed this range may be considered acceptable where: ▪ Results are less than 10 times the limits of reporting (LOR); ▪ Results are less than 20 times the LOR and the RPD is less than 50%; or ▪ Heterogeneous materials or volatile compounds are encountered.
Accuracy – A quantitative measure of the closeness of reported data to the "true" value	Data accuracy would be assessed through the analysis of: ▪ Method blanks, which are analysed for the analytes targeted in the primary samples; ▪ Matrix spike and matrix spike duplicate sample sets; ▪ Laboratory control samples; and ▪ Calibration of instruments against known standards.
Representativeness – The confidence (expressed qualitatively) that data are representative of each medium present onsite	To ensure the data produced by the laboratory is representative of conditions encountered in the field, the laboratory would carry out the following: ▪ Blank samples will be run in parallel with field samples to confirm there are no unacceptable instances of laboratory artefacts; ▪ Review of relative percentage differences (RPD) values for field and laboratory duplicates to provide an indication that the samples are generally homogeneous, with no unacceptable instances of significant sample matrix heterogeneities; and ▪ The appropriateness of collection methodologies, handling, storage and preservation techniques will be assessed to ensure/confirm there was minimal opportunity for sample interference or degradation (i.e. volatile loss during transport due to incorrect preservation / transport methods).
Completeness – A measure of the amount of useable data from a data collection activity	Analytical data sets acquired during the assessment will be evaluated as complete, upon confirmation that: ▪ Standard operating procedures (SOPs) for sampling protocols were adhered to; and ▪ Copies of all COC documentation are presented, reviewed and found to be properly completed. It can therefore be considered whether the proportion of "useable data" generated in the data collection activities is sufficient for the purposes of the land use assessment.
Comparability – The confidence (expressed	Given that a reported data set can comprise several data sets from separate sampling episodes, issues of comparability between data sets are

QA/QC Measures	Data Quality Indicators
qualitatively) that data may be considered to be equivalent for each sampling and analytical event	reduced through adherence to SOPs and regulator-endorsed or published guidelines and standards on each data gathering activity. In addition the data will be collected by experienced samplers and NATA-accredited laboratory methodologies will be employed in all laboratory testing programs.

J.1.2 Calculation of Relative Percentage Difference (RPD)

The RPD values were calculated using the following equation:

$$RPD = \frac{|C_O - C_R|}{[(C_O + C_R)/2]} \times 100$$

Where:

C_O = Concentration obtained for the primary sample; and

C_R = Concentration obtained for the blind replicate or split duplicate sample.

J.2 Field QA/QC Data Evaluation

The field quality assurance/quality control (QA/QC) soil samples collected during the investigations were as follows:

- Blind field duplicates; and
- Inter-laboratory duplicates.

Analytical results for tested soil QA/QC samples, including calculated RPD values between primary and duplicate samples, are presented in **Table J-2**.

J.2.1 Soil Investigation & Soil Validation

J.2.1.1 Blind Field Duplicates

One blind field duplicate (BFD) soil sample was collected as follows:

- Sample QD1 was collected from the primary sample BH101_0.1-0.2 on 27 June 2019;

The preparation of the BFD samples involved the collection of a bulk quantity of soil from the same sampling point without mixing, before dividing the material into identical sampling vessels. The duplicate samples were then presented blind to the primary laboratory (SGS) to avoid any potential analytical bias. BFD soil samples were analysed for TRHs, BTEX and selected heavy metals and calculated RPD values were found to be within the Data Acceptance Criteria (**Appendix K**, **Table Q5**).

J.2.1.2 Inter-Laboratory Duplicate

Sample QT1 was collected as an inter-laboratory duplicate (ILD) of the primary sample BH101_0.1-0.2 on 27 June 2019. The preparation of the ILD sample was identical to the BFD sample, as described above, and was analysed for TRHs, BTEX and selected heavy metals. The calculated RPD values were found to be within the Data Acceptance Criteria (**Appendix K**, **Table Q5**).

J.2.2 Assessment of Field QA/QC Data

All samples were classified in the field with respect to soil/fill characteristics and any observable signs of contamination based on visual and odour assessment, in regards to soil.

All samples, including field QC samples, were transported to the primary and secondary laboratories under strict Chain-of-Custody conditions and appropriate copies of relevant documentation were included in the respective reports.

The overall completeness of documentation produced under the field program of the subject assessment was considered to be adequate for the purposes of drawing valid conclusions regarding the environmental condition of the site.

Based on the results of the field QA/QC data EI considered the field QA/QC programme carried out during the investigation to be appropriate and the results to be acceptable.

J.3 LABORATORY QA/QC

J.3.1 Laboratory Accreditation

To undertake all analytical testing, EI commissioned SGS as the primary laboratory and Envirolab as the secondary laboratory. SGS and Envirolab, both established analytical laboratories which operate in accordance with the guidelines set out in ISO/IEC Guide 25 “General requirements for the competence of calibration and testing laboratories”, conducted all respective analyses using National Association Testing Authorities (NATA)-registered procedures.

In relation to contingencies, should the pre-determined DQOs not be achieved, in accordance with each laboratory’s QC policy (**Appendix K**), respective tests would be accordingly repeated. Should the results again fall outside the DQOs, then sample heterogeneity may be assumed and written comment will be provided to this effect on the final laboratory certificate. The laboratory QA/QC reports are included in **Appendix K**.

J.3.2 Sample Holding Times

Sample holding times were generally within the laboratory DQOs, which were consistent with standard environmental protocols as tabulated in **Appendix K**, **Tables QC1** and **QC2**.

J.3.3 Test Methods and Practical Quantitation Limits (PQLs)

Practical Quantitation Limits for all tested parameters during the assessment of soils and groundwater are presented in **Appendix K**, **Tables QC3** and **QC4**.

J.3.4 Method Blanks

Concentrations of all parameters in method blanks during the assessment were below the laboratory PQLs and were therefore within the DAC.

J.3.5 Laboratory Duplicate Samples

The Laboratory Control Samples (LCS) for the analysis batches showed calculated RPDs that were within acceptable ranges and conformed to the DAC.

J.3.6 Laboratory Control Samples

The Laboratory Control Samples for the analysis batches were within acceptable ranges and conformed to the DAC.

J.3.7 Matrix Spikes

All matrix spikes for the respective sample batches were within acceptable ranges and conformed to the DAC.

J.3.8 Surrogate

Recovery results for all surrogate samples conformed to the DAC.

J.3.9 Concluding Remark

Based on the laboratory QA/QC results EI considers that the analytical results for the various phases of laboratory testing were valid and useable for interpretation purposes.

Table J-2 Summary of QA/QC results for Investigation samples

Sample identification	Sampled Date	Description	TRH				BTEX						Heavy Metals							
			F1*	F2**	F3 (>C_{16} - C_{34})	F4 (>C_{34} - C_{40})	Benzene	Toluene	Ethylbenzene	Xylene (total)	m/p-xylene	o-xylene	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc
Intra-laboratory Duplicate																				
BH101_0.1-0.2	27/6/2019	Fill Material	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.2	<0.1	6	<0.3	11	19	59	0.24	3.6	69
QD1	27/6/2019	Replicate of BH101_0.1-0.2	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.2	<0.1	4	<0.3	9.2	19	67	0.23	3.8	69
RPD			***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***40.00***	***0.00***	***17.82***	***0.00***	***12.70***	***4.26***	***5.41***	***0.00***
Inter-laboratory Duplicate																				
BH101_0.1-0.2	27/6/2019	Fill Material	<50	<60	<500	<500	<0.5	<0.5	<0.5	<1.5	<1	<0.5	6	<0.3	11	19	59	0.24	3.6	69
QT1	27/6/2019	Replicate of BH101_0.1-0.2	<25	<50	<100	<100	<2	<0.5	<1	<3	<2	<1	8	<0.4	14	21	56	0.2	5	74
RPD			***NA***	***NA***	***NA***	***NA***	***NA***	***0.00***	***NA***	***NA***	***NA***	***NA***	***28.57***	***NA***	***24.00***	***10.00***	***5.22***	***18.18***	***32.56***	***6.99***

52.17 Indicates values where a single result is found to be less than detection, with the duplicate sample found to be over the detection limit.

82.35 RPD exceeds 30-50% range referenced from AS4482.1 (2005)

NOTE:

All soil results are reported in mg/kg . All water results are reported in µg/L.

* - to obtain F1 subtract the sum of BTEX concentrations from the C_6-C_{10} fraction

** - to obtain F2 subtract naphthalene from the > C_{10}-C_{16} fraction

Appendix K - Laboratory QA/AC Policies and DQOs

STATEMENT OF QA/QC PERFORMANCE

SE194647 R0

CLIENT DETAILS

Contact	Lan Ye
Client	EI AUSTRALIA
Address	SUITE 6.01 55 MILLER STREET PYRMONT NSW 2009
Telephone	61 2 95160722
Facsimile	(Not specified)
Email	Lan.ye@eiaustralia.com.au
Project	**E24270 - 41-43 Forbes St, Liverpool**
Order Number	**E24270**
Samples	9

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	**SE194647 R0**
Date Received	27 Jun 2019
Date Reported	02 Jul 2019

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 (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

HOLDING TIME SUMMARY

SE194647 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 sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Fibre Identification in soil

Method: ME-(AU)-[ENV]AN602

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE194647.001	LB177232	27 Jun 2019	27 Jun 2019	26 Jun 2020	28 Jun 2019	26 Jun 2020	01 Jul 2019
BH102_0.1-0.2	SE194647.003	LB177232	27 Jun 2019	27 Jun 2019	26 Jun 2020	28 Jun 2019	26 Jun 2020	01 Jul 2019
BH103_0.1-0.2	SE194647.004	LB177232	27 Jun 2019	27 Jun 2019	26 Jun 2020	28 Jun 2019	26 Jun 2020	01 Jul 2019
BH104.0.1-0.2	SE194647.005	LB177232	27 Jun 2019	27 Jun 2019	26 Jun 2020	28 Jun 2019	26 Jun 2020	01 Jul 2019
BH105_0-0.1	SE194647.006	LB177232	27 Jun 2019	27 Jun 2019	26 Jun 2020	28 Jun 2019	26 Jun 2020	01 Jul 2019
BH106_0.1-0.2	SE194647.008	LB177232	27 Jun 2019	27 Jun 2019	26 Jun 2020	28 Jun 2019	26 Jun 2020	01 Jul 2019

Mercury in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE194647.001	LB177271	27 Jun 2019	27 Jun 2019	25 Jul 2019	28 Jun 2019	25 Jul 2019	02 Jul 2019
BH101_0.3-0.4	SE194647.002	LB177271	27 Jun 2019	27 Jun 2019	25 Jul 2019	28 Jun 2019	25 Jul 2019	02 Jul 2019
BH102_0.1-0.2	SE194647.003	LB177271	27 Jun 2019	27 Jun 2019	25 Jul 2019	28 Jun 2019	25 Jul 2019	02 Jul 2019
BH103_0.1-0.2	SE194647.004	LB177271	27 Jun 2019	27 Jun 2019	25 Jul 2019	28 Jun 2019	25 Jul 2019	02 Jul 2019
BH104.0.1-0.2	SE194647.005	LB177271	27 Jun 2019	27 Jun 2019	25 Jul 2019	28 Jun 2019	25 Jul 2019	02 Jul 2019
BH105_0-0.1	SE194647.006	LB177271	27 Jun 2019	27 Jun 2019	25 Jul 2019	28 Jun 2019	25 Jul 2019	02 Jul 2019
BH105_0.2-0.3	SE194647.007	LB177271	27 Jun 2019	27 Jun 2019	25 Jul 2019	28 Jun 2019	25 Jul 2019	02 Jul 2019
BH106_0.1-0.2	SE194647.008	LB177271	27 Jun 2019	27 Jun 2019	25 Jul 2019	28 Jun 2019	25 Jul 2019	02 Jul 2019
QD1	SE194647.009	LB177271	27 Jun 2019	27 Jun 2019	25 Jul 2019	28 Jun 2019	25 Jul 2019	02 Jul 2019

Moisture Content

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE194647.001	LB177278	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	03 Jul 2019	02 Jul 2019
BH101_0.3-0.4	SE194647.002	LB177278	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	03 Jul 2019	02 Jul 2019
BH102_0.1-0.2	SE194647.003	LB177278	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	03 Jul 2019	02 Jul 2019
BH103_0.1-0.2	SE194647.004	LB177278	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	03 Jul 2019	02 Jul 2019
BH104.0.1-0.2	SE194647.005	LB177278	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	03 Jul 2019	02 Jul 2019
BH105_0-0.1	SE194647.006	LB177278	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	03 Jul 2019	02 Jul 2019
BH105_0.2-0.3	SE194647.007	LB177278	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	03 Jul 2019	02 Jul 2019
BH106_0.1-0.2	SE194647.008	LB177278	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	03 Jul 2019	02 Jul 2019
QD1	SE194647.009	LB177278	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	03 Jul 2019	02 Jul 2019

OC Pesticides in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE194647.001	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH101_0.3-0.4	SE194647.002	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH102_0.1-0.2	SE194647.003	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH103_0.1-0.2	SE194647.004	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH104.0.1-0.2	SE194647.005	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH105_0-0.1	SE194647.006	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH105_0.2-0.3	SE194647.007	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH106_0.1-0.2	SE194647.008	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
QD1	SE194647.009	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019

OP Pesticides in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE194647.001	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH101_0.3-0.4	SE194647.002	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH102_0.1-0.2	SE194647.003	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH103_0.1-0.2	SE194647.004	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH104.0.1-0.2	SE194647.005	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH105_0-0.1	SE194647.006	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH105_0.2-0.3	SE194647.007	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH106_0.1-0.2	SE194647.008	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
QD1	SE194647.009	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019

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
BH101_0.1-0.2	SE194647.001	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH101_0.3-0.4	SE194647.002	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH102_0.1-0.2	SE194647.003	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH103_0.1-0.2	SE194647.004	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH104.0.1-0.2	SE194647.005	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019

HOLDING TIME SUMMARY

SE194647 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 sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH105_0-0.1	SE194647.006	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH105_0.2-0.3	SE194647.007	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH106_0.1-0.2	SE194647.008	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
QD1	SE194647.009	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019

PCBs in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE194647.001	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH101_0.3-0.4	SE194647.002	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH102_0.1-0.2	SE194647.003	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH103_0.1-0.2	SE194647.004	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH104.0.1-0.2	SE194647.005	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH105_0-0.1	SE194647.006	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH105_0.2-0.3	SE194647.007	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
BH106_0.1-0.2	SE194647.008	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019
QD1	SE194647.009	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	02 Jul 2019

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
BH101_0.1-0.2	SE194647.001	LB177254	27 Jun 2019	27 Jun 2019	24 Dec 2019	28 Jun 2019	24 Dec 2019	02 Jul 2019
BH101_0.3-0.4	SE194647.002	LB177254	27 Jun 2019	27 Jun 2019	24 Dec 2019	28 Jun 2019	24 Dec 2019	02 Jul 2019
BH102_0.1-0.2	SE194647.003	LB177254	27 Jun 2019	27 Jun 2019	24 Dec 2019	28 Jun 2019	24 Dec 2019	02 Jul 2019
BH103_0.1-0.2	SE194647.004	LB177254	27 Jun 2019	27 Jun 2019	24 Dec 2019	28 Jun 2019	24 Dec 2019	02 Jul 2019
BH104.0.1-0.2	SE194647.005	LB177254	27 Jun 2019	27 Jun 2019	24 Dec 2019	28 Jun 2019	24 Dec 2019	02 Jul 2019
BH105_0-0.1	SE194647.006	LB177254	27 Jun 2019	27 Jun 2019	24 Dec 2019	28 Jun 2019	24 Dec 2019	02 Jul 2019
BH105_0.2-0.3	SE194647.007	LB177254	27 Jun 2019	27 Jun 2019	24 Dec 2019	28 Jun 2019	24 Dec 2019	02 Jul 2019
BH106_0.1-0.2	SE194647.008	LB177254	27 Jun 2019	27 Jun 2019	24 Dec 2019	28 Jun 2019	24 Dec 2019	02 Jul 2019
QD1	SE194647.009	LB177254	27 Jun 2019	27 Jun 2019	24 Dec 2019	28 Jun 2019	24 Dec 2019	02 Jul 2019

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
BH101_0.1-0.2	SE194647.001	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH101_0.3-0.4	SE194647.002	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH102_0.1-0.2	SE194647.003	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH103_0.1-0.2	SE194647.004	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH104.0.1-0.2	SE194647.005	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH105_0-0.1	SE194647.006	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH105_0.2-0.3	SE194647.007	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH106_0.1-0.2	SE194647.008	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
QD1	SE194647.009	LB177290	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019

VOC's in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE194647.001	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH101_0.3-0.4	SE194647.002	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH102_0.1-0.2	SE194647.003	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH103_0.1-0.2	SE194647.004	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH104.0.1-0.2	SE194647.005	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH105_0-0.1	SE194647.006	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH105_0.2-0.3	SE194647.007	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH106_0.1-0.2	SE194647.008	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
QD1	SE194647.009	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019

Volatile Petroleum Hydrocarbons in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE194647.001	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH101_0.3-0.4	SE194647.002	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH102_0.1-0.2	SE194647.003	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH103_0.1-0.2	SE194647.004	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH104.0.1-0.2	SE194647.005	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH105_0-0.1	SE194647.006	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
BH105_0.2-0.3	SE194647.007	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019

HOLDING TIME SUMMARY

SE194647 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 sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Volatile Petroleum Hydrocarbons in Soil (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH106_0.1-0.2	SE194647.008	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019
QD1	SE194647.009	LB177289	27 Jun 2019	27 Jun 2019	11 Jul 2019	28 Jun 2019	07 Aug 2019	01 Jul 2019

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)	BH101_0.1-0.2	SE194647.001	%	60 - 130%	119
	BH102_0.1-0.2	SE194647.003	%	60 - 130%	123
	BH103_0.1-0.2	SE194647.004	%	60 - 130%	123
	BH104.0.1-0.2	SE194647.005	%	60 - 130%	121
	BH105_0-0.1	SE194647.006	%	60 - 130%	123
	BH106_0.1-0.2	SE194647.008	%	60 - 130%	123

OP Pesticides in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH101_0.1-0.2	SE194647.001	%	60 - 130%	92
	BH102_0.1-0.2	SE194647.003	%	60 - 130%	90
	BH103_0.1-0.2	SE194647.004	%	60 - 130%	90
	BH104.0.1-0.2	SE194647.005	%	60 - 130%	88
	BH105_0-0.1	SE194647.006	%	60 - 130%	90
	BH106_0.1-0.2	SE194647.008	%	60 - 130%	94
d14-p-terphenyl (Surrogate)	BH101_0.1-0.2	SE194647.001	%	60 - 130%	94
	BH102_0.1-0.2	SE194647.003	%	60 - 130%	92
	BH103_0.1-0.2	SE194647.004	%	60 - 130%	92
	BH104.0.1-0.2	SE194647.005	%	60 - 130%	90
	BH105_0-0.1	SE194647.006	%	60 - 130%	92
	BH106_0.1-0.2	SE194647.008	%	60 - 130%	94

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH101_0.1-0.2	SE194647.001	%	70 - 130%	92
	BH101_0.3-0.4	SE194647.002	%	70 - 130%	90
	BH102_0.1-0.2	SE194647.003	%	70 - 130%	90
	BH103_0.1-0.2	SE194647.004	%	70 - 130%	90
	BH104.0.1-0.2	SE194647.005	%	70 - 130%	88
	BH105_0-0.1	SE194647.006	%	70 - 130%	90
	BH105_0.2-0.3	SE194647.007	%	70 - 130%	92
	BH106_0.1-0.2	SE194647.008	%	70 - 130%	94
d14-p-terphenyl (Surrogate)	BH101_0.1-0.2	SE194647.001	%	70 - 130%	94
	BH101_0.3-0.4	SE194647.002	%	70 - 130%	94
	BH102_0.1-0.2	SE194647.003	%	70 - 130%	92
	BH103_0.1-0.2	SE194647.004	%	70 - 130%	92
	BH104.0.1-0.2	SE194647.005	%	70 - 130%	90
	BH105_0-0.1	SE194647.006	%	70 - 130%	92
	BH105_0.2-0.3	SE194647.007	%	70 - 130%	92
	BH106_0.1-0.2	SE194647.008	%	70 - 130%	94
d5-nitrobenzene (Surrogate)	BH101_0.1-0.2	SE194647.001	%	70 - 130%	90
	BH101_0.3-0.4	SE194647.002	%	70 - 130%	88
	BH102_0.1-0.2	SE194647.003	%	70 - 130%	84
	BH103_0.1-0.2	SE194647.004	%	70 - 130%	86
	BH104.0.1-0.2	SE194647.005	%	70 - 130%	88
	BH105_0-0.1	SE194647.006	%	70 - 130%	88
	BH105_0.2-0.3	SE194647.007	%	70 - 130%	88
	BH106_0.1-0.2	SE194647.008	%	70 - 130%	86

PCBs in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH101_0.1-0.2	SE194647.001	%	60 - 130%	119
	BH102_0.1-0.2	SE194647.003	%	60 - 130%	123
	BH103_0.1-0.2	SE194647.004	%	60 - 130%	123
	BH104.0.1-0.2	SE194647.005	%	60 - 130%	121
	BH105_0-0.1	SE194647.006	%	60 - 130%	123
	BH106_0.1-0.2	SE194647.008	%	60 - 130%	123

VOC's in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH101_0.1-0.2	SE194647.001	%	60 - 130%	79
	BH101_0.3-0.4	SE194647.002	%	60 - 130%	79
	BH102_0.1-0.2	SE194647.003	%	60 - 130%	80

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.

VOC's in Soil (continued)

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH103_0.1-0.2	SE194647.004	%	60 - 130%	78
	BH104.0.1-0.2	SE194647.005	%	60 - 130%	79
	BH105_0-0.1	SE194647.006	%	60 - 130%	79
	BH105_0.2-0.3	SE194647.007	%	60 - 130%	73
	BH106_0.1-0.2	SE194647.008	%	60 - 130%	83
	QD1	SE194647.009	%	60 - 130%	84
d4-1,2-dichloroethane (Surrogate)	BH101_0.1-0.2	SE194647.001	%	60 - 130%	92
	BH101_0.3-0.4	SE194647.002	%	60 - 130%	95
	BH102_0.1-0.2	SE194647.003	%	60 - 130%	95
	BH103_0.1-0.2	SE194647.004	%	60 - 130%	93
	BH104.0.1-0.2	SE194647.005	%	60 - 130%	94
	BH105_0-0.1	SE194647.006	%	60 - 130%	93
	BH105_0.2-0.3	SE194647.007	%	60 - 130%	86
	BH106_0.1-0.2	SE194647.008	%	60 - 130%	100
	QD1	SE194647.009	%	60 - 130%	100
d8-toluene (Surrogate)	BH101_0.1-0.2	SE194647.001	%	60 - 130%	84
	BH101_0.3-0.4	SE194647.002	%	60 - 130%	86
	BH102_0.1-0.2	SE194647.003	%	60 - 130%	86
	BH103_0.1-0.2	SE194647.004	%	60 - 130%	83
	BH104.0.1-0.2	SE194647.005	%	60 - 130%	83
	BH105_0-0.1	SE194647.006	%	60 - 130%	85
	BH105_0.2-0.3	SE194647.007	%	60 - 130%	76
	BH106_0.1-0.2	SE194647.008	%	60 - 130%	90
	QD1	SE194647.009	%	60 - 130%	90
Dibromofluoromethane (Surrogate)	BH101_0.1-0.2	SE194647.001	%	60 - 130%	88
	BH101_0.3-0.4	SE194647.002	%	60 - 130%	90
	BH102_0.1-0.2	SE194647.003	%	60 - 130%	90
	BH103_0.1-0.2	SE194647.004	%	60 - 130%	87
	BH104.0.1-0.2	SE194647.005	%	60 - 130%	87
	BH105_0-0.1	SE194647.006	%	60 - 130%	87
	BH105_0.2-0.3	SE194647.007	%	60 - 130%	79
	BH106_0.1-0.2	SE194647.008	%	60 - 130%	92
	QD1	SE194647.009	%	60 - 130%	91

Volatile Petroleum Hydrocarbons in Soil

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH101_0.1-0.2	SE194647.001	%	60 - 130%	79
	BH101_0.3-0.4	SE194647.002	%	60 - 130%	79
	BH102_0.1-0.2	SE194647.003	%	60 - 130%	80
	BH103_0.1-0.2	SE194647.004	%	60 - 130%	78
	BH104.0.1-0.2	SE194647.005	%	60 - 130%	79
	BH105_0-0.1	SE194647.006	%	60 - 130%	79
	BH105_0.2-0.3	SE194647.007	%	60 - 130%	73
	BH106_0.1-0.2	SE194647.008	%	60 - 130%	83
	QD1	SE194647.009	%	60 - 130%	84
d4-1,2-dichloroethane (Surrogate)	BH101_0.1-0.2	SE194647.001	%	60 - 130%	92
	BH101_0.3-0.4	SE194647.002	%	60 - 130%	95
	BH102_0.1-0.2	SE194647.003	%	60 - 130%	95
	BH103_0.1-0.2	SE194647.004	%	60 - 130%	93
	BH104.0.1-0.2	SE194647.005	%	60 - 130%	94
	BH105_0-0.1	SE194647.006	%	60 - 130%	93
	BH105_0.2-0.3	SE194647.007	%	60 - 130%	86
	BH106_0.1-0.2	SE194647.008	%	60 - 130%	100
	QD1	SE194647.009	%	60 - 130%	100
d8-toluene (Surrogate)	BH101_0.1-0.2	SE194647.001	%	60 - 130%	84
	BH101_0.3-0.4	SE194647.002	%	60 - 130%	86
	BH102_0.1-0.2	SE194647.003	%	60 - 130%	86
	BH103_0.1-0.2	SE194647.004	%	60 - 130%	83
	BH104.0.1-0.2	SE194647.005	%	60 - 130%	83
	BH105_0-0.1	SE194647.006	%	60 - 130%	85
	BH105_0.2-0.3	SE194647.007	%	60 - 130%	76

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.

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

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	BH106_0.1-0.2	SE194647.008	%	60 - 130%	90
	QD1	SE194647.009	%	60 - 130%	90
Dibromofluoromethane (Surrogate)	BH101_0.1-0.2	SE194647.001	%	60 - 130%	88
	BH101_0.3-0.4	SE194647.002	%	60 - 130%	90
	BH102_0.1-0.2	SE194647.003	%	60 - 130%	90
	BH103_0.1-0.2	SE194647.004	%	60 - 130%	87
	BH104.0.1-0.2	SE194647.005	%	60 - 130%	87
	BH105_0-0.1	SE194647.006	%	60 - 130%	87
	BH105_0.2-0.3	SE194647.007	%	60 - 130%	79
	BH106_0.1-0.2	SE194647.008	%	60 - 130%	92
	QD1	SE194647.009	%	60 - 130%	91

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
LB177271.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB177290.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	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
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	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
		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
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	114

OP Pesticides in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB177290.001		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
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	92
		d14-p-terphenyl (Surrogate)	%	-	96

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Number	Parameter	Units	LOR	Result
LB177290.001	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
LB177290.001		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)	%	-	82
		2-fluorobiphenyl (Surrogate)	%	-	92
		d14-p-terphenyl (Surrogate)	%	-	96

PCBs in Soil

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

Sample Number		Parameter	Units	LOR	Result
LB177290.001		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	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	114

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

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

Sample Number		Parameter	Units	LOR	Result
LB177254.001		Arsenic, As	mg/kg	1	<1
		Cadmium, Cd	mg/kg	0.3	<0.3
		Chromium, Cr	mg/kg	0.3	<0.3
		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
LB177290.001		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
LB177289.001	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	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	105
		d4-1,2-dichloroethane (Surrogate)	%	-	97
		d8-toluene (Surrogate)	%	-	91
		Bromofluorobenzene (Surrogate)	%	-	87
	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
LB177289.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	105
		d4-1,2-dichloroethane (Surrogate)	%	-	97
		d8-toluene (Surrogate)	%	-	91

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.

Mercury in Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE194647.003	LB177271.014	Mercury	mg/kg	0.05	0.13	0.13	68	5
SE194650.003	LB177271.024	Mercury	mg/kg	0.05	<0.05	<0.05	200	0

Moisture Content

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE194647.003	LB177278.011	% Moisture	%w/w	0.5	13	13	38	3
SE194650.003	LB177278.021	% Moisture	%w/w	0.5	<0.5	<0.5	200	0

OC Pesticides in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE194647.008	LB177290.024		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	0	200	0
			Alpha BHC	mg/kg	0.1	<0.1	0	200	0
			Lindane	mg/kg	0.1	<0.1	0	200	0
			Heptachlor	mg/kg	0.1	<0.1	0	200	0
			Aldrin	mg/kg	0.1	<0.1	0	200	0
			Beta BHC	mg/kg	0.1	<0.1	0	200	0
			Delta BHC	mg/kg	0.1	<0.1	0	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	0	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	0.008	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	0.014	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	0.011	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	0	200	0
			Dieldrin	mg/kg	0.2	<0.2	0.05	200	0
			Endrin	mg/kg	0.2	<0.2	0	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	0	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	0	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	0	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	0	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	0	200	0
			Methoxychlor	mg/kg	0.1	<0.1	0	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	0	200	0
			Isodrin	mg/kg	0.1	<0.1	0	200	0
			Mirex	mg/kg	0.1	<0.1	0	200	0
			Total CLP OC Pesticides	mg/kg	1	<1	0.058	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.19	0.188	30	2

OP Pesticides in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE194647.006	LB177290.014		Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
			Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
			Malathion	mg/kg	0.2	<0.2	<0.2	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
			Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
			Ethion	mg/kg	0.2	<0.2	<0.2	200	0
			Azinphos-methyl (Guthion)	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	0
			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

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.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE194647.006	LB177290.014		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	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
			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	mg/kg	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	30	0
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	0
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	0
SE194649.002	LB177290.023		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
			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	mg/kg	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	30	2
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	0
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2

PCBs in Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE194647.008	LB177290.024	Arochlor 1016	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1221	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1232	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1242	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1248	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1254	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1260	mg/kg	0.2	<0.2	0	200	0
		Arochlor 1262	mg/kg	0.2	<0.2	0	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.

PCBs in Soil (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE194647.008	LB177290.024		Arochlor 1268	mg/kg	0.2	<0.2	0	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0.188	30	2

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

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE194647.003	LB177254.014		Arsenic, As	mg/kg	1	5	6	49	13
			Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
			Chromium, Cr	mg/kg	0.3	9.0	9.7	35	7
			Copper, Cu	mg/kg	0.5	12	12	34	0
			Nickel, Ni	mg/kg	0.5	2.7	3.1	47	15
			Lead, Pb	mg/kg	1	43	43	32	0
			Zinc, Zn	mg/kg	2	32	35	36	9
SE194650.003	LB177254.024		Arsenic, As	mg/kg	1	<1	<1	189	0
			Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
			Chromium, Cr	mg/kg	0.3	18	17	33	6
			Copper, Cu	mg/kg	0.5	3.2	3.0	46	6
			Nickel, Ni	mg/kg	0.5	6.3	5.4	39	15
			Lead, Pb	mg/kg	1	<1	<1	200	0
			Zinc, Zn	mg/kg	2	2.4	<2.0	128	16

TRH (Total Recoverable Hydrocarbons) in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE194647.006	LB177290.014		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
SE194649.002	LB177290.023		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	68	130	75	65
			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	130	139	19
			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	130	119	38
			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 %
SE194647.006	LB177289.014	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	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	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.3	4.3	50	1
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.7	4.6	50	1
			d8-toluene (Surrogate)	mg/kg	-	4.2	4.2	50	2
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.9	3.9	50	2
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE194649.002	LB177289.023	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	174	0
		Aromatic	Toluene	mg/kg	0.1	0.7	0.7	44	4
			Ethylbenzene	mg/kg	0.1	0.2	0.2	73	4
			m/p-xylene	mg/kg	0.2	0.5	0.5	69	6

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.

VOC's in Soil (continued)

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE194649.002	LB177289.023	Monocyclic	o-xylene	mg/kg	0.1	<0.1	<0.1	184	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.6	4.6	50	2
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.2	5.3	50	3
			d8-toluene (Surrogate)	mg/kg	-	4.8	4.9	50	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	4.6	50	3
		Totals	Total Xylenes	mg/kg	0.3	0.6	0.6	82	7
			Total BTEX	mg/kg	0.6	1.6	1.6	49	5

Volatile Petroleum Hydrocarbons in Soil

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

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE194647.006	LB177289.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.3	4.3	30	1
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.7	4.6	30	1
			d8-toluene (Surrogate)	mg/kg	-	4.2	4.2	30	2
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.9	3.9	30	2
		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
SE194649.002	LB177289.023		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.6	4.6	30	2
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.2	5.3	30	3
			d8-toluene (Surrogate)	mg/kg	-	4.8	4.9	30	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.5	4.6	30	3
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	174	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 %
LB177271.002	Mercury	mg/kg	0.05	0.20	0.2	70 - 130	102

OC Pesticides in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB177290.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	115
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	117
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	115
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	100
		Endrin	mg/kg	0.2	0.2	0.2	60 - 140	124
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	112
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.16	0.15	40 - 130	107

OP Pesticides in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB177290.002		Dichlorvos	mg/kg	0.5	1.7	2	60 - 140	83
		Diazinon (Dimpylate)	mg/kg	0.5	1.7	2	60 - 140	86
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	1.9	2	60 - 140	93
		Ethion	mg/kg	0.2	1.7	2	60 - 140	85
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	90
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	86

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB177290.002		Naphthalene	mg/kg	0.1	4.8	4	60 - 140	121
		Acenaphthylene	mg/kg	0.1	4.8	4	60 - 140	119
		Acenaphthene	mg/kg	0.1	4.7	4	60 - 140	117
		Phenanthrene	mg/kg	0.1	5.0	4	60 - 140	124
		Anthracene	mg/kg	0.1	4.8	4	60 - 140	119
		Fluoranthene	mg/kg	0.1	4.8	4	60 - 140	121
		Pyrene	mg/kg	0.1	4.6	4	60 - 140	115
		Benzo(a)pyrene	mg/kg	0.1	4.4	4	60 - 140	111
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	84
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	90
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	86

PCBs in Soil

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB177290.002	Arochlor 1260	mg/kg	0.2	0.3	0.4	60 - 140	83

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 %
LB177254.002	Arsenic, As	mg/kg	1	340	336.32	79 - 120	100
	Cadmium, Cd	mg/kg	0.3	420	416.6	69 - 131	102
	Chromium, Cr	mg/kg	0.3	33	35.2	80 - 120	93
	Copper, Cu	mg/kg	0.5	320	370.46	80 - 120	86
	Nickel, Ni	mg/kg	0.5	170	210.88	79 - 120	80
	Lead, Pb	mg/kg	1	91	107.87	79 - 120	84
	Zinc, Zn	mg/kg	2	280	301.27	80 - 121	92

TRH (Total Recoverable Hydrocarbons) in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB177290.002		TRH C10-C14	mg/kg	20	33	40	60 - 140	83
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	78
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	63
	TRH F Bands	TRH >C10-C16	mg/kg	25	32	40	60 - 140	80
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	70
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	70

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 %
LB177289.002	Monocyclic	Benzene	mg/kg	0.1	1.8	2.9	60 - 140	63
	Aromatic	Toluene	mg/kg	0.1	2.2	2.9	60 - 140	75
		Ethylbenzene	mg/kg	0.1	2.2	2.9	60 - 140	75
		m/p-xylene	mg/kg	0.2	4.5	5.8	60 - 140	77
		o-xylene	mg/kg	0.1	2.2	2.9	60 - 140	77
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.9	5	60 - 140	99
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.7	5	60 - 140	95
		d8-toluene (Surrogate)	mg/kg	-	4.9	5	60 - 140	98
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.0	5	60 - 140	100

Volatile Petroleum Hydrocarbons in Soil

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

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB177289.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	93
		TRH C6-C9	mg/kg	20	23	23.2	60 - 140	99
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.9	5	60 - 140	99
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.7	5	60 - 140	95
		d8-toluene (Surrogate)	mg/kg	-	4.9	5	60 - 140	98
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.0	5	60 - 140	100
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	137

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.

Mercury in Soil

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE194595.020	LB177271.004	Mercury	mg/kg	0.05	0.24	0.02579303624	0.2	108

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE194681.001	LB177290.024		Naphthalene	mg/kg	0.1	4.7	<0.1	4	117
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	4.6	<0.1	4	116
			Acenaphthene	mg/kg	0.1	4.9	<0.1	4	123
			Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	4.7	<0.1	4	119
			Anthracene	mg/kg	0.1	4.6	<0.1	4	116
			Fluoranthene	mg/kg	0.1	4.9	<0.1	4	122
			Pyrene	mg/kg	0.1	5.0	<0.1	4	125
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	4.3	<0.1	4	108
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	4.3	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	4.5	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	4.4	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	38	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	-	80
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	92
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	-	88

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%
SE194595.020	LB177254.004	Arsenic, As	mg/kg	1	42	1.71304514776	50	81
		Cadmium, Cd	mg/kg	0.3	49	-0.00957008462	50	98
		Chromium, Cr	mg/kg	0.3	70	26.3560130554	50	88
		Copper, Cu	mg/kg	0.5	61	8.88582357371	50	103
		Nickel, Ni	mg/kg	0.5	53	5.04821963934	50	97
		Lead, Pb	mg/kg	1	62	15.0968084949	50	93
		Zinc, Zn	mg/kg	2	58	7.12971304514	50	101

TRH (Total Recoverable Hydrocarbons) in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE194681.001	LB177290.024		TRH C10-C14	mg/kg	20	36	<20	40	90
			TRH C15-C28	mg/kg	45	<45	<45	40	100
			TRH C29-C36	mg/kg	45	<45	<45	40	73
			TRH C37-C40	mg/kg	100	<100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	<110	-	-
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	-	-
		TRH F Bands	TRH >C10-C16	mg/kg	25	35	<25	40	88
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	35	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	40	90
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	-

VOC's in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE194681.001	LB177289.004	Monocyclic Aromatic	Benzene	mg/kg	0.1	1.8	<0.1	2.9	61
			Toluene	mg/kg	0.1	2.1	<0.1	2.9	74
			Ethylbenzene	mg/kg	0.1	2.0	<0.1	2.9	70
			m/p-xylene	mg/kg	0.2	4.3	<0.2	5.8	74
			o-xylene	mg/kg	0.1	2.2	<0.1	2.9	74

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%
SE194681.001	LB177289.004	Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	4.4	-	90
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	4.4	-	91
			d8-toluene (Surrogate)	mg/kg	-	4.6	4.1	-	93
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.6	4.0	-	92
		Totals	Total Xylenes	mg/kg	0.3	6.5	<0.3	-	-
			Total BTEX	mg/kg	0.6	12	<0.6	-	-

Volatile Petroleum Hydrocarbons in Soil

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

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE194681.001	LB177289.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	89
			TRH C6-C9	mg/kg	20	22	<20	23.2	94
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.5	4.4	-	90
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.6	4.4	-	91
			d8-toluene (Surrogate)	mg/kg	-	4.6	4.1	-	93
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.6	4.0	-	92
		VPH F	Benzene (F0)	mg/kg	0.1	1.8	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	7.25	131

MATRIX SPIKE DUPLICATES

SE194647 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 end of this report for failure reasons.

No matrix spike duplicates were required for this job.

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.
-	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 Analytical Report comments for further information.

Table QC1 - Containers, Preservation Requirements and Holding Times - Soil			
Parameter	Container	Preservation	Maximum Holding Time
Acid digestible metals and metalloids - Total and TCLP (As,Cd.,Cu,Cr,Ni,Pb,Zn)	Glass with Teflon Lid	Nil	6 months
Mercury	Glass with Teflon Lid	Nil	28 days
TPH / BTEX / VOC / SVOC / CHC	Glass with Teflon Lid	4°C, zero headspace	14 days
PAHs (total and TCLP)	Glass with Teflon Lid	4°C [1]	14 days
Phenols	Glass with Teflon Lid	4°C [1]	14 days
OCPs, OPPs and total PCBs	Glass with Teflon Lid	4°C [1]	14 days
Asbestos	Sealed Plastic Bag	Nil	N/A

Table QC2 - Containers, Preservation Requirements and Holding Times - Water			
Parameter	Container Volume (mL)	Preservation	Maximum Holding Time
Heavy Metals	125mL Plastic	Field filtration 0.45μm HNO_3 / 4°C	6 months
Cyanide	125mL Amber Glass	pH > 12 NaOH / 4°C	6 months
TPH (C6-C9) / BTEX / VOCs SVOCs / CHCs	4 x 43mL Glass	HCl / 4°C [1]	14 days
TPH (C10-C36) / PAH / Phenolics OCP / OPP / TDS / pH	3 x 1L Amber Glass	None / 4°C [1]	28 days

Notes: [1] = Extraction within 14 days, Analysis within 40 days.

Table QC3 - Analytical Parameters, PQLs and Methods - Soil			
Parameter	**Unit**	**PQL**	**Method Reference**
Metals in Soil			
Arsenic - As[1]	mg / kg	1	USEPA 200.7
Cadmium - Cd[1]	mg / kg	0.5	USEPA 200.7
Chromium - Cr[1]	mg / kg	1	USEPA 200.7
Copper - Cu[1]	mg / kg	1	USEPA 200.7
Lead - Pb[1]	mg / kg	1	USEPA 200.7
Mercury - Hg[2]	mg / kg	0.1	USEPA 7471A
Nickel - Ni[1]	mg / kg	1	USEPA 200.7
Zinc - Zn[1]	mg / kg	1	USEPA 200.7
Total Petroleum Hydrocarbons (TPHs) in Soil			
C_6-C_9 fraction	mg / kg	25	USEPA 8260
C_{10}-C_{14} fraction	mg / kg	50	USEPA 8000
C_{15}-C_{28} fraction	mg / kg	100	USEPA 8000
C_{29}-C_{36} fraction	mg / kg	100	USEPA 8000
BTEX in Soil			
Benzene	mg / kg	1	USEPA 8260
Toluene	mg / kg	1	USEPA 8260
Ethylbenzene	mg / kg	1	USEPA 8260
m & p Xylene	mg / kg	2	USEPA 8260
o- Xylene	mg / kg	1	USEPA 8260
Other Organic Contaminants in Soil			
PAHs	mg / kg	0.05-0.2	USEPA 8270
CHCs	mg / kg	1	USEPA 8260
VOCs	mg / kg	1	USEPA 8260
SVOCs	mg / kg	1	USEPA 8260
OCPs	mg / kg	0.1	USEPA 8140, 8080
OPPs	mg / kg	0.1	USEPA 8140, 8080
PCBs	mg / kg	0.1	USEPA 8080
Phenolics	mg / kg	5	APHA 5530
Asbestos			
Asbestos	mg / kg	Presence / Absence	AS4964-2004

Notes:

1. Acid Soluble Metals by ICP-AES
2. Total Recoverable Mercury

Table QC4 - Analytical Parameters, PQLs and Methods - Groundwater

Parameter	Unit	PQL	Method
Heavy Metals			
Antimony - Sb	µg/L	1	USEPA 200.8
Arsenic - As	µg/L	1	USEPA 200.8
Beryllium - Be	µg/L	0.5	USEPA 200.8
Cadmium - Cd	µg/L	0.1	USEPA 200.8
Chromium - Cr	µg/L	1	USEPA 200.8
Cobalt - Co	µg/L	1	USEPA 200.8
Copper - Cu	µg/L	1	USEPA 200.8
Lead - Pb	µg/L	1	USEPA 200.8
Mercury - Hg	µg/L	0.5	USEPA 7471A
Molybdenum - Mo	µg/L	1	USEPA 200.8
Nickel - Ni	µg/L	1	USEPA 200.8
Selenium - Se	µg/L	1	USEPA 200.8
Silver - Ag	µg/L	1	USEPA 200.8
Tin (inorg.) - Sn	µg/L	1	USEPA 200.8
Nickel - Ni	µg/L	1	USEPA 200.8
Zinc - Zn	µg/L	1	USEPA 200.8
Total Petroleum Hydrocarbons (TPHs)			
C_6-C_9 fraction	µg/L	10	USEPA 8220A / 8000
C_{10}-C_{14} fraction	µg/L	50	USEPA 8000
C_{15}-C_{28} fraction	µg/L	100	USEPA 8000
C_{29}-C_{36} fraction	µg/L	100	USEPA 8000
BTEX			
Benzene	µg/L	1	USEPA 8220A
Toluene	µg/L	1	USEPA 8220A
Ethylbenzene	µg/L	1	USEPA 8220A
m- & p-Xylene	µg/L	2	USEPA 8220A
o-Xylene	µg/L	1	USEPA 8220A
Polyciclic Aromatic Hydrocarbons (PAHs)			
PAHs	µg/L	0.1	USEPA 8270
Benzo(a)pyrene	µg/L	0.01	USEPA 8270
OrganoChlorine Pesticides (OCPs)			
Aldrin	µg/L	0.001	USEPA 8081
Chlordane	µg/L	0.001	USEPA 8081
DDT	µg/L	0.001	USEPA 8081
Dieldrin	µg/L	0.001	USEPA 8081
Endosulfan	µg/L	0.001	USEPA 8081
Endrin	µg/L	0.001	USEPA 8081
Heptachlor	µg/L	0.001	USEPA 8081
Lindane	µg/L	0.001	USEPA 8081
Toxaphene	µg/L	0.001	USEPA 8081

Parameter	Unit	PQL	Method
Chlorinated Hydrocarbons (CHCs)			
1,2-dichlorobenzene	µg/L	1	USEPA 8260B
1,3-dichlorobenzene	µg/L	1	USEPA 8260B
1,4-dichlorobenzene	µg/L	1	USEPA 8260B
1,2,3-trichlorobenzene	µg/L	1	USEPA 8260B
1,2,4-trichlorobenzene	µg/L	1	USEPA 8260B
Hexachlorobutadeine	µg/L	1	USEPA 8260B
1,1,2-trichloroethane	µg/L	1	USEPA 8260B
Hexachloroethane	µg/L	10	USEPA 8270D
Other CHCs	µg/L	1	USEPA 8260B
Volatile Organic Compounds (VOCs)			
Aniline	µg/L	10	USEPA 8260B
2,4-dichloroaniline	µg/L	10	USEPA 8260B
3,4-dichloroaniline	µg/L	10	USEPA 8260B
Nitrobenzene	µg/L	50	USEPA 8260B
2,4-dinitrotoluene	µg/L	50	USEPA 8260B
2,4,6-trinitrotoluene	µg/L	50	USEPA 8260B
Phenolic Compounds			
Phenol	µg/L	10	USEPA 8041
2-chlorophenol	µg/L	10	USEPA 8041
4-chlorophenol	µg/L	10	USEPA 8041
2, 4-dichlorophenol	µg/L	10	USEPA 8041
2,4,6-trichlorophenol	µg/L	10	USEPA 8041
2,3,4,6-tetrachlorophenol	µg/L	10	USEPA 8041
Pentachlorophenol	µg/L	10	USEPA 8041
2,4-dinitrophenol	µg/L	10	USEPA 8041
Miscellaneous Parameters			
Total Cyanide	µg/L	5	APHA 4500C&E-CN
Fluoride	µg/L	10	APHA 4500 F-C
Salinity (TDS)	mg/L	1	APHA 2510
pH	units	0.1	APHA 4500H+
OrganoPhosphate Pesticides (OPPs)			
Azinphos Methyl	µg/L	0.01	USEPA 8141
Chloropyrifos	µg/L	0.01	USEPA 8141
Diazinon	µg/L	0.01	USEPA 8141
Dimethoate	µg/L	0.01	USEPA 8141
Fenitrothion	µg/L	0.01	USEPA 8141
Malathion	µg/L	0.01	USEPA 8141
Parathion	µg/L	0.01	USEPA 8141
Temephos	µg/L	0.01	USEPA 8141
Polychlorinated Biphenyls (PCBs)			
Individual PCBs	µg/L	0.01	USEPA 8081

Table QC5 - QC Sample Data Acceptance Criteria

QC Sample Type	Method of Assessment	Acceptable Range
Field QC		
Blind Duplicates and Split Samples	The assessment of split duplicate is undertaken by calculating the Relative Percent Difference (RPD) of the duplicate concentration compared with the primary sample concentration. The RPD is defined as: $RPD = 100 \times \frac{\lvert X_1 - X_2 \rvert}{\text{mean}(X1, X2)}$ Where: X_1 and X_2 are the concentrations of the primary and duplicate samples.	The acceptable range depends upon the levels detected: - 0-150% RPD (when the average concentration is <5 times the LOR/PQL) - 0-75% RPD (when the average concentration is 5 to 10 times the LOR/PQL) - 0-50% RPD (when the average concentration is >10 times the LOR/PQL)
Rinsate & Trip Blanks	Each blank is analysed as per the original samples.	Analytical Result <LOR/PQL
Laboratory prepared Trip Spike	The Trip Spike is analysed after returning from the field and the % recovery of the known spike is calculated.	70 - 130%
Laboratory QC		
Laboratory Duplicates	Assessment of Lab Duplicate RPD as per Blind Duplicates and Split Samples.	Lab Duplicate RPD < 15% (Inorganics) Lab Duplicate RPD < 30% (Organics) for sample results > 10 LOR
Surrogates Matrix Spikes Laboratory Control Samples	Assessment is undertaken by determining the percent recovery of the known surrogate spike (SS) or addition to the sample. $\%\ Recovery = 100 \times \frac{C - A}{B}$ Where: A = Concentration of analyte determined in the original sample; B = Added Concentration; and C = Calculated Concentration.	at least 2 SS recoveries to be within 70-130% subject to matrix effects (Organics) 80-120% (Inorganics / Metals) 60-140% (Organics) 10-140% (SVOC and Speciated Phenols) If the result is outside the above ranges, the result must be <3x Standard Deviation of the Historical Mean (calculated over the past 12 months).
Sample Matrix Spike Duplicates	Recovery RPD	<30% (Inorganics & Organics)
Calibration Check Standars	Continuous Calibration Verification (CCV)	CCV must be within ±15% (inorganics) CCV must be within ±25% (inorganics)
Reagent, Method & Calibration Check Blanks	Each blank is analysed as per the original samples.	Analytical Result <LOR/PQL

Note: PQL - Laboratory Practical Quantitation Limit (PQL) or the minimum detection limit for a particular analyte.
LOR = Limit of Reporting