CONSULTING EARTH SCIENTISTS

DETAILED CONTAMINATED LAND ASSESSMENT REPORT

251 ADELAIDE STREET, RAYMOND TERRACE, NEW SOUTH WALES

PREPARED FOR RAYMOND TERRACE PARKLANDS

CES DOCUMENT REFERENCE: CES200502-PHB-AE

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EXECUTIVE SUMMARY

Consulting Earth Scientists Pty Ltd (CES) was commissioned by Raymond Terrace Parklands to undertake a Detailed Contaminated Land Assessment (DCLA) for the former quarry and associated land at 251 Adelaide Street, Raymond Terrace (the Site) pursuant to soil and water requirements of the Planning Secretary's Environmental Assessment Requirements (SEARs) 1409.

It is understood that the Client intends to backfill the artificial former inundated quarry void with virgin excavated natural material (VENM), Excavated Natural Material (ENM) and Potential Acid Sulfate Soils (PASS) and to rehabilitate the disused mine for future recreational use. Overall, given the proposed backfilling of the quarry void with environmentally benign and appropriately placed PASS, this is a positive environmental outcome for the site.

The Site is formally defined as Lot 232 in Deposited Plan (DP) 593512. The Site location and Site layout plan are presented in **Figure 1** and **Figure 2**, respectively.

Environmental Resources Management (ERM) previously undertook a Phase 1 Assessment of the site entitled *Environmental Due Diligence Report, Phase 1 Environmental Site Assessment, 251 Adelaide Street, Raymond Terrace, NSW 2324, Australia*, (ERM, 4 July 2011). The report indicated that:

- *"No asbestos was identified during the site walkover"*;
- *"…ERM considers it unlikely that there are significant issues that remain on-site which would cause material soil and groundwater impact*";
- "*…given the presence of the sewer treatment plant, the possibility of contamination migrating to site, from an off-site source can not be excluded.*";
- "*Given the historical operation of the Site, the potential exists for historical operations to have caused soil and groundwater impact.*"; and
- *"The potential exists that contaminated fill has been brought on to the site."*

To complete this DCLA, CES carried out the following scope of works:

- Drilling of 17 boreholes using hand auger and pushtube methods;
- Selection of 17 soil samples and submission of selected samples to a NATA accredited laboratory for a broad analytical suite from these 17 boreholes;
- Collection of three soil grab samples from earthen mound materials;

- Drilling of five boreholes around the lake, collection of five soil samples and completion of the boreholes with groundwater monitoring wells;
- Collection and submission of 10 sediment samples to a NATA accredited laboratory for a broad analytical suite in two transects across the inundated quarry to assess sediment quality across the lake;
- Collection and submission of 10 surface water samples from the lake to a NATA accredited laboratory for a broad analytical suite;
- Collection of three surface water samples from Grahamstown Drain and Windeyer's Creek to assess the down gradient water quality; and
- Collection of five groundwater samples from the five monitoring wells using low flow sampling techniques. and submission of the samples to a NATA accredited laboratory for a broad analytical suite.

The DCLA was undertaken during August, September, and October 2020. The investigation encountered a subsurface profile generally comprised of fill underlain by natural silty, clayey sand. Field screening did not detect any evidence of visual or olfactory contamination, and the laboratory did not detect concentrations more than the conservative Tier 1 Screening Criteria. As a result, soil and fill underlying the site are a low risk to human health and the environment.

Sediment samples were collected from the flooded former quarry void. Sediments encountered were generally silty clays. The laboratory detected nickel concentrations in sediment samples which slightly exceeded the adopted low-level sediment criteria but, did not exceed the levels which may impact on the nature and diversity of the ecosystem. This indicated a potential low-level risk to the ecology of the flooded former quarry void.

The risks to the benthic ecosystem in the lake are considered to be even lower, since,

- The proposed infilling of the flooded quarry void will bury the current sediment that was sampled – thereby removing the specific benthic habitat created by the quarrying activities – i.e. restoring the original topography and removing an anthropogenic ecosystem;
- Inorganic (metal and metalloid) concentrations may be exaggerated due to preferential partitioning of the metals to sediment particles with increasing carbon content (from aerial deposited organic matter) and lower grain size (the encountered silty clays). These exaggerated levels may not be bioavailable to the existing benthic ecosystem; and
- The ecosystem of the artificial flooded former quarry void is of lower value than that of a natural waterbody in the area.

Surface water samples were collected from the flooded former quarry void, the up-gradient artificial Grahamstown Drain, and the down-gradient Windeyer's Creek. Copper, Nickel, and Zinc were detected in excess of the adopted screening criteria, indicating a potential risk to the ecology of these ecosystems. However, the exceedances are likely indicative of background levels, or derived from an upgradient source (such as the Grahamstown Dam) and not contamination derived from human activities on the Site. In addition, this water body will be infilled as a result of the proposed backfilling of the quarry void. Therefore, this risk to ecology is considered to be low and acceptable.

A number of metals detected in the groundwater samples were higher than the adopted groundwater criteria. These concentrations were either indicative of background levels or relate to off-site up-hydraulic gradient sources and not contamination derived from human activities on the Site. Therefore, the risks posed to groundwater ecosystem from the site are considered low and acceptable.

Based on the investigation results of the DCLA, the Site has not been contaminated from the current or historic land use.

In consideration of the above, the Site is suitable for the proposed commercial/industrial development. In addition, overall, given the proposed backfilling of the quarry void with environmentally benign and appropriately placed PASS, the proposed backfilling of the quarry void is a positive environmental outcome for the site and comprises the restoration of a site after an industrial history in order to facilitate a positive recreational future use and restoration of the original topography.

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LIST OF ABBREVIATIONS

ACM	Asbestos containing material
BTEX	Benzene, toluene, ethylbenzene, xylenes
COC	Chain of Custody
CES	Consulting Earth Scientists Pty Ltd
CSM	Conceptual Site Model
DO	Dissolved oxygen
DP	Deposited Plan
DQI	Data Quality Indicators
DoH	Department of Health
DQO	Data Quality Objectives
EC	Electrical conductivity
Eh	Redox potential
EPA	Environment Protection Authority
Ha	Hectares
LCS	Laboratory Control Sample
LEP	Local Environmental Plan
LGA	Local government area
m	Metre
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NSW	New South Wales
OCP	Organochlorine pesticides
OPP	Organophosphorus Pesticides

PAH	Polycyclic aromatic hydrocarbons
PCB	Poly-chlorinated biphenyls
PFAS	Per- and polyfluoroalkyl substances
PQL	Practical Quantitation Limit
PSP	Project Safety Plan
RPD	Relative percentage difference
SAQP	Sampling and Analysis Quality Plan
TRH	Total Recoverable Hydrocarbons
QA/QC	Quality Assurance and Quality Control

1 INTRODUCTION AND OBJECTIVES

1.1 INTRODUCTION

Consulting Earth Scientists Pty Ltd (CES) was commissioned by Raymond Terrace Parklands (the client) to undertake a Detailed Contaminated Land Assessment (DCLA)for the former quarry and associated land at 251 Adelaide Street, Raymond Terrace[1] pursuant to the requirements of the Planning Secretary's Environmental Assessment Requirements (SEARs) 1409.

It is understood that the Client intends to backfill the artificial former inundated quarry void with virgin excavated natural material (VENM), Excavated Natural Material (ENM) and Potential Acid Sulfate Soils (PASS) and to rehabilitate the disused mine for future recreational use. Overall, given the proposed backfilling of the quarry void with environmentally benign and appropriately placed PASS, this is a positive environmental outcome for the site.

251 Adelaide Street, Raymond Terrace, NSW is formally defined as Lot 232 in Deposited Plan (DP) 593512 (the Site) and covers an area of 443,600m^2 (44.36 Ha) of which approximately 207,100m^2 (20.71 Ha) is covered by a flooded former quarry void.

The soil assessment presented in this report principally relates to the area of the site that was historically used as a quarrying operations zone (land based) and is approximately is 7000 m^2 (0.7 Ha) in area. Refer to **Figure 1** and **Figure 2** for a site locality map and a site layout plan, respectively.

The sediment assessment presented in the report relates to the sediment quality of the inundated area, concentrating on the benthic zone (i.e., upper 20-100 mm of sediment at the bottom of the lake).

[1] This report does not include any work required for the development application for the proposed residential area, which is located to the north and west of the former quarry area and is understood to be part of a separate package of work.

The groundwater assessment presented in this report is based on five monitoring well locations around the site. These locations were located to assess both upgradient (to provide a baseline groundwater assessment for the current assessment) and downgradient locations (groundwater quality after moving through the site).

The surface water quality assessment is based on two transects across the lake to understand lateral variations in water quality. Three surface water sampling locations were also selected in Grahamstown Drain and Windeyer's Creek, to provide a baseline water quality assessment and assess the current condition.

The site is to be backfilled with natural material and is capable of receiving 3.5 million tonnes of ENM and/or VENM and/or appropriately placed PASS (to a maximum elevation of 1 m below the permanent groundwater level).

The site has been subject to the previous environmental investigations including:

- Environmental Resources Management (ERM) (2011), *Environmental Due Diligence Report, Phase 1 Environmental Site Assessment, 251 Adelaide Street, Raymond Terrace, NSW 2324, Australia*, 4 July 2011; and
- CES (2020), *Sampling and Analysis Quality Plan, 251 Adelaide Street, Raymond Terrace, NSW*, 18 August 2020.

The Phase 1 ESA notes, "*Based on the potential current sources of impact identified during the site walkover, ERM considers it unlikely that there are any significant issues that remain on-site which could cause material soil and groundwater impact.*" And "*No current sources of significant soil and groundwater impact that have the potential to enter underlying soil or groundwater have been identified on-site.*" As a result, the environmental risks were considered to be low.

This DCLA was undertaken in general accordance with the Sampling and Analysis Quality Plan (SAQP) (CES, 2020), which was prepared to address the soil and water key issues of SEARs 1409.

The SAQP was prepared with reference to the following documents:

- *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land* (NSW EPA, 2020); and
- *National Environment Protection (Assessment of site Contamination) Measure 1999*, as amended 2013 (ASC NEPM) National Environment Protection Council (NEPC), 2013.

1.2 OBJECTIVE

The key objectives of the works are to:

- Address the specific environmental soil and water key issues of the Planning Secretary's Environmental Assessment Requirements (SEARs) 1409:

  - *A detailed assessment of the extent and nature of any contamination of the soil, groundwater and marine sediments.*
- Further the understanding of the contamination status of the site and the assessment of site suitability; and
- Determine if the site is suitable for the proposed commercial/industrial land use.

2 SCOPE OF WORK

To achieve the objectives, CES proposes to adopt the following scope of work:

- Prepare an SAQP, which includes a summary of site environmental setting and site history information, the seven step Data Quality Objectives (DQO) assessment and a summary of the Conceptual Site Model (CSM).

2.1.1 Soil Investigation

Undertook a soil investigation in general accordance with the SAQP as follows:

- Advanced 17 soil bores via push tube methods across the former quarry activity impacted area (refer to **Figure 3**) to allow for the collection of 17 soil samples. The soil bores were advanced to the shallower of 0.5m into natural materials, or refusal. This area (0.7ha.) was the only accessible portion of the site that had a potentially contaminative former use (other than the earthen bunds around the northern portion and western parts of the lake (see below). The remaining portion of the site has either never been used by humans, is not accessible due to thick vegetation or the specific area was subsequently quarried and removed and is currently inundated;
- Collected 3 grab samples of bund fill material (two from the northern bund and one from the western bund) (refer to **Figure 2**);
- Field screened soil samples for visual (including asbestos) and olfactory evidence of impact and using a photo-ionisation detector (PID);
- Submitted 20 soil samples to a National Association of Testing Authorities (NATA) accredited environmental laboratory for Total Recoverable Hydrocarbons (TRH), Benzene Toluene Ethylbenzene and Xylene (BTEX), Polycyclic Aromatic Hydrocarbons (PAH), 8 common metals and metalloids (8 metals) and asbestos (fill samples only when sufficient sample is collected). In addition, one sample was analysed for pH, electrical conductivity, Cation Exchange Capacity (CEC) and clay content;
- Implemented a Quality Assurance and Quality Control (QAQC) programme consisting of**:**
  - The collection of 5% duplicate and 5% triplicate samples for soil and groundwater, which met the requirements of Section 3.5 of the *Guideline on Laboratory Analysis*

of Potentially Contaminated Soils (Schedule B3, NEPM, NEPC 1999 as amended 2013) for the collection of QAQC replicate samples; and

  - The collection of a trip spike, trip blank and rinsate sample.

2.1.2 Surface Water Quality

Undertook a surface water quality investigation in general accordance with the SAQP as follows:

- Collected 10 surface water samples across the inundated quarry void in two transects, two surface water samples from Grahamstown Drain, and one surface water sample from Windeyer's Creek (refer to **Figure 2**);
- Submitted 13 primary surface water samples to a NATA accredited laboratory for TRH, PAH, 8 metals, total organic content (TOC), and pH; and
- Implemented a QAQC programme consisting of the collection of 5% duplicate and 5% triplicate samples for surface water, which met the requirements of Section 3.5 of Schedule B3 (NEPM, NEPC 1999 as amended 2013) for the collection of QAQC replicate samples.

2.1.3 Sediments

Undertook a sediment investigation in general accordance with the SAQP as follows:

- Collected 10 sediment samples from two transects across the flooded former quarry void;
- Submitted 10 primary sediment samples to a NATA accredited laboratory for TRH, PAH, 8 metals, TOC, pH, and Australian Standard Leachate Procedure (ASLP) for 8 metals and PAH; and
- Implemented a QAQC programme consisting of the collection of 5% duplicate and 5% triplicate samples for sediment samples, which met the requirements of Schedule B3 (NEPM, 2013) for the collection of QAQC replicate samples.

2.1.4 Hydrogeological Fieldwork

Undertook a hydrological investigation in general accordance with the SAQP as follows:

- Advanced five soil bores via casing advancer or hollow auger drilling methods around the periphery of the former quarry void (refer to **Figure 2**). The soil bores will be advanced up to a maximum depth of 19m[2];

[2] Noting that sediment sampling on 25 August 2020 indicated a maximum quarry void depth of approximately 14m. Based on Section 4.4 of the NSW EPA (2016) Environmental Guidelines *Solid Waste Guidelines* (NSW EPA, 2016),

- One soil sample was collected per soil bore;
- Converted the soil bores into permanent groundwater monitoring wells;
- Submitted 5 primary soil samples to a NATA accredited laboratory for TRH, BTEX, PAH, and 8 metals;
- Developed the five groundwater monitoring wells;
- Collected 5 groundwater samples from newly installed groundwater monitoring wells using low flow techniques;
- Submitted 5 primary groundwater samples to a NATA accredited laboratory for TRH, PAH, 8 metals, pH, and TOC; and
- Completed water level monitoring for two additional monitoring rounds.

2.1.5 Reporting

Prepare an DCLA Report including:

- Confirmation of the soil, sediment, surface water, and groundwater sampling methodology;
- Discussion of the QA/QC sampling and whether the results of the QA/QC analysis provide robust confidence in the sampling procedures, sample handling and laboratory performance;
- Presentation of the guideline values for assessment of soil, sediment, surface water, and groundwater analysis results;
- Presentation of the analytical results, including tabular presentation of the results to allow comparison with the guideline values. Exceedances of the screening criteria will be presented on **Figures 4**, **5**, and **6**; and
- Assessment and discussion of changes to the conceptual site model (CSM), understanding of site suitability for the proposed development, and the remedial works required to make the site suitable.

"*the screened section of the well should monitor a profile from at least 5 to 10 metres below the base of the waste to the top of the aquifer or waste mass.*"

3 SITE IDENTIFICATION AND ENVIRONMENTAL SETTING

3.1 SITE IDENTIFICATION

The site, as it is referred to in this DCLA, consists of 251 Adelaide Street, Raymond Terrace, legally described as Lot 232 of DP 593512. A site locality map is attached as **Figure 1**.

The area of the site is approximately 443,600 m^2.

The site located within the local government area (LGA) of Port Stephens Council.

The approximate coordinates of the centre of the site are 382310.47 East 6372882.941 North (MGA 1994 Zone 56).

3.2 SITE DESCRIPTION

The Site is relatively flat rising slightly in the north-west corner. To facilitate access, a bridge crosses the Grahamstown Drain. A flooded former quarry void is situated in the centre of the Site. Grahamstown Drain runs from the north of the site to the southwest where it joins Windeyer's Creek that runs from east to west in the southern portion of the Site.

Access constraints for the site include:

- The overhead cables running along the western boundary of the site;
- The confluence of Grahamstown Drain and Windeyer's Creek in the western portion of the site and the associated swamp area, which prevents access to the south western portion of the site;
- The thick vegetation and swamp area in the central northern portion of site preventing access to the north-eastern portion of the site;
- Dense vegetation along the Pacific Highway and Windeyer's Creek, which prevents access to the southern portion of the site; and
- The Hunter Water Raymond Terrace Wastewater Treatment site, which is located to the east of the site, which restricts access to the eastern portion of the site. CES was able to negotiate access to install MW5 in the south eastern portion of the site, since no other access route was available.

As noted in Section 2.1.1, the area (0.7ha.) was the only accessible portion of the site that had a potentially contaminative former use as determined by the review of the historical aerial photos. The remaining portion of the site has either never been used by humans, is not accessible due to thick vegetation or the specific area was subsequently quarried and removed and is currently inundated.

3.3 SITE ZONING

The Port Stephens Council Local Environmental Plan (LEP) 2013 indicates that the site is currently zoned "RU2 – Rural Landscape".

3.4 SITE ENVIRONMENTAL SETTING

Detailed information on the environmental setting of the site is presented in the previous environmental reports listed in Section 1 and should be referred to. A summary of the site setting is presented below.

A review of the Newcastle 1:100,000 Geological Series Sheet 9232 (edition 1) 1995, indicated that the site is likely to be underlain by unconsolidated quaternary alluvium (Qa).

The subsurface profile presented in geotechnical report *Preliminary Geotechnical Investigation Report, 251 Adelaide Street, Raymond Terrace, NSW 2324*, Aargus, 2020), which investigated the site to the north of the subject site consists of:

- Fill: SAND, fine to medium grained, pale grey to yellow brown to dark brown or black, trace of silt, clay to depths of up to 7.5m;
- Fill: SAND, fine to medium grained, yellow to orange to between depths of 0.2 to 2.3m;
- Residual Soil: Sandy CLAY, high plasticity, yellow, pale grey, orange to brown between depths of 6.6 to 6.7m; and
- Natural: SANDSTONE, fine to medium grained, yellow orange, pale grey, from depths of 6.7m.

3.5 SURROUNDING LAND USE

The surrounding land use comprised the following:

- **North –** Vacant property with residential properties on Meredith Crescent beyond;
- **East** – Bushland and Raymond Terrace Wastewater Treatment Works with the Pacific Highway beyond;
- **South –** Bushland and Windeyer's Creek with the Pacific Highway and the Masonite Road commercial industrial properties beyond; and
- **West –** Adelaide Street with agricultural beyond and the Hunter River at approximately 1.4 km.

3.6 SUMMARY OF PREVIOUS REPORTS

3.6.1 Historical Aerials (LotSearch 2020)

Aerial photographs from 1954 to 2020 were reviewed by CES.

Grahamstown Drain has existed since 1954 and links Grahamstown Lake (Grahamstown Storage Reservoir) with the Hunter River (via Windeyer's Creek).

Quarrying activities began prior to 1966 in the central portion of the Site. Quarrying moved eastward with quarry 'infrastructure' established prior to 1976 in the central portion of the site. In 1984, the quarried area extended from the central portion of the site, to the eastern edge, and was inundated with water.

In 2001, the site remained relatively unchanged except the quarried area (and subsequent water inundated area) had extended to the west. The 2010 photograph indicates the quarrying 'infrastructure' in the central portion of the site had been moved to the western portion of the site, and the central portion had been quarried. The site remains relatively unchanged since 2010.

Historical Aerials are presented in **Appendix D**.

3.6.2 Phase 1 Environmental Site Assessment (ERM 2011)

The Phase 1 Environmental Site Assessment (ERM, 2011) stated the following:

- Two areas of operation have existed at the site:
    - An area in the central north. The area has been subsequently quarried and is inundated by water. This area is considered to be of low risk (as defined by CIRIA 552) and no access is possible; and
    - The Central Western area (area of this investigation). The central western area has a road base stockpile, buildings, potential AST (from historical aerial photographs), Septic tank, concrete structures. No evidence of USTs was identified by ERM (i.e., no evidence of a bowsers stands, vent pipes, or fill points).
- Quarrying operations comprised of a floating dredge, sand wash, mooring and pontoons, small office/weigh bridge, staff amenities, and earthmoving operations;
- Embankments are considered to be comprised of imported fill – however anecdotal evidence from staff indicate no off-site material was imported. The risk from these bunds is considered to be low;
- No asbestos or other contamination was observed during the Phase 1 investigation;
- The key pathways identified by ERM were between the former quarrying operations area to groundwater and surface water;
- The proposed future land use considered by ERM was commercial/industrial;
- Receptors include:
    - Site workers and visitors;
    - Groundwater and surface water (Windeyer's Creek/Grahamstown Drain and the Hunter River), ecology. Hunter River is approximately 1.4 km to the west of the site and via Grahamstown Drain and Windeyer's Creek (moderate/high sensitivity).
- Groundwater is expected to travel in a westerly direction towards the Hunter River;

- Previous operators of the site include Monier Drilling Ltd (1974-2008) and Rocla Drilling Pty (2008-2011);
- The identified potential sources of contamination at the site include:
  - Imported fill; and
  - Below ground effluent tank.

3.6.3 Preliminary Geotechnical Investigation (Aargus 2020)

The Preliminary Geotechnical Investigation (Aargus, 2020), although investigating an area directly north of the site, stated the following:

- Subsurface materials consisted of disturbed or reworked sandy soils, residual clay (at location BH4), and sandstone;
- A pre-existing groundwater well was located in the south-west of the site;
- Five groundwater wells (GW1 to GW5) were installed (of up to approximately 2.8m in depth) on the site (to the north);
- Groundwater was encountered at depths between 1.6 and 1.92m during drilling works;
- Stabilised groundwater levels were measured at depths between 1.46 and 1.74m; and
- Analytical results reported there are no potential acid sulfate soils or acid sulfate soils on the site.

This Preliminary Geotechnical Investigation Report did not consider environmental (human health or ecological risks).

3.7 PRELIMINARY CONCEPTUAL SITE MODEL

The preliminary conceptual site model, which is based on previous investigations and desk-based information (NB. A revised CSM is presented in Section 8 of this report, which revises this CSM based on analytical results and intrusive investigation findings), comprises:

Sources:

Based on the Preliminary Environmental Site Assessment (ERM, 2011), the potential sources of contamination are from the following:

- Previous industrial activities associated with quarry works including refuelling and site maintenance of plant and equipment;
- Fill of unknown origin present on site as embankments/levees; and
- The below ground effluent tank.

Contaminants of concern and media:

- Total Recoverable Hydrocarbons (TRH) – Soil, Sediment, and Groundwater;
- Benzene, Toluene, Ethylbenzene and Xylene (BTEX) – Soil and Groundwater;

- Polycyclic Aromatic Hydrocarbons (PAH) – Soil, Surface Water, Sediment, and Groundwater;
- Common metals and metalloids – Soil, Surface Water, Sediment, and Groundwater;
- Total Organic Carbon (TOC) – Surface Water, Sediment, and Groundwater;
- Acid Sulfate Soils – Surface Water, Sediment, and Groundwater;
- Leachable metals and PAH under neutral conditions via Australian Standard Leachate Procedure (ASLP) – Sediment[3]; and
- Asbestos – Soil;

The analysis does not include poly-chlorinated biphenyls (PCB) or Per- and polyfluoroalkyl substances (PFAS) since there is no known source for these contaminants.

Migration Pathways:

- Direct release to soil/water/groundwater/sediments;
- Leaching from soil/sediments;
- Groundwater migration (dissolved);
- Migration through soil;
- Surface water transport (dissolved/particulate);
- Wind transport (particulate/vapour);
- Preferential pathways through installed underground services and higher permeability materials; and
- Volatilisation.

Exposure Pathways:

- Direct contact;
- Direct/incidental ingestion; and
- Inhalation of vapours/particulates.

Receptors (and exposure type):

- Future site users (industrial);
- Offsite users of adjacent and nearby sites (residential including recreational);
- Groundwater;

[3] Analysis will only be undertaken if high concentrations of metals and/or PAH are detected within the sediment.

- Offsite groundwater discharge receiving water body (expected to be Windeyer’s Creek [based off topography] which is a tributary of the Hunter River);
- Ecology; and
- Workers associated with the construction workers (Work Health and Safety, commercial/industrial).

4 SITE ACCEPTANCE CRITERIA

4.1 AESTHETICS

Aesthetic issues generally relate to the presence of low-concern or non-hazardous inert foreign material (refuse) in soil or fill resulting from human activity (NEPC, 1999 as amended 2013).

Site assessment may not detect contamination above human health or environmental assessment criteria, but further assessment would be required in the following circumstances:

- Highly malodorous soils or extracted groundwater (e.g. strong residual petroleum hydrocarbon odours, hydrogen sulphide in soil or extracted groundwater, organo-sulfur compounds);
- Hydrocarbon sheen on surface water;
- Discoloured chemical deposits or soil staining with chemical waste other than of a very minor nature;
- Large monolithic deposits of otherwise low-risk material, e.g. gypsum as powder or plasterboard, cement kiln dust;
- Presence of putrescible refuse including material that may generate hazardous levels of methane such as a deep-fill profile of green waste or large quantities of timber waste; and
- Soils containing residue from animal burial (e.g., former abattoir sites).

4.2 SOIL

Health investigation levels (HILs) have been developed for a broad range of metals and organic substances. The HILs are applicable for assessing human health risk via all relevant pathways of exposure and are generic to all soil types. The HILs applied to the site are, therefore, based on the future use of the site, and the site can be divided in accordance with the proposed future use. For the proposed development, the criteria applicable to backfilling of the former quarry (commercial/industrial) is adopted as the Screening Criteria for the site.

Health screening levels (HSLs) have been developed for selected petroleum compounds and fractions and are applicable to assessing human health risk via the inhalation and direct contact pathways. The HSLs depend on specific soil physicochemical properties, land use scenarios, and the characteristics of building structures. They apply to different soil types, and depths below surface to >4 m. For commercial/industrial, the land use category HSL D (commercial/industrial) should be applied. For the proposed development, the commercial/industrial criteria (HSL D) have been adopted for the site.

'Petroleum hydrocarbon management limits' ('management limits') are applicable to petroleum hydrocarbon compounds only. They are applicable as screening levels following evaluation of human health and ecological risks and risks to groundwater resources. They are relevant for operating sites where significant sub-surface leakage of petroleum compounds has occurred and when decommissioning industrial and commercial sites. Although no significant sub-surface leakage has been recorded at the site, the commercial/industrial TRH Management Limits (coarse grained) have been adopted for the site.

Ecological investigation levels/Screening Levels (EILs) have been developed for selected metals and organic substances and are applicable for assessing risk to terrestrial ecosystems. EILs/ESLs can depend on specific soil physicochemical properties and land use scenarios. EILs/ESLs apply to the top two metres of soil. For the purpose of this investigation, data will be assessed in the context of the future land use category HSL D (commercial/industrial).

Asbestos HSL Health screening levels for asbestos in soils, which are based on scenario-specific likely exposure levels, are adopted from the Western Australia, Department of Health (WA DoH) guidelines – as prescribed in NEPM 2013. Based on the proposed end use, the Commercial/Industrial D exposure setting has been selected for the site.

A summary of the relevant adopted Soil Screening Criteria is presented in Table T1.

4.3 GROUNDWATER AND SURFACE WATER

4.3.1 Human Health – Groundwater Health Screening Levels

For the assessment of risks posed to human health for site users, health screening levels (HSLs) have been developed for selected petroleum compounds and carbon bands and are applicable to assessing human health risk via the inhalation pathways. These HSLs are presented in Table 1A (4) in the *Guideline on Investigation Levels for Soil and Groundwater* (Schedule B1, NEPC, 2013).

As the proposed backfilling of the former quarry is classified as commercial/industrial land use and the predominant soil type above groundwater is sand, the HSL D (commercial/industrial) for sand have been adopted for this assessment.

Based on the site setting information, direct ingestion and recreational human health risks were not considered as part of the assessment.

4.3.2 ANZG for Fresh and Marine Water Quality

For protection of Aquatic Ecosystems and protection of aquatic foods, the *Toxicant Default Guideline Values* published in *ANZG 2018 Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (online: http://www.waterquality.gov.au/anz-guidelines/guideline-values/default/water-quality-toxicants/search) have been selected in substitution of the groundwater investigation levels (GILs) presented in the *Guideline on Investigation Levels for Soil and Groundwater* (Schedule B1, NEPC, 2013).

Based on the likely receiving water body of Hunter River, the 95% species protection criteria have been adopted. As the site is located near the Fullerton Cove, which marks the divide between marine/estuarine environments and freshwater environments, a combination of fresh and marine criteria has been adopted.

A summary of the relevant adopted Surface Water and Groundwater Screening Criteria is presented in Tables T10 and T13.

4.3.3 Visual Amenity

For protection of Visual Amenity:

- Aesthetic values for oils and petrochemicals comprise a visual and olfactory assessment and should not be noticeable as a visible film on the water, nor should they be detectable by odour.

4.4 SEDIMENT

For the protection of Aquatic Ecosystems and protection of aquatic foods, the Toxicant Default Guideline Values published in the Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines (online: https://www.waterquality.gov.au/anz-guidelines/guideline-values/default/sediment-quality-toxicants) have been selected.

The sediment quality guidelines are divided into Sediment Quality Guideline (SQG) and SQG – High. The SQG represents a low ecological toxicity level (where no further assessment is required) and the SGQ-High, which represents a value where ecotoxicity levels may (depending on a wide range of other factors – including grain size, organic content, bioavailability of the particular parameter, ecosystems present, ecosystem chemical tolerance and ecosystem requiring protection) be high and impact the nature and diversity of the ecosystem present within the study area.

As noted in Section 1.3 of the Sediment Quality Guidelines, "*A measured value that exceeds the SQGVs does not necessarily mean that adverse biological effects will occur in the sediments but instead that further investigations should be undertaken to confirm the likely effects*."

A summary of the relevant adopted Sediment Screening Criteria is presented in Table T6.

5 FIELDWORK PROGRAMME DESIGN

The following proposed sampling programme has been designed based on the previous assessments and investigations carried out to date, knowledge of the potential issues resulting from past activities undertaken at the site and takes into consideration the objectives of the assessment.

5.1 SOIL SAMPLES

Twenty-two soil samples were collected in total. Seventeen samples were collected from the former quarrying operations area from the 17 boreholes, five samples were collected from the five monitoring well soil bores, and three samples were collected from bunded materials.

5.1.1 Sampling Pattern and Density

Soil bore locations were determined based on a targeted (judgemental) sampling pattern to investigate the western area of the site where quarrying activities and infrastructure existed (noting the central portion area had previously been quarried).

Soil bores were advanced to the natural soil profile.

The area of the site impacted by former quarry activity is 0.7 ha. Therefore the 17 boreholes completed at the site meets requirements of Table A of the Sampling Design Guidelines (NSW EPA, 1995) of 17 locations for a 0.7 ha site.

A further 5 soil samples were collected from the 5 soil bores converted to groundwater monitoring wells.

Three stockpile samples were collected as follows:

- G2 was collected from the bund directly east of the site access bridge on 7 September 202; and
- G3 and G4 were collected from the bund that east to west on the northern edge of the inundated area.

5.1.2 Depth Intervals of Sampling

Soil samples were collected at intervals and of any strata identified as having visual or olfactory evidence of hydrocarbon contamination. Soil samples were screened using a calibrated photoionisation detector (PID).

Twelve samples were screened for Asbestos Containing Materials (ACM) and Fibrous Asbestos (FA) in accordance with Section 11.3.2 of the *Guideline on Site Characterisation* (Schedule B2, ASC NEPM (NEPC 1999 as amended 2013). It is noted that some soil bores were not screened for asbestos as insufficient soil material was produced by the pushtube.

Based on field screening and visual/olfactory evidence of impact and to provide site coverage, samples were selected for laboratory analysis.

5.1.3 Method of Sampling Collection

Care was taken to ensure that representative samples are obtained from the depth required and that the integrity is maintained. Samples were collected directly from the push tube, auger, or bund.

A new pair of nitrile gloves was worn for each different sample.

Care was taken when collecting samples to ensure the most representative sample of the targeted material is sampled.

Due to the laboratory analysis suite including volatile and semi volatile analytes, samples collected in triplicate for QAQC assessment were not homogenised. Duplicate and triplicate samples were collected to target the same material from similar depths as the primary samples (soil) and immediately by filling sample containers for similar analysis in succession (rinsate).

5.2 GROUNDWATER

Five primary groundwater samples were collected including one QAQC sample.

Groundwater well locations are presented in **Figure 2**.

5.2.1 Well Development and Sample Collection

Fieldwork was undertaken in accordance with documented CES procedures by experienced staff.

Well development was undertaken by surging and pumping manually with a decontaminated foot valve attached to dedicated tubing. Development was undertaken until three well volumes have been removed.

Following development of the wells, the wells were left for approximately one week before purging and sampling, to recharge. The purging process was undertaken by the low-flow method using a bladder pump. Low flow sampling was completed using a bladder pump.

A calibrated and decontaminated water quality meter was used during the purging process to assess chemical equilibrium by measuring pH, redox potential (Eh), electrical conductivity, dissolved oxygen and temperature. The parameters were considered stable and at equilibrium when two consecutive readings were within ±10 %. Stabilisation of the water quality parameters was considered to represent formation specific (at the point of sampling) water being drawn into the parameter measurement cup. As such, the field parameter stabilisation was used to assess when water that is representative of the formation is present in the pump discharge. Sampling commenced after the parameters had stabilised.

Groundwater samples were collected in laboratory supplied sample containers, suitable for the proposed analysis.

5.3 SEDIMENT SAMPLES

The sediment samples were collected at the nominated locations using a Ponar "Grab" Sampler with samples placed directly into laboratory supplied sample containers, with Teflon lined lids. Sediment locations are presented in **Figure 2**.

5.4 SURFACE WATER

Thirteen surface water samples (three from surrounding waterways and ten from the inundated quarry void) were collected. Surface water samples were collected directly from the targeted water body by inserting a capped laboratory supplied sampling container with Teflon lined lids with the opening pointing down to avoid the collection of surface films.

The containers were filled more than 10 cm from the sediment bed and more than 10 cm below the surface water level (or as close to the centre of the channel) as possible, where practicable.

A calibrated and decontaminated water quality meter was used to assess chemical equilibrium by measuring pH, redox potential (Eh), electrical conductivity (EC), dissolved oxygen (DO) and temperature

Surface water sample locations are presented on **Figure 2**.

5.5 DECONTAMINATION PROCEDURES

Prior to sample collection, personnel that handled decontaminated sampling equipment that directly contacts the targeted media, washed their hands with soap and rinsed them thoroughly in potable water before donning a clean, new pair of disposable nitrile gloves. A new pair of nitrile gloves was worn for each different sample.

The pumps (foot valve and bladder pump) used to develop and purge each well were decontaminated in between sample locations by washing with potable water, followed by laboratory supplied deionised water.

The low flow pump sample train did not require decontamination since CES used dedicated tubing for each well.

Water quality instruments were decontaminated by washing with potable water followed by rinsing laboratory supplied deionised water. Sample collection was carried out by breaking the sample train on the monitoring well side of the water quality flow cell. That is to say that the collected sample did not pass through the flow cell.

A new set of disposable pushtube liners were used between soil bore locations.

5.6 SAMPLE HANDLING PROCEDURES

5.6.1 Sample Containers and Bags

Laboratory supplied sample containers with Teflon lined lids were used to contain samples. For each fill soil/sediment sampling location, a separate laboratory supplied 500 ml (approximately 800 g) ziplock plastic bag was used for asbestos samples, which were submitted for quantitative laboratory analyses.

5.6.2 Method of Sample Collection, Storage and Handling

All sample containers were labelled with the sample number, project number, date obtained and site name. This information was repeated on the Chain-of-Custody (COC) record form.

Care was taken to minimise disturbance of the sample to avoid aeration by minimising the distance between the outlet tubing and the container, tilting the container so that discharge flows gently down the inner walls (for groundwater samples), and ensuring containers had no airspace (fully filled).

Once filled, the caps were checked to ensure that they were secure and that there were no air bubbles/head space then placed within an esky / cool box in which double bagged ice has been added to keep the samples cool. At the end of each sampling day the samples in the cool box were transported to the CES office where ice was added until delivered to the laboratory (typically within one day). Custody seals were placed on the esky / cool box for delivery to the laboratory.

5.6.3 Documentation

For groundwater samples the supervising engineer/scientist filled out a copy of CES “Surface Water or Groundwater Sampling Field Data Sheet” and “Sample Register’, which documents:

- Time of sample collection;
- Weather;
- Unique sample identification number;
- Sample location and depth;
- Static Water Level;
- Date of well development;
- Water quality screening results (DO, Temperature, Redox potential, pH and conductivity);
- Presence or absence of odour (nature and intensity);
- Colour of the water;
- Presence or absence of sediment in the well; and
- Well condition and purging volumes.

For soil and sediment samples, CES completed a CES “Bore Hole Log” and “Sample Register” to document

- Time of sample collection;

- Weather;
- Unique sample identification number;
- Visual assessment of sample location;
- Description of soils encountered (in accordance with AS172-2017) and depth encountered;
- Field Screening results (in accordance with Section 11.3.2 ASC NEPM Schedule B2 (NEPC 1999 as amended 2013));
- Groundwater inflow (if observed); and
- Presence or absence of odour (nature and intensity).

All samples, including QA samples, were transported to the primary and check laboratories under Chain-of Custody procedures and maintained in an ice-filled cooler. The COC detailed the following information:

- Site identification;
- The sampler;
- Nature of the sample;
- Collection time and date;
- Analyses to be performed;
- Sample preservation method;
- Departure time from site; and
- Dispatch couriers.

5.7 LABORATORY ANALYSIS

5.7.1 Soil

Each soil sample was analysed for one or more of the following:

- TRH;
- BTEX;
- PAH;
- Eight common metals and metalloids;
- SPOCAS (maximum of two samples); and
- Asbestos (analysis to comply with Section 11.3.2 of the *Guideline on Site Characterisation* (Schedule B2, ASC NEPM (NEPC 1999 as amended 2013).

5.7.2 Surface Water

Each surface water sample was analysed for:

- Eight metals and metalloids;
- PAH;
- TOC;

- TRH; and
- pH.

5.7.3 *Sediment*

Each sediment sample was analysed for:

- Eight metals and metalloids;
- PAH;
- TRH;
- TOC;
- pH; and
- ASLP 8 metals and PAH.

5.7.4 *Groundwater*

Each groundwater sample was analysed for:

- Eight Metals and metalloids;
- PAH;
- TRH;
- TOC;
- pH; and
- Soluble chloride: soluble sulfate (for acid sulfate assessment).

5.8 FIELD QUALITY ASSURANCE / QUALITY CONTROL PROGRAMME

Field QA/QC for this project consists of field duplicates and field triplicates for groundwater and soil samples. For groundwater sampling, field QA/QC sample also comprised rinsate blanks and trip blanks. A description of each of these samples and their frequency of testing is provided below.

5.8.1 *Primary Environmental Samples*

Environmental samples or primary samples are the representative samples of groundwater or soil collected for analysis to determine aspects of their chemical composition.

5.8.2 *Field Duplicate Samples*

Field duplicate samples are provided by the collection of two environmental samples from the same location or successively from the same monitoring bore or sample location. These samples are preserved, stored, transported, prepared and analysed in an identical manner. The results of analyses on the primary and blind replicate sample pair are assessed by calculating the RPDs between the results. The RPD is calculated as the difference between the results divided by their mean value and expressed as a percentage. If the RPD exceeds the value adopted for any analytes, additional investigation will be required, or justification provided for not conducting additional investigation.

One blind replicate was collected for every twenty environmental samples (5%) for soil, sediment, surface water, and groundwater, in accordance with the requirements of the *Guideline on Laboratory Analysis of Potentially Contaminated Soils* (Schedule B3 (ASC NEPM, NEPC 1999, as amended 2013). This frequency was considered to be sufficient to ensure that each batch of samples is accompanied by a blind replicate. If not, an additional blind replicate was carried out.

5.8.3 Field Triplicate Samples

Field triplicate samples provide a check on the analytical proficiency of the laboratories. Split samples are collected from the same location or successively from the same monitoring bore or sample location. Split samples must be taken from the same location as the blind replicate, thus becoming a triplicate sample. Spilt samples (triplicates) are preserved, stored, transported, prepared and analysed, at the secondary laboratory.

One blind replicate was collected for every twenty environmental samples (5%) for soil, sediment and every 10 environmental samples (10%) for surface water, in accordance with the requirements of the Schedule B3 (ASC NEPM, NEPC 1999, as amended 2013). This frequency was considered to be sufficient to ensure that each batch of samples is accompanied by a split sample. If not, an additional split sample was carried out.

5.8.4 Rinsate Samples

Rinsate (equipment) blanks generally consist of pre-preserved bottles filled with laboratory-prepared deionised water that has been passed over decontaminated field equipment. Rinsate blanks are prepared on site, labelled with a unique CES sample identification number and transported to the principle laboratory for analysis as regular environmental samples. The purpose of the rinsate blank is to assess the efficiency of decontamination procedures.

Rinsate samples were collected from the hand auger (for the soil investigation) and the Ponar Grab Sampler (for the sediment investigation).

5.8.5 Trip Blanks

Trip blanks consisted of pre-washed bottles containing laboratory prepared distilled or de-ionised water or uncontaminated soil. The role of trip blanks is to detect potential contamination during sample transport. These samples reside in transport vessels during sampling activities and are not opened in the field.

One soil trip blank was submitted with the soil investigation.

5.8.6 Trip Spikes

Trip spikes consisted of pre-washed bottles containing laboratory prepared water or soil spiked with a distinct concentration of volatile contaminant. The role of trip spikes is to ensure correct handling, in particular the use of ice boxes, is utilised when during collection and transport.

One soil trip spike was submitted with the soil investigation.

6 QUALITY ASSURANCE / QUALITY CONTROL RESULTS

The QA/QC Data Acceptance criteria are presented in Table 1.

Table 1: QA/QC Data Acceptance Criteria

QA/QC Sample Type	Method of Assessment	Acceptable Range
Field QA/QC		
Blind and Split Replicates	The assessment of split replicate is undertaken by calculating the Relative Percent Difference (RPD) of the replicate concentration compared with the original sample concentration. The RPD is defined as: $$\text{RPD} = 100 \times \frac{\lvert X_1 - X_2 \rvert}{\text{Average}}$$ Where: X_1 and X_2 are the concentration of the original and replicate samples.	*The acceptable range depends upon the levels detected:* ▪ *0 – 100% RPD (When the average concentration is < 5 times the PQL)* ▪ *0 – 75% RPD (When the average concentration is 5 to 10 times the PQL)* ▪ *0 – 50% RPD (When the average concentration is > 10 times the PQL)*
Blanks (Rinsate, Trip and Field Blanks)	*Each blank is analysed as per the original samples.*	*Analytical Result < PQL*
Laboratory QA/QC		
Laboratory Duplicates	Assessment as per Split Replicates.	*The acceptable range depends upon the levels detected:* ▪ *0 – 100% RPD (When the average concentration is < 4 times the PQL)* ▪ *0 – 50% RPD (When the average concentration is 4 to 10 times the PQL)* ▪ *0 – 30% RPD (When the average concentration is > 10 times the PQL)*
Surrogates Matrix Spikes Laboratory Control Samples	Assessment is undertaken by determining the % Recovery of the known spike or addition to the sample. $$\text{\% Recovery} = 100 \times \frac{C - A}{B}$$	Surrogates: 70% – 130% Matrix Spikes: 70% - 130% (Organics) 80% - 120% (Inorganics) LCS:

QA/QC Sample Type	Method of Assessment	Acceptable Range
	Where: A = Concentration of analyte determined in the original sample; B = Added Concentration; C = Calculated Concentration.	70% - 130% (Organics) 90% - 110% (Inorganics)
Method Blanks	Each blank is analysed as per the original samples.	*Analytical Result < PQL*
Note: *PQL = Laboratory Practical Quantitation Limit or the minimum detection limit for a particular analyte.*		

6.1 GENERAL FIELD QAQC PROCEDURES

6.1.1 Sample Handling and Transport Methods

All samples were labelled with a unique identifier consisting of the sample location. Groundwater and soil samples were placed into laboratory prepared and supplied sample containers. After collection, samples were placed directly into an ice-filled esky and transported to a NATA accredited laboratory for the analytes selected, under chain of custody (COC) protocols.

6.1.2 Field Quality and Quality Control

Quality assurance procedures adopted for the groundwater assessment included:

1. Ensuring field screening instruments are calibrated;
2. Placing samples immediately on ice following sampling;
3. Ensuring correct sampling containers and preservatives are employed for contaminants being analysed; and
4. Ensuring analysis was performed within recommended holding times.

6.2 FIELD QA / QC RESULTS

Field QA/QC for this project consisted of blind replicates, split samples, a trip spike, and a trip blank. The results of the QAQC assessment including the Relative Percentage Difference (RPD) calculations are presented in Tables T3, T7, T11, and T14.

6.2.1 Blind Replicate Samples

Blind replicate samples were collected for soil, sediment, surface water, and groundwater to exceed the requirements of the ASC NEPM (NEPC 1999 as amended 2013) of 5% of samples. A blind sample was included with each batch of samples submitted to the laboratory for analysis.

Blind replicate RPD results conformed to the Data Acceptance Criteria (DAC) presented in Table 1.

6.2.2 Split Samples

Split samples were collected for soil, sediment, surface water, and groundwater to exceed the requirements of the ASC NEPM (NEPC 1999 as amended 2013) of 5% of samples. A split sample was included with each batch of samples submitted to the laboratory for analysis.

Split replicate RPD results conformed to the DAC presented in Table 1, with the following exceptions:

- Total organic carbon in primary surface water sample SW3 and split replicate sample QW1A (RPD 196.7%).

While this RPD exceedance has been identified, the remaining analytes conformed to the DAC. The exceedance is considered likely to be a result of the holding times between the primary and tertiary laboratory, rather than an issue with sample analysis quality by the primary laboratory.

6.2.3 Trip Blanks

One Trip Blank was collected and analysed. Trip Blank results were not detected in excess of the laboratory PQL, and therefore conformed to the DAC.

6.2.4 Trip Spikes

One Trip Spike was collected and analysed. Trip Spike recoveries were detected within the range presented as acceptable in the DAC.

6.2.5 Rinsate Samples

One soil rinsate and one sediment rinsate were collected and analysed. The results of the rinsate samples conformed to the DAC.

6.3 LABORATORY QA/QC ASSESSMENT

The reliability of test results from the analytical laboratories was monitored according to the QA/QC procedures used by the NATA accredited laboratory. The QA/QC programme employed by Envirolab (the primary laboratory) and ALS (the secondary laboratory) specifies holding times, extraction dates, method descriptions, Chain of Custody (COC) requirements, analysis, PQLs and acceptance criteria for the results. Laboratory QA/QC requirements to be undertaken by Envirolab are based on NEPM requirements.

Laboratory QA/QC assessment results are presented in the Laboratory Certificates of Analysis and documentation presented in **Appendix F**. Review of QAQC comments in the laboratory Certificates of Analysis did not identify issues which would indicate that are likely to have had a material effect on the assessment of laboratory analytical data.

6.4 QAQC ASSESSMENT SUMMARY

The field procedures applied, and laboratory QA/QC programme demonstrates that the data provided by the laboratory is representative of the properties of the samples provided by CES. The samples were collected in accordance with established CES SOPs. The QA/QC assessment did not detect any issues with the quality of the data collected therefore CES has a high degree of confidence in the quality of the data provided, and the data within this report is representative and suitable for the assessment.

7 RESULTS

Fieldwork was undertaken on the following days:

- Sediment and surface water sampling were completed on 25 August 2020;
- Soil bore advancement and well installation was completed on 31 August, 01 September, 07 September, 08 September, 22 October, and 23 October;
- Groundwater well development was completed on 23 October 2020; and
- Groundwater sampling was completed on 29 October 2020.

7.1 SOIL INVESTIGATION

7.1.1 Encountered Subsurface Conditions

A subsurface model has been prepared and is presented in Table 2.

The depths of the various strata are based on the depths encountered at the borehole locations and may be different at other parts of the Site. Detailed descriptions and depths of materials encountered are presented on the borehole logs included in **Appendix C**.

It should be noted that the depths provided in this table relate to the ground level at the time of the investigation works in August, September and October 2020.

Table 2: Inferred Subsurface Model

Geotechnical Unit	Approximate Depth to Top of Unit (m)	Approximate Thickness (m)	Typical Description
Unit 1 – Fill	0.0	~0.0 – 3.7	Silty, clayey, SAND: fine to medium grained, medium plasticity, with gravels, organic material, some aggregate, no odours or staining, brown/grey Sandy CLAY: low plasticity, brown SAND: fine grained, beige
Unit 2 – Natural	0.0 – 3.7	Unknown	Silty, clayey, SAND: fine to medium grained, with organic material, some siltstone gravels, white/light brown/grey Silty, sandy CLAY: high plasticity, with organic material, dark grey CLAY: moderate plasticity, dark grey CLAY: medium plasticity, shale fragments and ironstone gravels, no odours or staining, grey/red/yellow/orange, dry

7.1.2 Field Screening

No soils encountered during fieldwork exhibited visual or olfactory indicators of contamination, such as odours or staining.

PID screening of soils did not detect VOC in soil headspace in excess of 3.1 ppm (detection limit of the equipment) indicating volatile contamination is unlikely. PID results are presented on borehole logs presented as **Appendix C**.

No asbestos or suspected ACM were observed.

7.1.3 Laboratory Analysis

Laboratory Certificates of Analysis, Sample Receipt Notification, and COC documentation is presented as **Appendix F**.

A summary of laboratory analysis and a comparison of the analysis results to the ASC NEPM (NEPC 2013) HIL D/HSL D, EIL/HSL Commercial/Industrial, and the TRH Management Limits for Commercial/Industrial (coarse soils) are presented in Table T1 located within the Tables Section of this report.

An assessment of the laboratory results indicates that the contaminants of potential concern do not exceed the adopted screening criteria.

7.2 SEDIMENT INVESTIGATION

7.2.1 Field Observations

Sediments located at the base of the former quarry inundated area generally consisted of Silty CLAY: with minor sand and gravels, high plasticity, dark grey/yellow/brown.

7.2.2 Laboratory Analysis

Laboratory Certificates of Analysis, Sample Receipt Notification, and COC documentation is presented as **Appendix F**.

A summary of laboratory analysis and a comparison of the analysis results to the ANZECC/ARCMANZ (2013) SQG and SQG (high) are presented in Table T6 located within the Tables Section of this report.

An assessment of the laboratory results indicates that the contaminants of potential concern do not exceed the SQG and SQG (high) guidelines value except for:

- Nickel in sediment samples S1 to S10 which marginally exceed the SQG guideline value but do not exceed the SQG (high).

Sediment guidelines exceedances are presented in **Figure 4**.

7.3 SURFACE WATER INVESTIGATION

7.3.1 Field Observations

Surface water within the former quarry void (SW1 to SW10), upgradient locations of Grahamstown Drain (SW11 and SW12), and down gradient location where the Grahamstown Drain meets Windeyer's Creek (SW13) was generally fresh, well oxygenated, mild to moderately reducing, light brown/grey/clear, low turbidity, with no odours or sheen. The surface water readings are presented in Table T9.

It is noted that the dissolved oxygen in surface water sample SW13 was less than the other samples. This may be due to the extensive surface vegetation in the water.

7.3.2 Laboratory Analysis

Laboratory Certificates of Analysis, Sample Receipt Notification, and COC documentation is presented as **Appendix F**.

A summary of laboratory analysis and a comparison of the analysis results to the ANZG (2018) Fresh and Marine Water Quality (95% species protection) are presented in Table T10 located within the Tables Section of this report.

An assessment of the laboratory results indicates that the contaminants of potential concern do not exceed the adopted guidelines value except for:

- Copper in surface water samples SW1, SW2, and SW4 to SW13 which exceeds both Fresh and Marine Water guidelines;
- Nickel in surface water samples SW4, SW6 to SW9, and SW11 to SW13 which exceeds the Marine and Fresh Water Guidelines;
- Zinc in surface water samples SW1, SW2, and SW4 to SW13 which exceeds both Fresh and Marine Water guidelines.

Surface water guideline exceedances are presented in **Figure 5**.

7.4 GROUNDWATER INVESTIGATION

7.4.1 Groundwater Gauging

Standing groundwater levels were measured in the monitoring wells using a calibrated interface probe. No free LNAPL was detected in the groundwater monitoring wells. The groundwater readings are presented in Table T12. Groundwater ranged between 0.21 metres below top of casing (mBTOC) to 2.46 mBTOC.

7.4.2 Field Observations

The details of field observations, including standing water levels, colour, turbidity, and odours are presented in Table T12.

7.4.3 *Field Parameters*

Groundwater field parameters data is presented in Table T12. These parameters indicated that the water beneath the Site was generally neutral (MW1 to MW4) to acidic (MW5), poorly oxygenated, brackish and a strongly to mildly reducing environment was present.

Field data sheets are presented in **Appendix E**. Calibration certificates for the water quality meter and interface probe are presented in **Appendix B**.

7.4.4 *Groundwater Laboratory Analytical Results*

Laboratory Certificates of Analysis, Sample Receipt Notification, and COC documentation is presented as **Appendix E**.

A summary of laboratory analysis and a comparison of the analysis results to the ANZG (2018) Fresh and Marine Water Quality (95% species protection) and NEPM (2013) Groundwater HSLs for Commercial/Industrial[4] are presented in Table T13 located within the Tables Section of this report.

The laboratory detected concentrations below the adopted groundwater criteria with the exception of the following:

- Cadmium in MW5 exceeded the ANZG (2018) Fresh and Marine Water Quality Criteria;
- Copper in MW1 to MW5 exceeded the ANZG (2018) Fresh and Marine Water Quality Criteria;
- Lead in MW5 exceed the ANZG (2018) Fresh Water Quality Criteria;
- Nickel in MW1, MW3, and MW5 exceeded the Marine Water or Fresh and Marine Water Quality Criteria; and
- Zinc in MW1 to MW5 exceeded the Fresh and Marine Water Quality Criteria.

Groundwater monitoring well exceedances are presented in **Figure 6**.

[4] The NEPM (2013) Groundwater HSLs are only applicable for groundwater at depths of greater than or equal to 2m below ground level. Although in some examples, these guideline values are not applicable (i.e. water level is less than 2m below ground level), these values have been used as a preliminary screening.

8 CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) was developed in consideration of the historical information, current site conditions, and analytical results. The CSM takes into account the proposed use of the site as the backfilling of the former quarry void.

8.1 POTENTIAL ON-SITE SOURCES OF CONTAMINATION

Previous Industrial Quarry Activities

The historical review and site inspection indicate the site was previously an active quarry. The use of petroleum products such as fuels, oils, and hydraulic oils, as well as the use of processing machinery. In consideration of analytical results, COPC include:

- Heavy Metals (cadmium, chromium, copper, lead, nickel, and zinc).

Uncontrolled Fill

Some cut and fill activities would have occurred during the development of the site. Fill is present on site as embankments and levees in the western portion of the site. The origin of the fill is unknown and the potential exists for this material to be contaminated. In consideration of analytical results, COPC include:

- Heavy Metals (cadmium, chromium, copper, lead, nickel, and zinc).

8.2 POTENTIAL OFF-SITE SOURCES OF CONTAMINATION

Raymond Terrace Wastewater Treatment Works

Raymond Terrace Wastewater Treatment Works is located hydraulically up-gradient to the Site and can treat approximately 6.4Ml of wastewater per day. In addition, "*…Treated effluent is discharged to Windeyer's Creek via Grahamstown Drain* (https://www.hunterwater.com.au/our-water/wastewater-systems/wastewater-treatment-plants/raymond-terrace-wwtw)." Potential contaminants of concern associated with domestic wastewater and domestic wastewater treatment include:

- Heavy metals;
- Cations and Anions;
- pH; and
- EC.

Grahamstown Drain

Grahamstown Drain is both hydraulically up-gradient and down-gradient from the site. It is understood artificial Grahamstown Drain receives surface water run-off from the greater Raymond Terrace area prior to reaching the site. As mentioned above, it also receives treated effluent discharged from Raymond Terrace Wastewater Treatment Works. As a result, there exists the potential that Grahamstown Drain is likely to have contain the following contaminants:

- Heavy Metals (cadmium, chromium, copper, lead, nickel, and zinc).

8.3 POTENTIAL PATHWAYS

The pathways through which contaminants may reach receptors are in part dependent on the nature and behaviour of the contaminant. The following potential pathways have been identified in accordance with Section 3.2.4 of the *Guideline on Derivation of Health-Based Investigation Levels* (Schedule B7, NEPM 2013):

- Ingestion / dermal contact during construction (acute risks); and
- Indoor and outdoor inhalation of vapours; and
- Outdoor dermal contact and incidental ingestion of contaminants in the particulate form (dust).

8.4 RECEPTORS

Potential sensitive receptors (on and off-site) are listed below:

- Future construction workers during the construction of the proposed redevelopment (acute only);
- Future employees and site visitors;
- Groundwater beneath the site;
- Surface Water; and
- Neighbouring waterbodies.

9 DISCUSSION

9.1 SOIL

As no COPC concentrations exceed the adopted criteria, the soil and fill underlying the site are considered to be a low and acceptable risk to human health and the environment.

9.2 SEDIMENT

Sediment samples were collected from the base of the flooded former quarry void and Nickel exceedances of the ANZECC/ARCMANZ (2013) SQG indicate a potential low-level risk to the ecology of the flooded former quarry void. In addition, ASLP analysis indicates that the some metals and metalloids are theoretically leachable from the sediments.

It is noted that the sediment was a Silty CLAY – which, with reference to Section 2.10.3 of the *Sediment Quality Assessment – A Practical Handbook* (Simpson and Batley, Second Edition, 2016), may exhibit higher concentrations since a finer matrix is likely to trap and retain more contaminants. In addition, it is noted that a given contaminant concentration in a sandy sediment will generally be more toxic than the same concentration in a fine-grained sediment, because the partitioning to pore water will be greater.

It is also noted that total organic carbon ranged from 2% to 4.6% within the sediment samples. Increasing organic carbon content favours the partitioning of metals to sediment particles (Chapman et al, 1999, *Appropriate Applications of Sediment Quality Values for Metals and Metalloids*).

Potential future infilling of the flooded quarry void will raise the benthic zone and eventually after completion of the backfilling operations, the benthic habitat will cease to exist.

9.3 SURFACE WATER

Surface water samples were collected from the flooded former quarry void, the up-gradient artificial Grahamstown Drain, and the down-gradient Windeyer’s Creek. Some metal exceedances of the adopted criteria indicate a potential risk to the ecology of the flooded former quarry void, artificial Grahamstown Drain, and Windeyer’s Creek.

It is understood that the up-gradient artificial Grahamstown Drain receives surface water run-off from the greater Raymond Terrace region and treated effluent discharged from Raymond Terrace Wastewater Treatment Works area prior to reaching the site. As a result, the Grahamstown Drain is likely to have elevated metal concentrations. In addition, up-gradient surface water sampling (SW11) of Grahamstown Drain and up-gradient groundwater wells (MW4 and MW5) generally have higher or equal to metal concentrations than the flooded former quarry void and down-gradient surface water samples. This is likely indicative of background levels or a result of offsite sources and not contamination produced by the Site's historical use.

In consideration of the above, the surface water exceedances generated by the site are unlikely to pose an unacceptable risk to Windeyer's Creek or the Hunter River.

In consideration of the above, remediation or management of surface water is not required for the proposed development. Through the backfilling of the former quarry void, the sediments containing marginally elevated metal concentrations will cease to be mobile, leading to a potential improvement to the water quality of the down-gradient receptors. However, it should be noted that the Grahamstown Drain and Windeyer's Creek (and the concentrations detected in these watercourses, which were derived upgradient from the site) may continue to impact the surface water quality.

9.4 GROUNDWATER

With respect to metal concentrations in excess of the screening criteria, detected in MW1 to MW5, the following is noted:

- Groundwater flow is likely to be to the west, towards Windeyer's Creek which feeds the Hunter River, with the Hunter River the likely receiving water body;
- The Hunter River is a highly disturbed water course, therefore the 95% species protection criteria for moderately disturbed ecosystems may be overly conservative for the purposes of this assessment;
- Concentrations of metals in site soils were not elevated to an extent that would indicate a source of groundwater contamination resulting from the metals was located onsite during the sites history;
- Similarly, concentrations of metals in site sediments and ASLP values were not elevated to an extent that would indicate a source of groundwater contamination resulting from the metals that were located onsite during the sites history; and
- Concentrations in MW5 and MW4 (upgradient wells) which are located on the up-gradient site boundary were generally higher than in MW1 to MW3 (down gradient wells) which may indicate that the concentrations are indicative of background levels or a result of offsite sources and not contamination produced by the Site's historical use.

In consideration of the above, the groundwater exceedances are unlikely to pose an unacceptable risk to the receiving water body's water quality as the receiving water body is a highly disturbed ecosystem. In addition, it is unlikely that contaminant concentrations in groundwater are a result of onsite sources, rather representative of regional groundwater quality in an urbanised area or a result of upgradient sources.

In consideration of the above, remediation or management of groundwater is not required for the proposed development.

9.5 SITE SUITABILITY

Based on the CSM and investigation results, the Site has not been contaminated based on current or historic land use. The Site is environmentally suitable for the proposed commercial/industrial land use. In addition, overall, given the proposed backfilling of the quarry void with environmentally benign and appropriately placed PASS, this is a positive environmental outcome for the site and restoration of a site after an industrial history in order to facilitate positive recreational future use.

10 LIMITATIONS OF THIS REPORT

This report has been prepared for use by the client who commissioned the works in accordance with the project brief and based on information provided by the client. The advice contained in this report relates only to the current project and all results, conclusions and recommendations should be reviewed by a competent person with experience in geotechnical and environmental investigations before being used for any other purpose. CES accepts no liability for use or interpretation by any person or body other than the client. This report must not be reproduced except in full and must not be amended in any way without prior approval by the client and CES.

This report does not provide a complete assessment of the environmental status of the site and is limited to the scope defined therein.

It is noted that considerable areas of the site could not be investigated due to:

- The presence of the large central inundated quarry void;
- The surrounding saturated land to the south and west in the vicinity of Windeyers Creek and Grahamstown Drain;
- The limited access from the east due to the Hunter Water Raymond Terrace Sewage Works;
- The saturated land to the central north of the site; and
- The limited access from the south to investigate the southern edge of the inundated quarry.

Should information become available regarding conditions at the site including previously unknown sources of contamination, CES reserves the right to review the report in the context of the additional information.

11 REFERENCES

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Figures

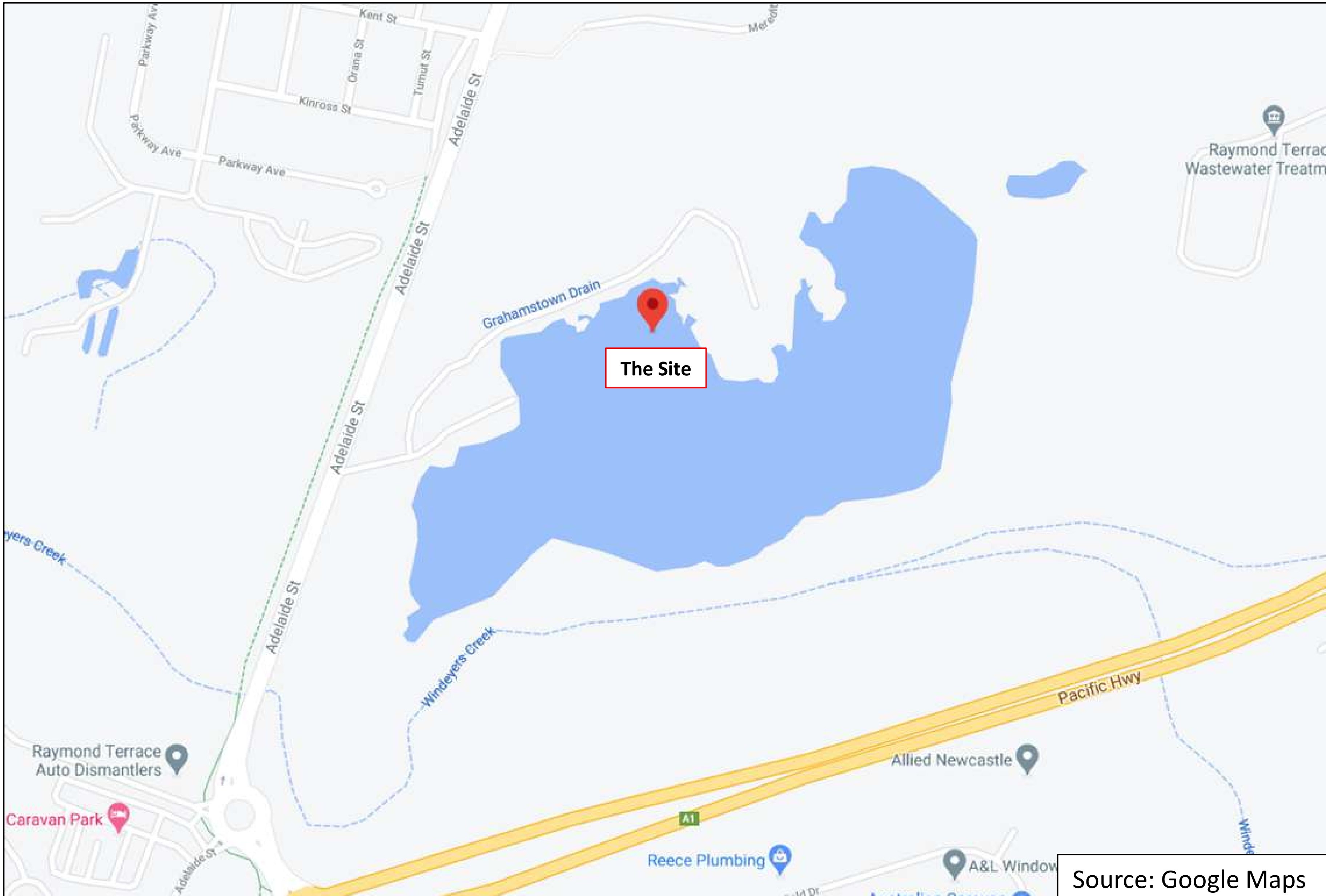

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Figure 1: Site Locality Map

CES Project ID: CES200502-PHB	Date: 15/07/20
Prepared by: A.Carras	Checked by: M.Challoner

Contaminated Land Soil Investigation Area

Surface Water Monitoring Location

Soil Grab Sample Location

Inferred Groundwater Flow

Monitoring Well (Water Balance and Groundwater Quality

Surface Water and Sediment Monitoring Location

CONSULTING EARTH SCIENTISTS	Figure 2: Monitoring Location Plan	CES Project ID: CES200502-PHB	Date: 15/07/20
		Prepared by: A.Carras	Checked by: M.Challoner

Soil Bore Location

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Figure 1: Indicative Contaminated Land Assessment Area and GW Monitoring Well Location Plan

CES Project ID: CES200502-PHB	Date: 15/07/20
Prepared by: A.Carras	Checked by: M.Challoner

Sediment Monitoring Location

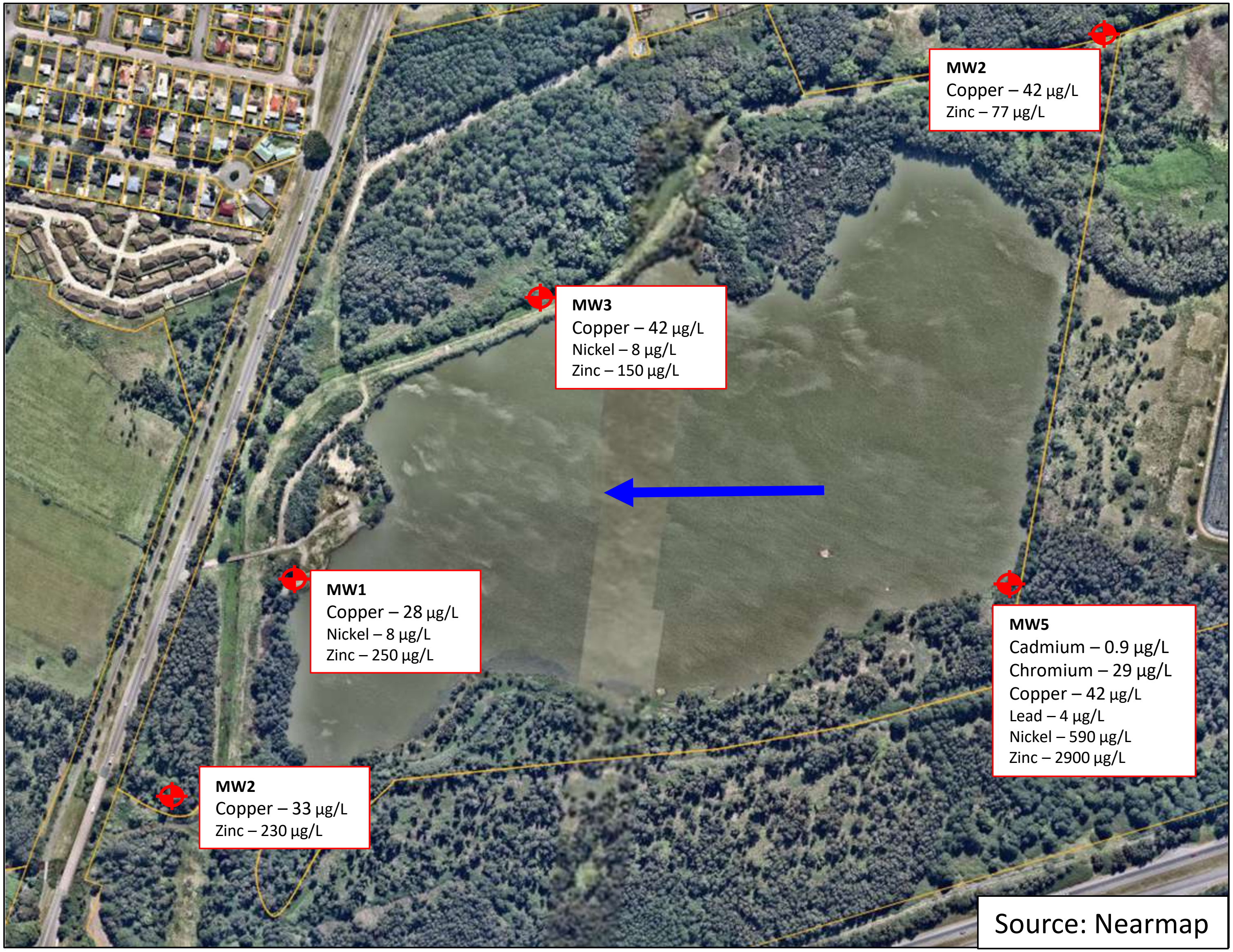
Inferred Groundwater Flow

CONSULTING EARTH SCIENTISTS	Figure 4: Sediment Guideline Exceedances	CES Project ID: CES200502-PHB	Date: 15/07/20
		Prepared by: A.Carras	Checked by: M.Challoner

Surface Water Monitoring Location

Inferred Groundwater Flow

CONSULTING EARTH SCIENTISTS	Figure 5: Surface Water Guideline Exceedances	CES Project ID: CES200502-PHB	Date: 15/07/20
		Prepared by: B.Ren	Checked by: M.Challoner



Contaminated Land Soil Investigation Area

Surface Water Monitoring Location

Soil Grab Sample Location

Inferred Groundwater Flow

Monitoring Well (Water Balance and Groundwater Quality

Surface Water and Sediment Monitoring Location

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Figure 6: Groundwater Monitoring Well Exceedances

CES Project ID: CES200502-PHB	Date: 15/07/20
Prepared by: A.Carras	Checked by: M.Challoner

Tables

Table T1: Summary of Soil Analytical Results

		Lab Report	HIL D/HSL D Commercial/Industrial (HSL 0-<1 m, 1m to <2m, 2m to <4m, 4m+ Sand)	EIL/ESL Commerical/Industrial	TRH Management Limits Commercial/Industrial Coarse Grained Soils	250313	250313	250313	250313	250313	250313	250313	250828	250828	250828	250828	250828	250828
		Job #				CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB
		Sample				SB1/2.0	SB2/0.5	SB3/0.5	SB4/1.0	SB5/0.5	SB6/0.1	MW1/1.0	SB7/0.5	SB8/0.1	SB9/0.1	SB10/0.1	SB11/0.1	SB12/1.5
		Depth				2.0	0.5	0.5	1.0	0.5	0.1	1.0	0.5	0.1	0.1	0.1	0.1	1.5
		Date Sample				01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020	31/08/2020		08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020
	Units	PQL																
TRH C6 - C9	mg/kg	25				<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
TRH C6 - C10	mg/kg	25			700	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
vTPH C6 - C10 lessBTEX (F1)	mg/kg	25	45, 70, 110, 200	215		<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
Benzene	mg/kg	0.2	0.5, 0.5, 0.5, 0.5	75		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	0.5	160, 220, 310, 540	135		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	1	55, NL, NL, NL	165		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	2				<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene	mg/kg	1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
naphthalene	mg/kg	1	3, NL, NL, NL			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	3	40, 60, 95, 170	180		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
TRH C10 - C14	mg/kg	50				<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH C15 - C28	mg/kg	100				<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH C29 - C36	mg/kg	100				<100	<100	<100	<100	<100	**320**	<100	<100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	50			1000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C10 - C16less Naphthalene (F2)	mg/kg	50	110, 240, 440, NL	170		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C16-C34	mg/kg	100		1700	3500	<100	<100	<100	<100	<100	**310**	<100	<100	<100	<100	<100	<100	<100
TRH >C34-C40	mg/kg	100		3300	10000	<100	<100	<100	<100	<100	**290**	<100	<100	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	50				<50	<50	<50	<50	<50	**600**	<50	<50	<50	<50	<50	<50	<50
Naphthalene	mg/kg	0.1		370		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1				**0.1**	**0.2**	**0.1**	<0.1	<0.1	<0.1	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1				**0.1**	**0.2**	**0.1**	<0.1	<0.1	<0.1	**0.1**	<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	<0.1	<0.1	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.2				<0.2	**0.3**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.05		0.7		<0.05	**0.09**	**0.08**	<0.05	<0.05	<0.05	**0.07**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1				<0.1	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.1				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.1				<0.1	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total +vePAH's	mg/kg	0.05	4000			**0.2**	**1.2**	**0.4**	<0.05	<0.05	<0.05	**0.4**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.5	40			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.5	40			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.5	40			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	mg/kg	4	3000	160		**11**	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Cadmium	mg/kg	0.4	900			<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	1	3600	890		**20**	**5**	**13**	**36**	**8**	**9**	**19**	**5**	**2**	**5**	**6**	**10**	**5**
Copper	mg/kg	1	240000	200		**3**	**5**	**9**	**15**	**4**	**7**	**8**	**14**	<1	**2**	**4**	**5**	**3**
Lead	mg/kg	1	1500	1800		**10**	**4**	**11**	**10**	**11**	**7**	**8**	**10**	<1	**2**	**3**	**4**	**3**
Mercury	mg/kg	0.1	730			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	6000	110		**2**	**4**	**8**	**10**	**3**	**5**	**9**	**3**	<1	**2**	**4**	**6**	**1**
Zinc	mg/kg	1	400000	530		**12**	**18**	**44**	**18**	**11**	**22**	**25**	**30**	**2**	**8**	**17**	**14**	**5**

Table T1: Summary of Soil Analytical Results

			HIL D/HSL D Commercial/Industrial (HSL 0-<1 m, 1m to <2m, 2m to <4m, 4m+ Sand)	EIL/ESL Commerical/Industrial	TRH Management Limits Commercial/Industrial Coarse Grained Soils												
		Lab Report				250828	250828	250828	250828	250828	250828	250828	250828	250828	250828	254263	254263
		Job #				CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB
		Sample				SB13/1.0	SB14/1.0	SB15/0.5	SB16/1.0	SB17/0.1	G2	G3	G4	MW2/1.0	MW3/3.0	MW5/0.5	MW4/1.0
		Depth				1.0	1.0	0.5	1.0	0.1	-	-	-	1	3	0.5	1
		Date Sample				08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020	7/09/2020	8/09/2020	08/09/2020	08/09/2020	07/08/2020	22/10/2020	23/10/2020
	Units	PQL															
TRH C6 - C9	mg/kg	25				<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
TRH C6 - C10	mg/kg	25			700	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
vTPH C6 - C10 lessBTEX (F1)	mg/kg	25	45, 70, 110, 200	215		<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
Benzene	mg/kg	0.2	0.5, 0.5, 0.5, 0.5	75		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	0.5	160, 220, 310, 540	135		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	1	55, NL, NL, NL	165		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	2				<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene	mg/kg	1				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
naphthalene	mg/kg	1	3, NL, NL, NL			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	3	40, 60, 95, 170	180		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
TRH C10 - C14	mg/kg	50				<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH C15 - C28	mg/kg	100				<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH C29 - C36	mg/kg	100				<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	50			1000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C10 - C16less Naphthalene (F2)	mg/kg	50	110, 240, 440, NL	170		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C16-C34	mg/kg	100		1700	3500	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH >C34-C40	mg/kg	100		3300	10000	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	50				<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Naphthalene	mg/kg	0.1		370		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<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	<0.1	<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	<0.1	<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	<0.1	<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	<0.1	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1				**0.3**	<0.1	<0.1	<0.1	<0.1	<0.1	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1				**0.3**	<0.1	<0.1	<0.1	<0.1	<0.1	**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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1				**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.2				**0.3**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.05		0.7		**0.2**	<0.05	<0.05	<0.05	<0.05	<0.05	**0.08**	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1				**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.1				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.1				**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total +vePAH's	mg/kg	0.05	4000			**1.9**	<0.05	<0.05	<0.05	<0.05	<0.05	**0.4**	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.5	40			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.5	40			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.5	40			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	mg/kg	4	3000	160		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	**7**
Cadmium	mg/kg	0.4	900			<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	1	3600	890		**6**	**35**	**4**	**22**	**2**	**12**	**21**	**21**	**5**	**21**	**36**	**29**
Copper	mg/kg	1	240000	200		**10**	**17**	**5**	**13**	<1	**6**	**12**	**17**	**6**	**13**	**18**	**24**
Lead	mg/kg	1	1500	1800		**10**	**11**	**8**	**11**	<1	**5**	**11**	**17**	**2**	**11**	**11**	**11**
Mercury	mg/kg	0.1	730			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	6000	110		**4**	**8**	**4**	**16**	<1	**5**	**10**	**10**	**2**	**8**	**7**	**29**
Zinc	mg/kg	1	400000	530		**33**	**13**	**32**	**31**	**3**	**13**	**47**	**110**	**5**	**43**	**17**	**50**

Table T2: Summary of Asbestos Analytical Results

		Lab Report	HSL D Commercial/Industrial	250313	250313	250313	250828	250828	250828	250828	250828	250828	250828	250828	250828
		Project Number		CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB
		Sample		SB1/2.0	SB2/0.5	SB3/0.5	SB9/0.1	SB10/0.1	SB11/0.1	SB13/1.0	SB16/1.0	SB17/0.1	G2	G3	G4
		Depth		2.0	0.5	0.5	0.1	0.1	0.1	1	1	0.1	-	-	-
		Date Sampled		1/09/2020	1/09/2020	1/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020	07/08/2020	08/09/2020	08/09/2020
	Units	PQL													
Sample mass tested	g			362.21	571.08	285.27	664.15	625.61	686.91	339.17	361.96	558.73	515.25	479.11	405.79
Sample Description	-			Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Grey coarse-grained soil & rocks	Brown sandy soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-			No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected
Trace Analysis	-			No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	N/A		No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	--		–	–	–	–	–	–	–	–	–	–	–	–
FA and AF Estimation*	g	--		–	–	–	–	–	–	–	–	–	–	–	–
ACM >7mm Estimation*		<0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

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Table T3: Summary of Soil QAQC Results

		Lab Report	250313	250313	ES2031890					254263	250313	ES2031890				
		Project	CES200502-PHB	CES200502-PHB	CES200502-PHB	**Average**	**Blind RPD**	**Average**	**Split RPD**	CES200502-PHB	CES200502-PHB	CES200502-PHB	**Average**	**Blind RPD**	**Average**	**Split RPD**
		Sample	SB6/0.1	QS2	QS2A					MW5/0.5	QS5	QS5A				
		Depth		0.1			**%**		**%**		0.5			**%**		**%**
		Date Sampled		1/09/2020							22/10/2020					
	Units	PQL														
TRH C6 - C9	mg/kg	25	<25	<25	<10	N/A	N/A	N/A	N/A	<25	<25	<10	N/A	N/A	N/A	N/A
TRH C6 - C10	mg/kg	25	<25	<25	<10	N/A	N/A	N/A	N/A	<25	<25	<10	N/A	N/A	N/A	N/A
vTPH C6 - C10 lessBTEX (F1)	mg/kg	25	<25	<25	<10	N/A	N/A	N/A	N/A	<25	<25	<10	N/A	N/A	N/A	N/A
Benzene	mg/kg	0.2	<0.2	<0.2	<0.2	N/A	N/A	N/A	N/A	<0.2	<0.2	<0.2	N/A	N/A	N/A	N/A
Toluene	mg/kg	0.5	<0.5	<0.5	<0.5	N/A	N/A	N/A	N/A	<0.5	<0.5	<0.5	N/A	N/A	N/A	N/A
Ethylbenzene	mg/kg	1	<1	<1	<0.5	N/A	N/A	N/A	N/A	<1	<1	<0.5	N/A	N/A	N/A	N/A
m+p-xylene	mg/kg	2	<2	<2	<0.5	N/A	N/A	N/A	N/A	<2	<2	<0.5	N/A	N/A	N/A	N/A
o-Xylene	mg/kg	1	<1	<1	<0.5	N/A	N/A	N/A	N/A	<1	<1	<0.5	N/A	N/A	N/A	N/A
naphthalene	mg/kg	1	<1	<1	<1	N/A	N/A	N/A	N/A	<1	<1	<1	N/A	N/A	N/A	N/A
Total +ve Xylenes	mg/kg	3	<3	<3	<0.5	N/A	N/A	N/A	N/A	<3	<3	<0.5	N/A	N/A	N/A	N/A
TRH C10 - C14	mg/kg	50	<50	<50	<50	N/A	N/A	N/A	N/A	<50	<50	<50	N/A	N/A	N/A	N/A
TRH C15 - C28	mg/kg	100	<100	<100	<100	N/A	N/A	N/A	N/A	<100	<100	<100	N/A	N/A	N/A	N/A
TRH C29 - C36	mg/kg	100	320.000	<100	<100	320.000	N/A	320.000	N/A	<100	<100	<100	N/A	N/A	N/A	N/A
TRH >C10-C16	mg/kg	50	<50	<50	<50	N/A	N/A	N/A	N/A	<50	<50	<50	N/A	N/A	N/A	N/A
TRH >C10 - C16less Naphthalene (F2)	mg/kg	50	<50	<50	<50	N/A	N/A	N/A	N/A	<50	<50	<50	N/A	N/A	N/A	N/A
TRH >C16-C34	mg/kg	100	310.000	<100	<100	310.000	N/A	310.000	N/A	<100	<100	<100	N/A	N/A	N/A	N/A
TRH >C34-C40	mg/kg	100	290.000	<100	<100	290.000	N/A	290.000	N/A	<100	<100	<100	N/A	N/A	N/A	N/A
Total +ve TRH (>C10-C40)	mg/kg	50	600.000	<50	<50	600.000	N/A	600.000	N/A	<50	<50	<50	N/A	N/A	N/A	N/A
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Benzo(b,j+k)fluoranthene	mg/kg	0.2	<0.2	<0.2	<0.5	N/A	N/A	N/A	N/A	<0.2	<0.2	<0.5	N/A	N/A	N/A	N/A
Benzo(a)pyrene	mg/kg	0.05	<0.05	<0.05	<0.5	N/A	N/A	N/A	N/A	<0.05	<0.05	<0.5	N/A	N/A	N/A	N/A
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Dibenzo(a,h)anthracene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Benzo(g,h,i)perylene	mg/kg	0.1	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.5	N/A	N/A	N/A	N/A
Arsenic	mg/kg	4	<4	<4	<5	N/A	N/A	N/A	N/A	<4	<4	8	N/A	N/A	N/A	N/A
Cadmium	mg/kg	0.4	<0.4	<0.4	<1	N/A	N/A	N/A	N/A	<0.4	<0.4	<1	N/A	N/A	N/A	N/A
Chromium	mg/kg	1	9	13	10	11	36.4%	10	10.5%	36	35	34	36	2.8%	36	5.6%
Copper	mg/kg	1	7	8	8	8	13.3%	8	13.3%	18	18	18	18	0.0%	18	0.0%
Lead	mg/kg	1	7	11	8	9	44.4%	8	13.3%	11	11	12	11	0.0%	11	9.1%
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1	N/A	N/A	N/A	N/A
Nickel	mg/kg	1	5	7	6	6	33.3%	6	18.2%	7	8	7	8	13.3%	7	0.0%
Zinc	mg/kg	1	22	21	20	22	4.7%	21	9.5%	17	18	17	18	5.7%	17	0.0%

Table T4: Soil QAQC Results (Trip Blank and Trip Spike)

		Sample Type	Trip Spike	Trip Blank
		Sample	TS	TB
		Laboratory Report	250828	250828
		Date Sampled	7/09/2020	7/09/2020
	Units	PQL		
TRH C6 - C9	mg/kg	25	-	<25
TRH C6 - C10	mg/kg	25	-	<25
vTPH C6 - C10 lessBTEX (F1)	mg/kg	25	-	<25
Benzene	mg/kg	0.2	116%	<0.2
Toluene	mg/kg	0.5	112%	<0.5
Ethylbenzene	mg/kg	1	100%	<1
m+p-xylene	mg/kg	2	99%	<2
o-Xylene	mg/kg	1	100%	<1
naphthalene	mg/kg	1	-	<1
Total +ve Xylenes	mg/kg	3	-	<3

Table T5: Soil QA/QC Results (Rinsate)

		Sample	RB1
		Sample Type	Rinsate
		Laboratory Report	250828
		Laboratory	Envirolab
		Date Sampled	7/09/2020
	Units	PQL	
TRH C6 - C9	µg/L	10	<10
TRH C6 - C10	µg/L	10	<10
vTPH C6 - C10 lessBTEX (F1)	µg/L	10	<10
Benzene	µg/L	1	<1
Toluene	µg/L	1	<1
Ethylbenzene	µg/L	1	<1
m+p-xylene	µg/L	2	<2
o-Xylene	µg/L	1	<1
naphthalene	µg/L	1	<1
TRH C10 - C14	µg/L	50	<50
TRH C15 - C28	µg/L	100	<100
TRH C29 - C36	µg/L	100	<100
TRH >C10-C16	µg/L	50	<50
TRH >C10 - C16less Naphthalene (F2)	µg/L	50	<50
TRH >C16-C34	µg/L	100	<100
TRH >C34-C40	µg/L	100	<100
Naphthalene	µg/L	1	<1
Acenaphthylene	µg/L	1	<1
Acenaphthene	µg/L	1	<1
Fluorene	µg/L	1	<1
Phenanthrene	µg/L	1	<1
Anthracene	µg/L	1	<1
Fluoranthene	µg/L	1	<1
Pyrene	µg/L	1	<1
Benzo(a)anthracene	µg/L	1	<1
Chrysene	µg/L	1	<1
Benzo(b,j+k)fluoranthene	µg/L	1	<1
Benzo(a)pyrene	µg/L	1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	1	<1
Dibenzo(a,h)anthracene	µg/L	1	<1
Benzo(g,h,i)perylene	µg/L	1	<1
Total +vePAH's	µg/L	0.1	<0.1
Benzo(a)pyrene TEQ calc(PQL)	µg/L	5	<5
Arsenic	µg/L	1	<1
Cadmium	µg/L	0.1	<0.1
Chromium	µg/L	1	<1
Copper	µg/L	1	<1
Lead	µg/L	1	<1
Mercury	µg/L	0.05	<0.05
Nickel	µg/L	1	<1
Zinc	µg/L	1	<1

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Table T6: Summary of Sediment Analytical Results

		Lab Report	SQG (ANZECC/ARMCANZ, 2013)	SQG - High (ANZECC/ARMCANZ, 2013)	249813	249813	249813	249813	249813	249813	249813	249813	249813	249813
		Job #			CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB	CES200502-PHB
		Sample			S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
		Depth (m)			9	14	14	13	5	4	11	8	7	5
		Date Sampl			25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
	Units	PQL												
TRH C10 - C14	mg/kg	50			<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH C15 - C28	mg/kg	100			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH C29 - C36	mg/kg	100			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	50			<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C16-C34	mg/kg	100			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH >C34-C40	mg/kg	100			<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	50	280	550	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Naphthalene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b,j+k)fluoranthene	mg/kg	0.2			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)pyrene	mg/kg	0.05			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(g,h,i)perylene	mg/kg	0.1			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total +vePAH's	mg/kg	0.05	10	50	**NIL (+)VE**	**NIL (+)VE**	**NIL (+)VE**	**NIL (+)VE**	**NIL (+)VE**	**NIL (+)VE**	**NIL (+)VE**	**NIL (+)VE**	**NIL (+)VE**	**NIL (+)VE**
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.5			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.5			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.5			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Naphthalene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene ASLP	µg/L	0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arsenic	mg/kg	4	20	70	**8**	**8**	**11**	**11**	**11**	**8**	**8**	**11**	**7**	**10**
Cadmium	mg/kg	0.4	1.5	10	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	1	80	370	**44**	**48**	**47**	**48**	**42**	**40**	**38**	**37**	**51**	**44**
Copper	mg/kg	1	65	270	**20**	**23**	**26**	**25**	**22**	**26**	**24**	**21**	**23**	**22**
Lead	mg/kg	1	50	220	**13**	**15**	**14**	**14**	**14**	**11**	**12**	**14**	**16**	**15**
Mercury	mg/kg	0.1	0.15	1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	21	52	**26**	**28**	**31**	**31**	**27**	**30**	**28**	**27**	**29**	**26**
Zinc	mg/kg	1	200	410	**70**	**78**	**57**	**58**	**68**	**56**	**55**	**65**	**82**	**78**
Arsenic ASLP	µg/L	1			**3**	**2**	**4**	**5**	**2**	**2**	**7**	**4**	**2**	**2**
Cadmium ASLP	µg/L	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium ASLP	µg/L	1			**7**	**6**	**12**	**15**	**6**	**9**	**21**	**11**	**10**	**10**
Copper ASLP	µg/L	1			**5**	**5**	**8**	**5**	**5**	**4**	**18**	**10**	**11**	**8**
Lead ASLP	µg/L	1			**2**	**1**	**4**	**5**	**1**	**2**	**9**	**4**	**4**	**2**
Mercury ASLP	µg/L	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel ASLP	µg/L	1			**5**	**4**	**8**	**9**	**4**	**6**	**13**	**8**	**6**	**7**
Zinc ASLP	µg/L	1			**8**	**7**	**17**	**21**	**7**	**13**	**36**	**17**	**18**	**14**
pH	pH unit	0.1			**5.1**	**5.1**	**5.5**	**5.7**	**4.9**	**6.2**	**6.2**	**4.2**	**4.9**	**4.9**
Total Organic Carbon	mg/kg	100			**31000**	**37000**	**26000**	**23000**	**46000**	**20000**	**23000**	**34000**	**35000**	**42000**

Table T7: Summary of Sediment QAQC Assessment Results

		Lab Report	249813	249813	ES2030224				
		Project	CES200502-PHB	CES200502-PHB	CES200502-PHB	Average	Blind RPD	Average	Split RPD
		Sample	S1	QS1	QS1A				
		Depth	9				%		%
		Date Sampled	25/08/2020						
	Units	PQL							
TRH C10 - C14	mg/kg	50	<50	<50	60	N/A	N/A	60	N/A
TRH C15 - C28	mg/kg	100	<100	<100	150	N/A	N/A	150	N/A
TRH C29 - C36	mg/kg	100	<100	<100	160	N/A	N/A	160	N/A
TRH >C10-C16	mg/kg	50	<50	<50	50	N/A	N/A	50	N/A
TRH >C16-C34	mg/kg	100	<100	<100	230	N/A	N/A	230	N/A
TRH >C34-C40	mg/kg	100	<100	<100	240	N/A	N/A	240	N/A
Total +ve TRH (>C10-C40)	mg/kg	50	<50	<50	520	N/A	N/A	520	N/A
Naphthalene	mg/kg	0.01	<0.01	<0.01	<0.01	N/A	N/A	N/A	N/A
Acenaphthylene	mg/kg	0.01	<0.01	<0.01	<0.01	N/A	N/A	N/A	N/A
Acenaphthene	mg/kg	0.01	<0.01	<0.01	<0.01	N/A	N/A	N/A	N/A
Fluorene	mg/kg	0.01	<0.01	<0.01	<0.01	N/A	N/A	N/A	N/A
Phenanthrene	mg/kg	0.01	<0.01	<0.01	<0.01	N/A	N/A	N/A	N/A
Anthracene	mg/kg	0.01	<0.01	<0.01	<0.01	N/A	N/A	N/A	N/A
Fluoranthene	mg/kg	0.01	<0.01	<0.01	0.02	N/A	N/A	0.02	N/A
Pyrene	mg/kg	0.01	<0.01	<0.01	0.02	N/A	N/A	0.02	N/A
Benzo(a)anthracene	mg/kg	0.01	<0.01	<0.01	0.02	N/A	N/A	0.02	N/A
Chrysene	mg/kg	0.01	<0.01	<0.01	0.01	N/A	N/A	0.01	N/A
Benzo(b,j+k)fluoranthene	mg/kg	0.02	<0.02	<0.02	0.02	N/A	N/A	0.02	N/A
Benzo(a)pyrene	mg/kg	0.05	<0.05	<0.05	<0.05	N/A	N/A	N/A	N/A
Indeno(1,2,3-c,d)pyrene	mg/kg	0.01	<0.01	<0.01	0.01	N/A	N/A	0.010	N/A
Dibenzo(a,h)anthracene	mg/kg	0.01	<0.01	<0.01	<0.01	N/A	N/A	N/A	N/A
Benzo(g,h,i)perylene	mg/kg	0.01	<0.01	<0.01	0.02	N/A	N/A	0.02	N/A
Arsenic	mg/kg	4	8	9	13	9	11.8%	11	47.6%
Cadmium	mg/kg	0.4	<0.4	<0.4	<1	N/A	N/A	N/A	N/A
Chromium	mg/kg	1	44	43	44	44	2.3%	44	0.0%
Copper	mg/kg	1	20	20	23	20	0.0%	22	14.0%
Lead	mg/kg	1	13	13	14	13	0.0%	14	7.4%
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1	N/A	N/A	N/A	N/A
Nickel	mg/kg	1	26	26	31	26	0.0%	29	17.5%
Zinc	mg/kg	1	70	65	70	68	7.4%	70	0.0%
pH	pH unit	0.1	5.1	5.0	6.7	5	2.0%	6	27.1%
Total Organic Carbon	%	0.01	3.1	3.3	3	3	6.2%	3	13.8%

Table T8: Sediment QAQC Results (Rinsate)

		Sample	RB1
		Sample Type	Rinsate
		Laboratory Report	249813
		Laboratory	Envirolab
		Date Sampled	25/08/2020
	Units	PQL	
TRH C6 - C9	µg/L	10	<10
TRH C6 - C10	µg/L	10	<10
vTPH C6 - C10 lessBTEX (F1)	µg/L	10	<10
Benzene	µg/L	1	<1
Toluene	µg/L	1	<1
Ethylbenzene	µg/L	1	<1
m+p-xylene	µg/L	2	<2
o-Xylene	µg/L	1	<1
naphthalene	µg/L	1	<1
TRH C10 - C14	µg/L	50	<50
TRH C15 - C28	µg/L	100	<100
TRH C29 - C36	µg/L	100	<100
TRH >C10-C16	µg/L	50	<50
TRH >C10 - C16less Naphthalene (F2)	µg/L	50	<50
TRH >C16-C34	µg/L	100	<100
TRH >C34-C40	µg/L	100	<100
Naphthalene	µg/L	1	<1
Acenaphthylene	µg/L	1	<1
Acenaphthene	µg/L	1	<1
Fluorene	µg/L	1	<1
Phenanthrene	µg/L	1	<1
Anthracene	µg/L	1	<1
Fluoranthene	µg/L	1	<1
Pyrene	µg/L	1	<1
Benzo(a)anthracene	µg/L	1	<1
Chrysene	µg/L	1	<1
Benzo(b,j+k)fluoranthene	µg/L	1	<1
Benzo(a)pyrene	µg/L	1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	1	<1
Dibenzo(a,h)anthracene	µg/L	1	<1
Benzo(g,h,i)perylene	µg/L	1	<1
Total +vePAH's	µg/L	0.1	<0.1
Benzo(a)pyrene TEQ calc(PQL)	µg/L	5	<5
Arsenic	µg/L	1	<1
Cadmium	µg/L	0.1	<0.1
Chromium	µg/L	1	<1
Copper	µg/L	1	<1
Lead	µg/L	1	<1
Mercury	µg/L	0.05	<0.05
Nickel	µg/L	1	<1
Zinc	µg/L	1	<1

Table T9: Surface Water Field Parameter Measurement and Observation Results

Sample ID	Date	Depth m BSW	pH	EC µS/cm	DO mg/L	Eh mV	Temp °C	Observations
SW1	25.08.20	0.3	7.79	368.10	9.64	163.7	13.5	Stagnant, no algal growth, light brown, no odour, low turbidity
SW2	25.08.20	0.3	7.75	366.30	9.72	138.8	13.4	Stagnant, no algal growth, light brown, no odour, low turbidity
SW3	25.08.20	0.3	7.66	363.80	9.88	138	13.4	Stagnant, no algal growth, light brown, no odour, low turbidity
SW4	25.08.20	0.3	7.63	363.00	9.76	131.2	13.3	Stagnant, no algal growth, light brown, no odour, low turbidity
SW5	25.08.20	0.3	7.62	362.90	9.53	116.9	13.4	Stagnant, no algal growth, light brown, no odour, low turbidity
SW6	25.08.20	0.3	7.69	363.20	9.46	128.3	13.6	Stagnant, no algal growth, light brown, no odour, low turbidity
SW7	25.08.20	0.3	7.60	363.40	9.59	119.3	13.6	Stagnant, no algal growth, light brown, no odour, low turbidity
SW8	25.08.20	0.3	7.64	363.20	9.34	124.2	13.6	Stagnant, no algal growth, light brown, no odour, low turbidity
SW9	25.08.20	0.3	7.63	363.10	9.69	100.5	13.8	Stagnant, no algal growth, light brown, no odour, low turbidity
SW10	25.08.20	0.3	7.54	365.80	9.91	84.3	14.1	Stagnant, no algal growth, light brown, no odour, low turbidity
SW11	25.08.20	0.3	7.00	488.00	11.30	135.2	13.0	Low flow, no algal growth, light grey, no odour, low turbidity
SW12	25.08.20	0.3	6.77	485.10	8.65	150.6	12.8	Low flow, no algal growth, clear, no odour, low turbidity
SW13	25.08.20	0.3	6.81	509.00	5.06	89.6	13.2	Low flow, no algal growth, clear, no odour, low turbidity

m BSW: metres below surface water
SWL: Standing water level
EC: Electrical conductivity
DO: Dissolved oxygen
Eh: Redox potential
Temp: Temperature
µS/cm: Micro siemens per centimetre
mg/L: milligram per litre
mV: millivolts
°C: Degrees Celsius

Table T10: Summary of Surface Water Analytical Results

	ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Fresh water, 95% species protection)	ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Marine water, 95% species protection)		Lab Report	249817	249817	249817	249817	249817	249817	249817	249817	249817	249817	249817	249817	249817
				Project Number	CES200502	CES200502	CES200502	CES200502	CES200502	CES200502	CES200502	CES200502	CES200502	CES200502	CES200502	CES200502	CES200502
				Sample	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	SW11	SW12	SW13
				Date Sampled	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
				Location	Quarry Void	Quarry Void	Quarry Void	Quarry Void	Quarry Void	Quarry Void	Quarry Void	Quarry Void	Quarry Void	Quarry Void	Grahamstown Drain (Northern)	Grahamstown Drain (Central)	Windeyers Creek
			Units	PQL													
TRH C6 - C9	-	-	µg/L	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
TRH C6 - C10	-	-	µg/L	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
TRH C10 - C14	-	-	µg/L	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH C15 - C28	-	-	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH C29 - C36	-	-	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH >C10-C16	-	-	µg/L	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C16-C34	-	-	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH >C34-C40	-	-	µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Naphthalene	16	50	µg/L	0.2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acenaphthylene	-	-	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Acenaphthene	-	-	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluorene	-	-	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phenanthrene	0.6	0.6	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Anthracene	0.01	0.01	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Fluoranthene	1	1	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Pyrene	-	-	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(a)anthracene	-	-	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chrysene	-	-	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(b,j+k)fluoranthene	-	-	µg/L	0.1	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Benzo(a)pyrene	0.1	0.1	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	-	-	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibenzo(a,h)anthracene	-	-	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	-	-	µg/L	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total +vePAH's	-	-	µg/L	0.1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Benzo(a)pyrene TEQ calc(PQL)	-	-	µg/L	0.5	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
pH	-	-	pH units	-	**7.6**	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**	**5.7**	**6**	**6.1**
Total Organic Carbon	-	-	mg/L	1	**11**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**10**	**5**	**5**	**7**
Arsenic	13	-	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium	0.2	0.7	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	**0.1**	**0.1**
Chromium	1	4.4	µg/L	1	<1	<1	**1**	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	1.4	1.3	µg/L	1	**72**	**54**	<1	**91**	**70**	**82**	**58**	**120**	**41**	**100**	**50**	**110**	**81**
Lead	3.4	4.4	µg/L	1	**1**	<1	<1	**1**	**1**	**2**	**1**	**1**	**1**	**1**	**2**	**1**	**2**
Mercury	0.06	0.1	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel	11	7	µg/L	1	**7**	**5**	**2**	**11**	**7**	**9**	**10**	**8**	**8**	**7**	**18**	**17**	**17**
Zinc	8	15	µg/L	1	**45**	**36**	**2**	**55**	**42**	**230**	**44**	**60**	**40**	**40**	**78**	**85**	**97**

	Exceeds Freshwater Criteria
	Exceeds Marine water Criteria
	Exceeds both Fresh and Marine Water

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Table T11: Summary of Surface Water QAQC Assessment Results

		Lab Report	249813	249813	ES2030223				
		Project	CES200502-PHB	CES200502-PHB	CES200502-PHB	**Average**	**Blind RPD**	**Average**	**Split RPD**
		Sample	SW3	QW1	QW1A				
		Date Sampled	25/08/2020				**%**		**%**
	Units	PQL							
TRH C6 - C9	µg/L	10.00	<10	<10	<20	N/A	N/A	N/A	N/A
TRH C6 - C10	µg/L	10.00	<10	<10	<20	N/A	N/A	N/A	N/A
TRH C10 - C14	µg/L	50	<50	<50	<50	N/A	N/A	N/A	N/A
TRH C15 - C28	µg/L	100	<100	<100	<100	N/A	N/A	N/A	N/A
TRH C29 - C36	µg/L	100	<100	<100	<50	N/A	N/A	N/A	N/A
TRH >C10-C16	µg/L	50	<50	<50	<100	N/A	N/A	N/A	N/A
TRH >C16-C34	µg/L	100	<100	<100	<100	N/A	N/A	N/A	N/A
TRH >C34-C40	µg/L	100	<100	<100	<100	N/A	N/A	N/A	N/A
Naphthalene	µg/L	0.2	<1	<1	<1.0	N/A	N/A	N/A	N/A
Acenaphthylene	µg/L	0.1	<1	<1	<1.0	N/A	N/A	N/A	N/A
Acenaphthene	µg/L	0.1	<1	<1	<1.0	N/A	N/A	N/A	N/A
Fluorene	µg/L	0.1	<1	<1	<1.0	N/A	N/A	N/A	N/A
Phenanthrene	µg/L	0.1	<1	<1	<1.0	N/A	N/A	N/A	N/A
Anthracene	µg/L	0.1	<1	<1	<1.0	N/A	N/A	N/A	N/A
Fluoranthene	µg/L	0.1	<1	<1	<1.0	N/A	N/A	N/A	N/A
Pyrene	µg/L	0.1	<1	<1	<1.0	N/A	N/A	N/A	N/A
Benzo(a)anthracene	µg/L	0.1	<1	<1	<1.0	N/A	N/A	N/A	N/A
Chrysene	µg/L	0.1	<1	<1	<1.0	N/A	N/A	N/A	N/A
Benzo(b,j+k)fluoranthene	µg/L	0.2	<2	<2	<1.0	N/A	N/A	N/A	N/A
Benzo(a)pyrene	µg/L	0.1	<1	<1	<0.5	N/A	N/A	N/A	N/A
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	<1	<1	<1.0	N/A	N/A	N/A	N/A
Dibenzo(a,h)anthracene	µg/L	0.1	<1	<1	<1.0	N/A	N/A	N/A	N/A
Benzo(g,h,i)perylene	µg/L	0.1	<1	<1	<1.0	N/A	N/A	N/A	N/A
pH	pH units	-	7.5	7.4	7.5	7.450	1.3%	7.495	0.1%
Total Organic Carbon	mg/L	1	10	10	1200	10.000	0.0%	605.000	196.7%
Arsenic	µg/L	1.00	<1	<1	<1	N/A	N/A	N/A	N/A
Cadmium	µg/L	0.10	<0.1	<0.1	<0.1	N/A	N/A	N/A	N/A
Chromium	µg/L	1.00	1	<1	<1	1	N/A	1	N/A
Copper	µg/L	1.00	<1	1	<1	1	N/A	N/A	N/A
Lead	µg/L	1.00	<1	<1	<1	N/A	N/A	N/A	N/A
Mercury	µg/L	0.05	<0.05	<0.05	<0.04	N/A	N/A	N/A	N/A
Nickel	µg/L	1.00	2	2	2	2	0.0%	2	0.0%
Zinc	µg/L	1.00	2	<1	<5	2	N/A	2	N/A

Table T12: Groundwater Field Parameter Measurement and Observation Results

Well ID	Date	SWL	Total Depth	pH	EC	DO	Eh	Temp	Observations
		m BTOC	m BTOC		µS/cm	mg/L	mV	^{o}C	
MW1	29/10/2020	2.46	17.27	6.38	2,169	1.19	-62.8	19.3	Black/dark grey, high turbidity, no odour, no sheen
MW2	29/10/2020	0.21	18.04	6.05	1,739	0.39	-55.2	18.3	Light grey, moderate turbidity, no odour, no sheen
MW3	29/10/2020	2.30	13.90	5.46	607	1.10	-67.7	18.5	Grey, moderate turbidity, no odour, no sheen
MW4	29/10/2020	0.35	11.81	5.52	980	1.15	28.6	18.5	Light grey, low tubridity, no odour, no sheen
MW5	29/10/2020	1.15	15.35	3.65	5,401	2.85	218.5	18.1	Brown, high turbidity, no odour, no sheen

m BTOC: metres below top of casing
SWL: Standing water level
EC: Electrical conductivity
DO: Dissolved oxygen
Eh: Redox potential
Temp: Temperature
µS/cm: Micro siemens per centimetre
mg/L: milligram per litre
mV: millivolts
^{o}C: Degrees Celsius

Table T13: Summary of Groundwater Analytical Results

	NEPM (2013) HSL Commercial/Industrial (2m to <4m, 4m to <8m, 8m+ sand)	ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Fresh water, 95% species protection)	ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Marine water, 95% species protection)		Lab Report	254589	254589	254589	254589	254589
					Project Number	CES200502	CES200502	CES200502	CES200502	CES200502
					Sample	MW1	MW2	MW3	MW4	MW5
					Date Sampled	29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020
				Units	PQL					
TRH C6 - C9	-	-	-	µg/L	10	<10	<10	<10	<10	<10
TRH C6 - C10	-	-	-	µg/L	10	<10	<10	<10	<10	<10
TRH C10 - C14	-	-	-	µg/L	50	<50	**220**	<50	<50	<50
TRH C15 - C28	-	-	-	µg/L	100	<100	**270**	<100	<100	<100
TRH C29 - C36	-	-	-	µg/L	100	<100	<100	<100	<100	<100
TRH >C10-C16	-	-	-	µg/L	50	<50	**250**	<50	<50	<50
TRH >C16-C34	-	-	-	µg/L	100	<100	**180**	<100	<100	<100
TRH >C34-C40	-	-	-	µg/L	100	<100	<100	<100	<100	<100
Naphthalene	NL, NL, NL	16	50	µg/L	0.2	<1	**1**	<1	<1	<1
Acenaphthylene	-	-	-	µg/L	0.1	<1	<1	<1	<1	<1
Acenaphthene	-	-	-	µg/L	0.1	<1	<1	<1	<1	<1
Fluorene	-	-	-	µg/L	0.1	<1	<1	<1	<1	<1
Phenanthrene	-	0.6	0.6	µg/L	0.1	<1	<1	<1	<1	<1
Anthracene	-	0.01	0.01	µg/L	0.1	<1	<1	<1	<1	<1
Fluoranthene	-	1	1	µg/L	0.1	<1	<1	<1	<1	<1
Pyrene	-	-	-	µg/L	0.1	<1	<1	<1	<1	<1
Benzo(a)anthracene	-	-	-	µg/L	0.1	<1	<1	<1	<1	<1
Chrysene	-	-	-	µg/L	0.1	<1	<1	<1	<1	<1
Benzo(b,j+k)fluoranthene	-	-	-	µg/L	0.1	<2	<2	<2	<2	<2
Benzo(a)pyrene	-	0.1	0.1	µg/L	0.1	<1	<1	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	-	-	-	µg/L	0.1	<1	<1	<1	<1	<1
Dibenzo(a,h)anthracene	-	-	-	µg/L	0.1	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	-	-	-	µg/L	0.1	<1	<1	<1	<1	<1
Benzo(a)pyrene TEQ calc(PQL)	-	-	-	µg/L	0.5	<5	<5	<5	<5	<5
Total +vePAH's	-	-	-	µg/L	0.1	NIL (+)VE	**1.4**	NIL (+)VE	NIL (+)VE	NIL (+)VE
Arsenic	-	13	-	µg/L	1	**7**	**2**	**1**	**1**	**13**
Cadmium	-	0.2	0.7	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	**0.9**
Chromium	-	1	4.4	µg/L	1	**1**	<1	**1**	<1	**29**
Copper	-	1.4	1.3	µg/L	1	**28**	**33**	**42**	**42**	**70**
Lead	-	3.4	4.4	µg/L	1	**2**	<1	**3**	**1**	**4**
Mercury	-	0.06	0.1	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel	-	11	7	µg/L	1	**8**	**4**	**8**	**6**	**590**
Zinc	-	8	15	µg/L	1	**250**	**230**	**150**	**77**	**2900**
pH	-	-	-	µg/L	1	**6.6**	**6**	**6**	**5.8**	**3.7**
Total Organic Carbon	-	-	-	µg/L	1	**200**	**11**	**9**	**3**	**20**

Exceeds Freshwater Criteria
Exceeds Marine water Criteria
Exceeds both Fresh and Marine Water

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Table T14: Summary of Surface Water QAQC Assessment Results

		Lab Report	254589-A	254589-A		
		Project	CES200502	CES200502	**Average**	**Blind RPD**
		Sample	MW3	MW3 - [DUPLICATE]		
		Date Sampled	29/10/2020			**%**
	Units	PQL				
TRH C6 - C9	µg/L	10.00	<10	<10	N/A	N/A
TRH C6 - C10	µg/L	10.00	<10	<10	N/A	N/A
TRH C10 - C14	µg/L	50	<50	<50	N/A	N/A
TRH C15 - C28	µg/L	100	<100	<100	N/A	N/A
TRH C29 - C36	µg/L	100	<100	<100	N/A	N/A
TRH >C10-C16	µg/L	50	<50	<50	N/A	N/A
TRH >C16-C34	µg/L	100	<100	<100	N/A	N/A
TRH >C34-C40	µg/L	100	<100	<100	N/A	N/A
Naphthalene	µg/L	1	<1	<1	N/A	N/A
Acenaphthylene	µg/L	1	<1	<1	N/A	N/A
Acenaphthene	µg/L	1	<1	<1	N/A	N/A
Fluorene	µg/L	1	<1	<1	N/A	N/A
Phenanthrene	µg/L	1	<1	<1	N/A	N/A
Anthracene	µg/L	1	<1	<1	N/A	N/A
Fluoranthene	µg/L	1	<1	<1	N/A	N/A
Pyrene	µg/L	1	<1	<1	N/A	N/A
Benzo(a)anthracene	µg/L	1	<1	<1	N/A	N/A
Chrysene	µg/L	1	<1	<1	N/A	N/A
Benzo(b,j+k)fluoranthene	µg/L	2	<2	<2	N/A	N/A
Benzo(a)pyrene	µg/L	1	<1	<1	N/A	N/A
Indeno(1,2,3-c,d)pyrene	µg/L	1	<1	<1	N/A	N/A
Dibenzo(a,h)anthracene	µg/L	1	<1	<1	N/A	N/A
Benzo(g,h,i)perylene	µg/L	1	<1	<1	N/A	N/A
pH	pH units	0.1	6.0	6.0	6.000	0.0%
Total Organic Carbon	mg/L	1	9	8	8.500	11.8%
Arsenic	µg/L	1.00	1	1	1	0.0%
Cadmium	µg/L	0.10	<0.1	<0.1	N/A	N/A
Chromium	µg/L	1.00	1	1	1	0.0%
Copper	µg/L	1.00	42	41	42	2.4%
Lead	µg/L	1.00	3	3	3	0.0%
Mercury	µg/L	0.05	<0.05	<0.05	N/A	N/A
Nickel	µg/L	1.00	8	8	8	0.0%
Zinc	µg/L	1.00	150	140	145	6.9%

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Table T15: EIL Soil Physiochemical Properties

		Project	CES200205
		Laboratory Report	250828
		Sample	SB15/0.5
		Depth	0.5
		Date Sampled	8/09/2020
	Units	PQL	
Iron	mg/kg	10	8000
pH 1:5 soil:CaCl2	pH Units	0.1	6.1
Total Organic Carbon(Walkley Black)	mg/kg	1000	13000
Exchangeable Ca	meq/100g	0.1	3.6
Exchangeable K	meq/100g	0.1	0.3
Exchangeable Mg	meq/100g	0.1	2.5
Exchangeable Na	meq/100g	0.1	0.17
Cation Exchange Capacity	meq/100g	1	6.6
Clay in soils <2µm	% (w/w)	1	24

Appendix A – Photographic Log

Photograph 1 – Flooded former quarry, looking south-east.

Photograph 2 – Flooded former quarry, looking east.

Photograph 3 – Flooded former quarry, looking north-east.

Photograph 4 – Former quarry impacted area (contaminated land investigation area), looking north-west.

Photograph 5 – Former quarry impacted area (contaminated land investigation area), looking north.

Photograph 6 – Former quarry impacted area (contaminated land investigation area), looking south.

Photograph 7 – Former quarry impacted area (contaminated land investigation area), looking north-west.

Photograph 8 – Former quarry impacted area (contaminated land investigation area), looking east


Photograph 9 – SB1 Lithology.


Photograph 10 – SB2 Lithology.

Photograph 11 – SB3 Lithology.

Photograph 12 – SB4 Lithology.


Photograph 13 – SB5 Lithology.


Photograph 14 – SB6 Lithology.


Photograph 15 – SB7 Lithology.


Photograph 16 – SB12 Lithology.

Photograph 17 – SB13 Lithology.

Photograph 18 – SB14 Lithology.

Photograph 19 – SB15 Lithology.

Photograph 20 – SB16 Lithology.

Photograph 21 – SB17 Lithology.

Photograph 22 – MW1, facing south-west.


Photograph 23 – MW3, facing east.


Photograph 24 – MW5, facing north-west.

Appendix B – Calibration Certificates

Air-Met Scientific Pty Ltd
1300 137 067

Oil / Water Interface Meter

Instrument Geotech Interface Meter (30M)
Serial No. 3969

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Calibrated by: Ashok Hettigama

Calibration date: 27/10/2020

Next calibration due: 26/12/2020

Oil / Water Interface Meter

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Instrument **Geotech Interface Meter (30M)**
Serial No. **4357**

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Calibrated by: **Chris Edwards**

Calibration date: **10/11/2020**

Next calibration due: **9/01/2021**

Calibration & Service Report
Gas Monitor

Company:	Active Environmental Solutions Hire	**Manufacturer:**	RAE Systems	**Serial #:**	592-914571
Contact:	Aleks Todorovic	**Instrument:**	MiniRAE 3000	**Asset #:**	-
Address:	2 Merchant Avenue Thomastown Vic 3074	**Model:**	PGM 7320	**Part #:**	-
		Configuration:	VOC	**Sold:**	-
Phone:	03 9464 2300 | **Fax:** 03 9464 3421	**Wireless:**	-	**Last Cal:**	-
Email:	Hire@aesolutions.com.au	**Network ID:**	-	**Job #:**	-
		Unit ID:	-	**Cal Spec:**	Std

Item	Test	Pass/Fail	Comments
Battery	Li Ion	✓	
Charger	Charger, Power supply	✓	
	Cradle	✓	
Pump	Flow	✓	>500 mL/min
Filter	Filter, fitting, etc	✓	
Alarms	Audible, visual, vibration	✓	
Display	Operation	✓	
PCB	Operation	✓	
Connectors	Condition	✓	
Firmware	Version	✓	2.16
Datalogger	Operation	✓	
Monitor Housing	Condition	✓	
Case	Condition/Type	✓	
Sensors			
Oxygen		-	
LEL		-	
PID	10.6eV	✓	
Toxic 1		-	
Toxic 2		-	
Toxic 3		-	
Toxic 4		-	
Toxic 5		-	

Engineer's Report

Setup, service and calibration for hire

Calibration Certificate

Sensor	Type	Serial No:	Span Gas	Concentration	Traceability Lot #	CF	Reading	
							Zero	Span
Oxygen								
LEL								
PID	10.6eV	2R000773	Isobutylene	100 PPM	3075-2-1	1	0	100 PPM
Toxic 1								
Toxic 2								
Toxic 3								
Toxic 4								
Toxic 5								

Calibrated/Repaired by: Milenko Sisic

Date: 03/08/2020

Next due: 03/02/2021

24/8/20

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 17C102195

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		330737	pH 7.02
2. pH 4.00		pH 4.00		330734	pH 4.10
3. pH 10.00		pH 10.00		352607	pH 9.65
3. mV		229.6mV		342074/346052	230.0mV
4. EC		2.76mS		333787	2.76mS
5. D.O		0.00ppm		329994	0.01ppm
6. Temp		21.0°C		MultiTherm	21.0°C

Calibrated by: Eloise Carroll

Calibration date: 24/08/2020

Next calibration due: 23/09/2020

Multi Parameter Water Meter

Air-Met Scientific Pty Ltd
1300 137 067

Instrument **YSI Quatro Pro Plus**
Serial No. **18J104319**

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 10.00		pH 10.00		355386	pH 9.82
2. pH 7.00		pH 7.00		330737	pH 7.01
3. pH 4.00		pH 4.00		351412	pH 4.04
4. mV		231.8mV		357172/357173	231.8mV
5. EC		2.76mS		350510	2.76mS
6. D.O		0.00ppm		10959	0.00ppm
7. Temp		21.1°C		MultiTherm	21.2°C

Calibrated by: **Kylie Rawlings**

Calibration date: **28/10/2020**

Next calibration due: **27/11/2020**

Appendix C - Borelogs

GROUNDWATER WELL MW1

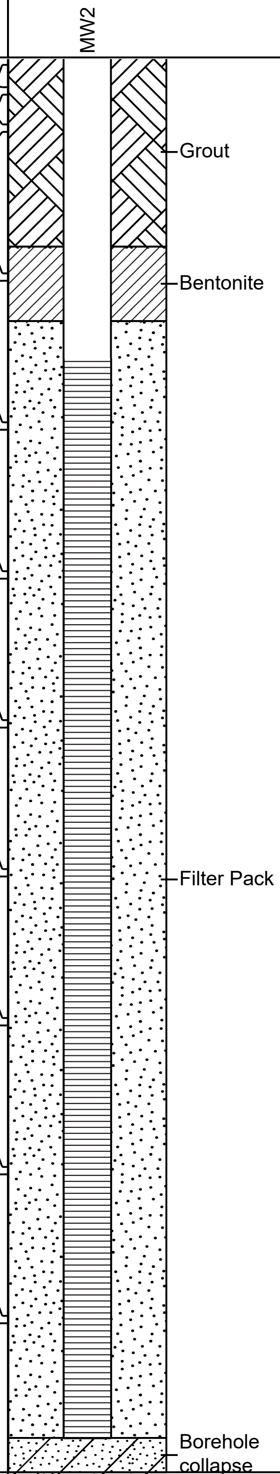
PROJECT NUMBER CES200502-PHB
PROJECT NAME Raymond Terrace
CLIENT Phoenix Builders
ADDRESS 251 Adelaide Street, Raymond Terrace NSW

DRILLING DATE 07/09/20
DRILLIN COMPANY NUMAC
DRILLER Lewis
DRILLING METHOD Hollow Flight Augers
TOTAL DEPTH 19

COORDINATES -32.778581, 151.739263
COORD SYS Latitude/Longtitude
LOGGED BY Andrew Carras
CHECKED BY Mark Challoner

Depth (m)	Samples	Water	Graphic Log	Moisture	Material Description	Well Diagram (0.96m Stickup)	Additional Observations
0–2.7	MW1/1.0			D; H	FILL: Sandy CLAY: moderate plasticity, with silt, foregin materials include aggregate and ceramic tiles, dark brown/grey	MW2	
2.7–16		∇ (approx. 3.4)		M; W	Clayey SAND: fine to medium grained, white/grey		
16–19					Clayey SAND: fine to medium grained, brown		
19					Termination Depth at: 19m		

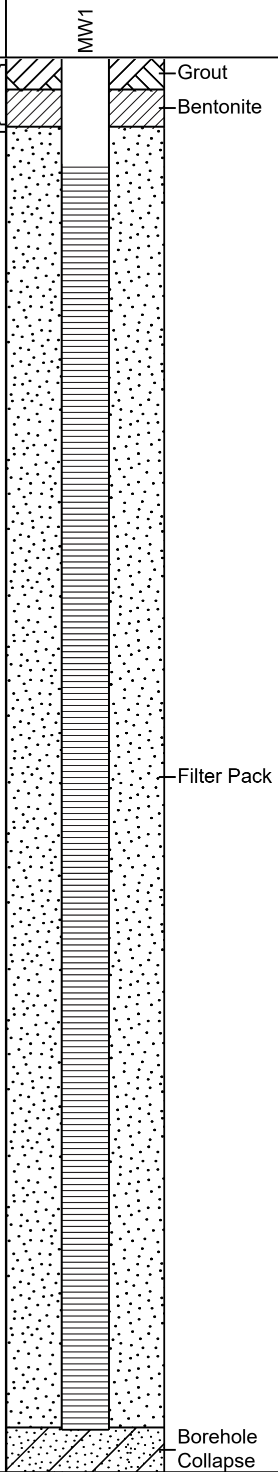
pH	pH FOX
6.03	4.40
6.11	4.31
5.13	3.60
4.50	4.10
5.73	5.01
6.07	4.11
6.67	6.11
7.30	5.91
7.45	6.35
7.92	6.50
7.43	7.41



GROUNDWATER WELL MW2

PROJECT NUMBER CES200502-PHB	**DRILLING DATE** 07/09/20	**COORDINATES** -32.776776, 151.740395
PROJECT NAME Raymond Terrace	**DRILLIN COMPANY** NUMAC	**COORD SYS** Latitude/Longtitude
CLIENT Phoenix Builders	**DRILLER** Lewis	
ADDRESS 251 Adelaide Street, Raymond Terrace NSW	**DRILLING METHOD** Casing Advancer	**LOGGED BY** Andrew Carras
	TOTAL DEPTH 19	**CHECKED BY** Mark Challoner

Depth (m)	Samples	Water	Graphic Log	Moisture	Material Description	pH	pH Fox	Well Diagram (0.60m Stickup)	Additional Observations
0–0.4				D	FILL: Sandy CLAY: fine grained, brown	5.62	5.31	Grout	
0.4–2.5	MW2/1.0			M	Clayey SAND: fine to medium grained, with organic material, light brown/grey	5.65	5.29	Bentonite	
2.5–4		▽ (approx. 3.4)		W	Sandy CLAY: high plasticity, dark grey with white fine grained sand			Filter Pack	
4–19					Clayey SAND: fine to medium grained, white with grey clays			Filter Pack; Borehole Collapse (18.6–19)	
19					Termination Depth at: 19m				



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GROUNDWATER WELL MW3

PROJECT NUMBER CES200502-PHB
PROJECT NAME Raymond Terrace
CLIENT Phoenix Builders
ADDRESS 251 Adelaide Street, Raymond Terrace NSW

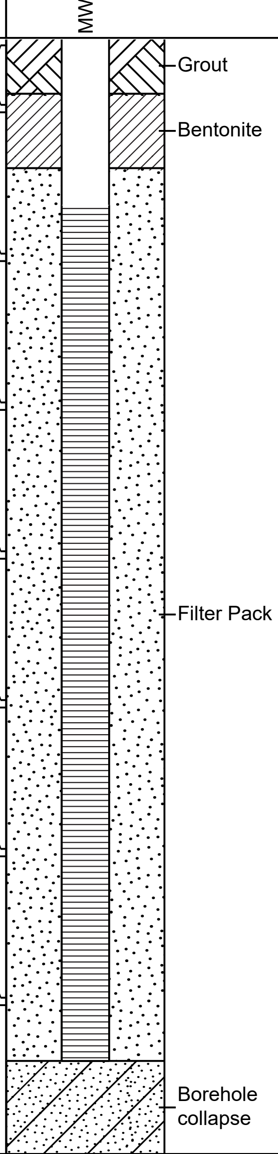
DRILLING DATE 08/09/20
DRILLIN COMPANY NUMAC
DRILLER Lewis
DRILLING METHOD Hollow Flight Auger
TOTAL DEPTH 19

COORDINATES -32.774930, 151.741825
COORD SYS Latitude/Longtitude
LOGGED BY Andrew Carras
CHECKED BY Mark Challoner

Depth (m)	Samples	Water	Moisture	Material Description
0 – 3.7	MW3/3.0 (at 3.0)	∇ (at 3.0)	D (0–2), H (2–2.7), M (2.7–3), W (from 3)	FILL: Silty Sandy CLAY: moderate plasticity, with some gravels, organic material, dark brown
3.7 – 15				Clayey SAND: fine to medium grained, white sand with dark grey clay
10				increasing clay content
15				Termination Depth at: 15m Refusal on inferred bedrock

pH	pH FOX
8.24	6.69
8.33	6.32
8.34	5.91
5.89	4.93
5.86	4.61
6.10	5.51
6.35	6.11
6.36	6.02

Well Diagram (0.85m Stickup)

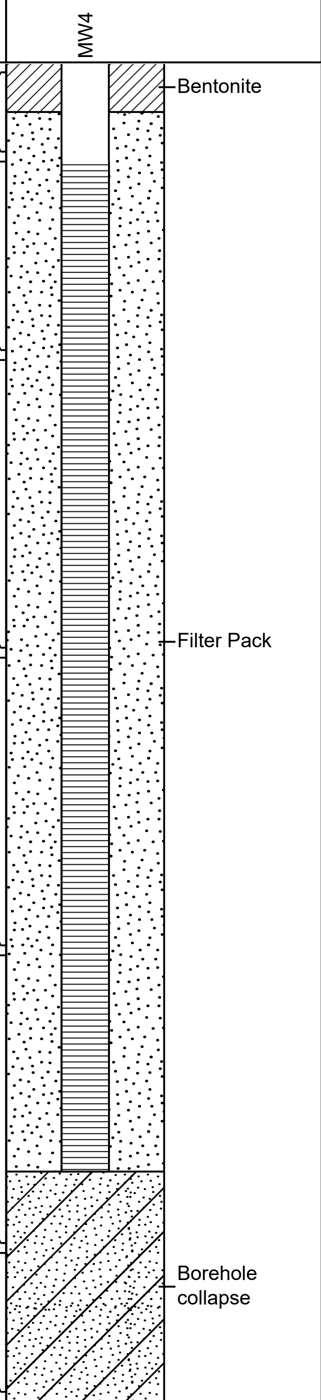


Additional Observations

GROUNDWATER WELL MW4

PROJECT NUMBER CES200502-PHB	**DRILLING DATE** 23/10/20	**COORDINATES** -32.772527, 151.748027
PROJECT NAME Raymond Terrace	**DRILLIN COMPANY** STRATACORE	**COORD SYS** Latitude/Longtitude
CLIENT Phoenix Builders	**DRILLER** Mike	
ADDRESS 251 Adelaide Street, Raymond Terrace NSW	**DRILLING METHOD** Hollow Flight Auger	**LOGGED BY** Andrew Carras
	TOTAL DEPTH 13.5	**CHECKED BY** Mark Challoner

Depth (m)	Samples	Water	Graphic Log	Moisture	Material Description	pH	pH FOX	Well Diagram (0.63m Stickup)	Additional Observations
0.0–0.5		▽		H, M	FILL: Silty SAND: fine grained, with organic material, brown	6.3	5.9		
0.5–13.5	MW4/1.0			W	Silty Sandy CLAY: high plasticity, white sand with dark grey clays and silts				
1						5.8	5.2		
3						6.2	5.9		
6						6.4	5.8		
9						6.1	4.9		
12						6.0	5.0		
13.5						6.4	5.9		
13.5					Termination Depth at: 13.5m Refusal on inferred bedrock				



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GROUNDWATER WELL MW5

PROJECT NUMBER CES200502-PHB
PROJECT NAME Raymond Terrace
CLIENT Phoenix Builders
ADDRESS 251 Adelaide Street, Raymond Terrace NSW

DRILLING DATE 22/10/20
DRILLIN COMPANY STRATACORE
DRILLER Mike
DRILLING METHOD Hollow Flight Auger
TOTAL DEPTH 20

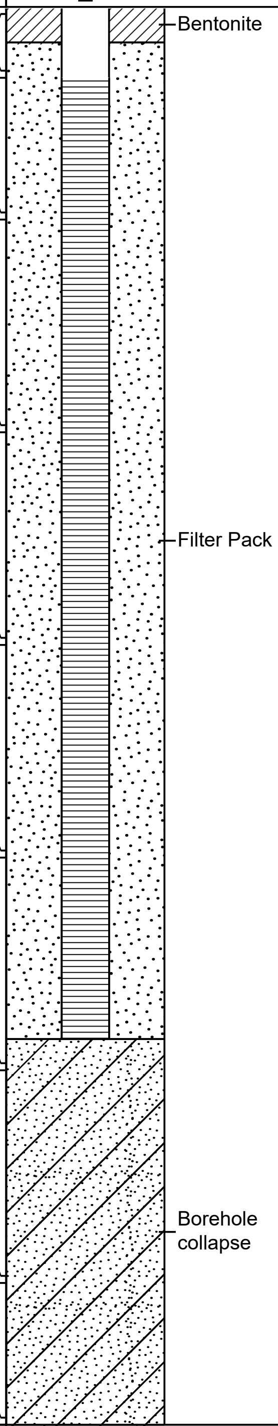
COORDINATES -32.776781, 151.747116
COORD SYS Latitude/Longtitude

LOGGED BY Andrew Carras
CHECKED BY Mark Challoner

Depth (m)	Samples	Water	Moisture	Material Description
0	MW5/0.5		D	Sandy CLAY: high plasticity, with organic detritus, grey/brown
		⊻	H, M, W	Clayey Sandy: fine to medium grained, with silt and minor quartz gravels, white sand with grey clay
5				Light grey with lower clay content
11				Brown
20				Termination Depth at: 20m Initial well installation attempt failed.

pH	pH FOX
6.9	5.9
7.1	6.4
6.3	5.1
5.9	4.9
6.4	5.9
6.2	4.9
6.3	5.2
6.3	5.9
6.5	5.9

Well Diagram (0.63m Stickup)



Additional Observations

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ENVIRONMENTAL BOREHOLE SB01

PROJECT NUMBER CES200502-PHB	**DRILLING DATE** 01/09/20	**COORDINATES** -32.776784, 151.740492
PROJECT NAME Raymond Terrace	**DRILLING COMPANY** NUMAC	**COORD SYS** Latitude, longtitude
CLIENT Phoenix Builders	**DRILLER** Lewis	
ADDRESS 251 Adelaide Street, Raymond Terrace NSW	**DRILLING METHOD** Push Tube	**LOGGED BY** Andrew Carras
	TOTAL DEPTH 4.8	**CHECKED BY** Mark Challoner

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.0			FILL: Silty SAND: fine to medium grained, with clay, foreign materials include aggregate, tiles, and ceramic pieces, brown	M	No staining or odours
0.5	0.1					
1	0.1					
1.5	0.1					
				FILL: Silty SAND: fine to medium grained, with clay, foreign materials include ceramic pieces, brown	M	
2	0.5	SB1/2.0				
				Increasing sand content		
2.5	0.2			Clayey SAND: fine to medium grained, with silt, grey	W	No staining or odours
3	0.7					
3.5						
4						
4.5						
				Termination Depth at:3.2 m		

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ENVIRONMENTAL BOREHOLE SB02

PROJECT NUMBER CES200502-PHB
PROJECT NAME Raymond Terrace
CLIENT Phoenix Builders
ADDRESS 251 Adelaide Street, Raymond Terrace NSW

DRILLING DATE 01/09/20
DRILLING COMPANY NUMAC
DRILLER Lewis
DRILLING METHOD Push Tube
TOTAL DEPTH 3.6

COORDINATES -32.776660, 151.740597
COORD SYS Latitude, longtitude
LOGGED BY Andrew Carras
CHECKED BY Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
0	0.7			FILL: Silty SAND: fine to medium grained, with clay, foreign materials include aggregate, brown/grey	D	No staining or odours
0.5	0.4	SB2/0.5			M	
1	0.7			Increasing sand content		
1.5	0.6					
2	0.5					
2.2				Silty SAND: medium to coarse grained, with siltstone gravels, brown	W	No staining or odours
2.5	1.3					
3	1.2					No staining, slight organic odour
3.5						
3.6				Termination Depth at:3.6 m		
4						
4.5						

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ENVIRONMENTAL BOREHOLE SB03

PROJECT NUMBER CES200502-PHB
PROJECT NAME Raymond Terrace
CLIENT Phoenix Builders
ADDRESS 251 Adelaide Street, Raymond Terrace NSW

DRILLING DATE 01/09/20
DRILLING COMPANY NUMAC
DRILLER Lewis
DRILLING METHOD Push Tube
TOTAL DEPTH 3.6

COORDINATES -32.776529, 151.740316
COORD SYS Latitude, longtitude
LOGGED BY Andrew Carras
CHECKED BY Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.1			FILL: Silty SAND: fine to medium grained, with clay, foreign materials include aggregate, brown/grey	D	No staining or odours
0.5	0.5	SB3/0.5				
1	0.4			CLAY: moderate plasticity, grey	M	No staining, slight organic odour
				Clayey SAND: medium to coarse grained, white/grey	W	No staining or odours
1.5	0.6					
2	0.9			Grey		
2.5	0.7			Increasing clay content		
3						
3.5						
				Termination Depth at:3.6 m		
4						
4.5						

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ENVIRONMENTAL BOREHOLE SB04

PROJECT NUMBER CES200502-PHB
PROJECT NAME Raymond Terrace
CLIENT Phoenix Builders
ADDRESS 251 Adelaide Street, Raymond Terrace NSW

DRILLING DATE 01/09/20
DRILLING COMPANY NUMAC
DRILLER Lewis
DRILLING METHOD Push Tube
TOTAL DEPTH 3.6

COORDINATES -32.776383, 151.740509
COORD SYS Latitude, longtitude

LOGGED BY Andrew Carras
CHECKED BY Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
0.5	0.6 0.4			FILL: Silty SAND: fine to medium grained, with clay and cobbles, foreign materials include aggregate, brown/grey	D	No staining or odours
1 1.5	0.7 0.2	SB4/1.0		CLAY: moderate plasticity, grey	M	No staining or odours
2 2.5 3 3.5	0.9 0.7			Clayey SAND: fine to medium grained, grey	W	No staining or odours
4 4.5				Termination Depth at:3.6 m		

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ENVIRONMENTAL BOREHOLE SB05

PROJECT NUMBER CES200502-PHB
PROJECT NAME Raymond Terrace
CLIENT Phoenix Builders
ADDRESS 251 Adelaide Street, Raymond Terrace NSW

DRILLING DATE 01/09/20
DRILLING COMPANY NUMAC
DRILLER Lewis
DRILLING METHOD Push Tube
TOTAL DEPTH 3.6

COORDINATES -32.776411, 151.740816
COORD SYS Latitude, longtitude
LOGGED BY Andrew Carras
CHECKED BY Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.5			FILL: Silty SAND: fine to medium grained, with clay, foreign materials include aggregate, brown/grey	D	No staining or odours
0.5	0.7	SB5/0.5				
1	0.9			CLAY: moderate plasticity, grey	M	No staining or odours
1.5	3.1			Clayey SAND: medium to coarse grained, grey	W	No staining or odours
2	0.7					
2.5	0.6					
3						
3.5						
				Termination Depth at:3.6 m		
4						
4.5						

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ENVIRONMENTAL BOREHOLE SB06

PROJECT NUMBER CES200502-PHB	**DRILLING DATE** 01/09/20	**COORDINATES** -32.776317, 151.740721
PROJECT NAME Raymond Terrace	**DRILLING COMPANY** NUMAC	**COORD SYS** Latitude, longtitude
CLIENT Phoenix Builders	**DRILLER** Lewis	
ADDRESS 251 Adelaide Street, Raymond Terrace NSW	**DRILLING METHOD** Push Tube	**LOGGED BY** Andrew Carras
	TOTAL DEPTH 3.6	**CHECKED BY** Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.5	SB6/0.1		FILL: Silty SAND: fine to medium grained, with clay, foreign materials include aggregate, light brown	D	No staining or odours
0.5	0.9			dark brown		
1	0.3				M	No staining or odours
1.5	1.0			Clayey SAND: medium to coarse grained, grey	W	No staining or odours
2	0.7					
2.5	0.8					
3						
3.5						
				Termination Depth at:3.6 m		
4						
4.5						

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ENVIRONMENTAL BOREHOLE SB07

PROJECT NUMBER CES200502-PHB	**DRILLING DATE** 08/09/20	**COORDINATES** -32.775851, 151.740965
PROJECT NAME Raymond Terrace	**DRILLING COMPANY** NUMAC	**COORD SYS** Latitude, longtitude
CLIENT Phoenix Builders	**DRILLER** Lewis	
ADDRESS 251 Adelaide Street, Raymond Terrace NSW	**DRILLING METHOD** Push Tube	**LOGGED BY** Andrew Carras
	TOTAL DEPTH 0.8	**CHECKED BY** Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.6	SB7/0.1		Clayey SAND: fine to medium grained, with siltstone gravels, brown	D	No staining or odours
0.5	0.9					No staining or odours
				Termination Depth at: 0.8 m		

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ENVIRONMENTAL BOREHOLE SB08

PROJECT NUMBER CES200502-PHB	**DRILLING DATE** 08/09/20	**COORDINATES** -32.775824, 151.740829
PROJECT NAME Raymond Terrace	**DRILLING COMPANY** NUMAC	**COORD SYS** Latitude, longtitude
CLIENT Phoenix Builders	**DRILLER** Lewis	
ADDRESS 251 Adelaide Street, Raymond Terrace NSW	**DRILLING METHOD** Push Tube	**LOGGED BY** Andrew Carras
	TOTAL DEPTH 0.8	**CHECKED BY** Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.3	SB8/0.1		Clayey SAND: fine to medium grained, brown	D	No staining or odours
0.5	0.8					No staining or odours
				Termination Depth at: 0.8 m		

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ENVIRONMENTAL BOREHOLE SB09

PROJECT NUMBER CES200502-PHB	**DRILLING DATE** 08/09/20	**COORDINATES** -32.775728, 151.740605
PROJECT NAME Raymond Terrace	**DRILLING COMPANY** NUMAC	**COORD SYS** Latitude, longtitude
CLIENT Phoenix Builders	**DRILLER** Lewis	
ADDRESS 251 Adelaide Street, Raymond Terrace NSW	**DRILLING METHOD** Push Tube	**LOGGED BY** Andrew Carras
	TOTAL DEPTH 0.6	**CHECKED BY** Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.2	SB9/0.1		FILL: Silty Gravelly SAND: fine to medium grained, brown/red	D	No staining or odours
0.5	0.6			Clayey SAND: fine to medium grained, beige/grey	D	No staining or odours
				Termination Depth at: 0.6 m		

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ENVIRONMENTAL BOREHOLE SB10

PROJECT NUMBER CES200502-PHB	**DRILLING DATE** 08/09/20	**COORDINATES** -32.775828, 151.740504
PROJECT NAME Raymond Terrace	**DRILLING COMPANY** NUMAC	**COORD SYS** Latitude, longtitude
CLIENT Phoenix Builders	**DRILLER** Lewis	
ADDRESS 251 Adelaide Street, Raymond Terrace NSW	**DRILLING METHOD** Push Tube	**LOGGED BY** Andrew Carras
	TOTAL DEPTH 0.2	**CHECKED BY** Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.1	SB10/0.1		FILL: Silty Gravelly SAND: fine to medium grained, foregin materials include concrete and tiles, brown/red	D	No staining or odours
0.5				Termination Depth at: 0.2 m Refusal on concrete aggregate		

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ENVIRONMENTAL BOREHOLE SB11

PROJECT NUMBER CES200502-PHB	**DRILLING DATE** 08/09/20	**COORDINATES** -32.776076, 151.740318
PROJECT NAME Raymond Terrace	**DRILLING COMPANY** NUMAC	**COORD SYS** Latitude, longtitude
CLIENT Phoenix Builders	**DRILLER** Lewis	
ADDRESS 251 Adelaide Street, Raymond Terrace NSW	**DRILLING METHOD** Push Tube	**LOGGED BY** Andrew Carras
	TOTAL DEPTH 0.2	**CHECKED BY** Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.1	SB11/0.1		FILL: Silty Gravelly SAND: fine to medium grained, foregin materials include concrete and tiles, brown/red	D	No staining or odours
0.5				Termination Depth at: 0.2 m Refusal on concrete aggregate		

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ENVIRONMENTAL BOREHOLE SB12

PROJECT NUMBER CES200502-PHB
PROJECT NAME Raymond Terrace
CLIENT Phoenix Builders
ADDRESS 251 Adelaide Street, Raymond Terrace NSW

DRILLING DATE 08/09/20
DRILLING COMPANY NUMAC
DRILLER Lewis
DRILLING METHOD Push Tube
TOTAL DEPTH 2.7

COORDINATES -32.776093, 151.740626
COORD SYS Latitude, longtitude
LOGGED BY Andrew Carras
CHECKED BY Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
0–1.0 (0.5)	0.5 1.8			FILL: Silty Gravelly SAND: fine to medium grained, brown/grey/red	D	No staining or odours
1.0–1.5 (1)	0.3			Sandy CLAY: moderate plasticity, dark grey mottled brown	M	No staining or odours
1.5–2.7 (1.5, 2, 2.5)	0.4 0.5	SB12/1.5		Clayey SAND: medium grained, beige	W	No staining or odours
2.7 (3, 3.5, 4, 4.5)				Termination Depth at:2.7 m		

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ENVIRONMENTAL BOREHOLE SB13

PROJECT NUMBER CES200502-PHB
PROJECT NAME Raymond Terrace
CLIENT Phoenix Builders
ADDRESS 251 Adelaide Street, Raymond Terrace NSW

DRILLING DATE 08/09/20
DRILLING COMPANY NUMAC
DRILLER Lewis
DRILLING METHOD Push Tube
TOTAL DEPTH 2.7

COORDINATES -32.776003, 151.740754
COORD SYS Latitude, longtitude
LOGGED BY Andrew Carras
CHECKED BY Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.7			FILL: Silty Gravelly SAND: fine to medium grained, brown/grey/red	D	No staining or odours
0.5	0.6			FILL: Gravelly SAND: fine to medium grained, brown/red/grey	D	No staining or odours
1	0.2	SB13/1.0				
1.5	0.4			FILL: Sandy CLAY: moderate plasticity, red/grey	H	No staining or odours
2	0.9			Sandy CLAY: moderate to high plasticity, with organic material, dark grey	M	No staining or odours
2.5	0.8					
				Termination Depth at:2.7 m		
3						
3.5						
4						
4.5						

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ENVIRONMENTAL BOREHOLE SB14

PROJECT NUMBER CES200502-PHB
PROJECT NAME Raymond Terrace
CLIENT Phoenix Builders
ADDRESS 251 Adelaide Street, Raymond Terrace NSW

DRILLING DATE 08/09/20
DRILLING COMPANY NUMAC
DRILLER Lewis
DRILLING METHOD Push Tube
TOTAL DEPTH 1.5

COORDINATES -32.776317, 151.740929
COORD SYS Latitude, longtitude
LOGGED BY Andrew Carras
CHECKED BY Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.2			FILL: Silty SAND: fine to medium grained, with minor clay, grey/brown	D	No staining or odours
0.5	0.3			CLAY: moderate plasticity, grey mottled brown	H	No staining or odours
1	0.7	SB14/1.0		Clayey SAND: medium to coarse grained, light/dark grey	M	No staining or odours
	0.8				W	
1.5				Termination Depth at: 1.5 m		

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ENVIRONMENTAL BOREHOLE SB15

PROJECT NUMBER CES200502-PHB
PROJECT NAME Raymond Terrace
CLIENT Phoenix Builders
ADDRESS 251 Adelaide Street, Raymond Terrace NSW

DRILLING DATE 08/09/20
DRILLING COMPANY NUMAC
DRILLER Lewis
DRILLING METHOD Push Tube
TOTAL DEPTH 2.7

COORDINATES -32.776164, 151.740890
COORD SYS Latitude, longtitude
LOGGED BY Andrew Carras
CHECKED BY Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.3			FILL: SAND: fine grained, beige	D	No staining or odours
0.5 1	0.6 0.2	SB15/0.5		FILL: Silty Gravelly SAND: fine to medium grained, brown/red/grey	D H	No staining or odours
1.5 2 2.5	0.4 0.7			Sandy CLAY: moderate plasticity, grey	M W	No staining or odours
3 3.5 4 4.5				Termination Depth at: 2.7 m		

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ENVIRONMENTAL BOREHOLE SB16

PROJECT NUMBER CES200502-PHB	**DRILLING DATE** 08/09/20	**COORDINATES** -32.776184, 151.741073
PROJECT NAME Raymond Terrace	**DRILLING COMPANY** NUMAC	**COORD SYS** Latitude, longtitude
CLIENT Phoenix Builders	**DRILLER** Lewis	
ADDRESS 251 Adelaide Street, Raymond Terrace NSW	**DRILLING METHOD** Push Tube	**LOGGED BY** Andrew Carras
	TOTAL DEPTH 2.7	**CHECKED BY** Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.4			FILL: Silty SAND: fine to medium grained, grey/brown	D	No staining or odours
0.5	1.1			FILL: Sandy GRAVEL: fine to medium grained, grey/brown	D	No staining or odours
1	2.2	SB17/1.0				
1.5	2.6			CLAY: moderate plasticity, dark grey	M	No staining or odours
2	1.7			Clayey SAND: medium to coarse grained, beige	W	No staining or odours
2.5						
				Termination Depth at: 2.7 m		
3						
3.5						
4						
4.5						

Disclaimer This log is intended for environmental not geotechnical purposes.

produced by ESlog.ESdat.net on 17 Nov 2020

ENVIRONMENTAL BOREHOLE SB17

PROJECT NUMBER CES200502-PHB
PROJECT NAME Raymond Terrace
CLIENT Phoenix Builders
ADDRESS 251 Adelaide Street, Raymond Terrace NSW

DRILLING DATE 08/09/20
DRILLING COMPANY NUMAC
DRILLER Lewis
DRILLING METHOD Push Tube
TOTAL DEPTH 0.8

COORDINATES -32.776072, 151.740948
COORD SYS Latitude, longtitude
LOGGED BY Andrew Carras
CHECKED BY Mark Challoner

COMMENTS

Depth (m)	PID	Samples	Graphic Log	Material Description	Moisture	Additional Observations
	0.4	SB17/0.1		FILL: Silty Gravelly SAND: fine to medium grained, dark grey/brown	D	No staining or odours
0.5	0.5			increasing gravel content		No staining or odours
				Termination Depth at: 0.8 m		

Appendix D – Lotsearch Historical Photographs

LOTSEARCH

LOTSEARCH AERIALS

Date: 04 Sep 2020

Reference: LS014560 EA

Address: 251 Adelaide Street, Raymond Terrace, NSW 2324

Aerial Imagery 2020

251 Adelaide Street, Raymond Terrace, NSW 2324

Scale: 0 80 160 240 320 Meters	Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 03 September 2020

Aerial Imagery 2015

251 Adelaide Street, Raymond Terrace, NSW 2324

Scale: 0 80 160 240 320 Meters	Data Sources: Aerial Imagery © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 03 September 2020

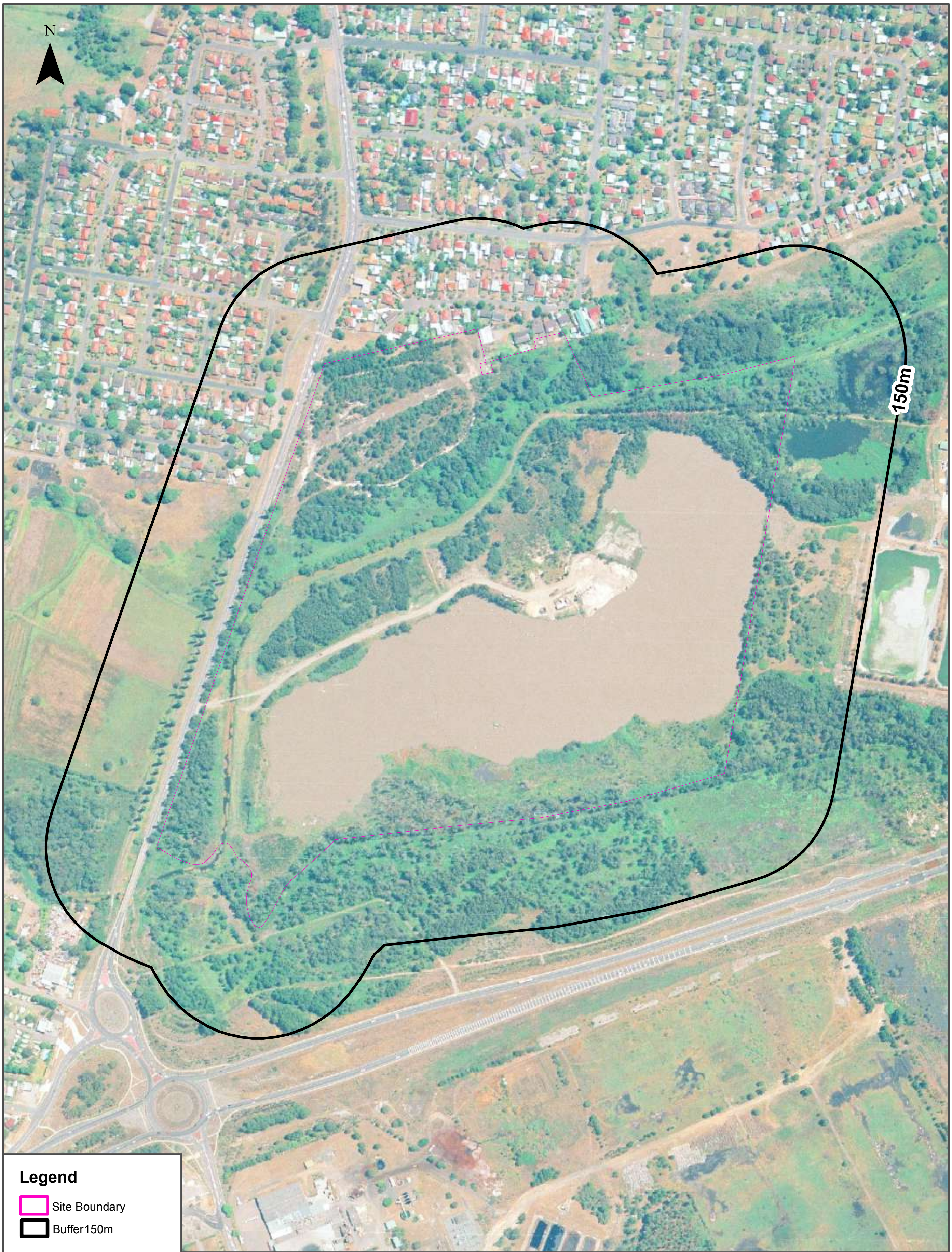
Aerial Imagery 2010

251 Adelaide Street, Raymond Terrace, NSW 2324

Scale: 0 80 160 240 320 Meters	Data Sources Aerial Imagery: © Aerometrex Pty Ltd	Coordinate System: GDA 1994 MGA Zone 56	Date: 04 September 2020

Aerial Imagery 2001

251 Adelaide Street, Raymond Terrace, NSW 2324



Scale: 0 80 160 240 320 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 03 September 2020

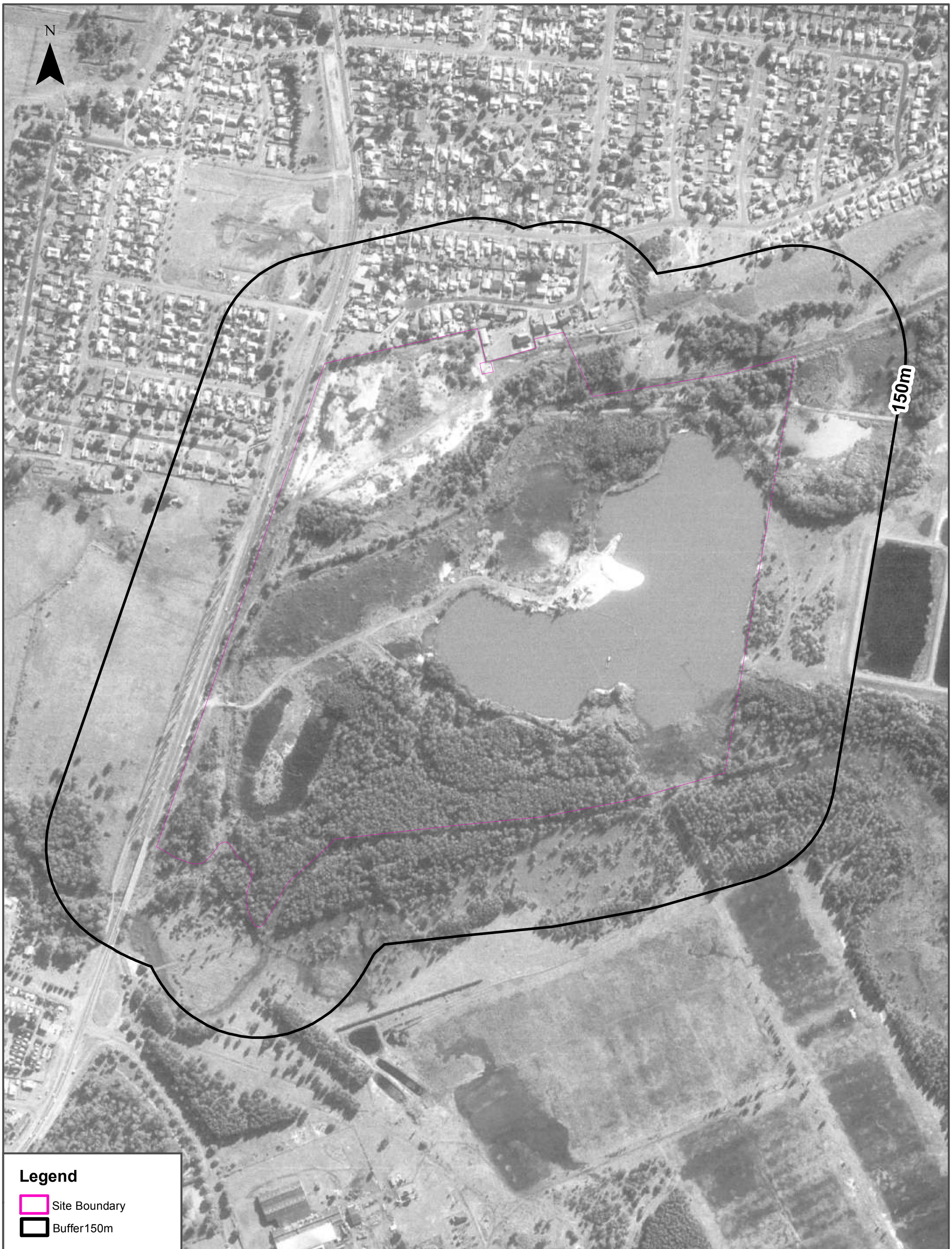
Aerial Imagery 1993

251 Adelaide Street, Raymond Terrace, NSW 2324

Scale: 0 80 160 240 320 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 03 September 2020

Aerial Imagery 1984

251 Adelaide Street, Raymond Terrace, NSW 2324



Scale: 0 80 160 240 320 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 03 September 2020

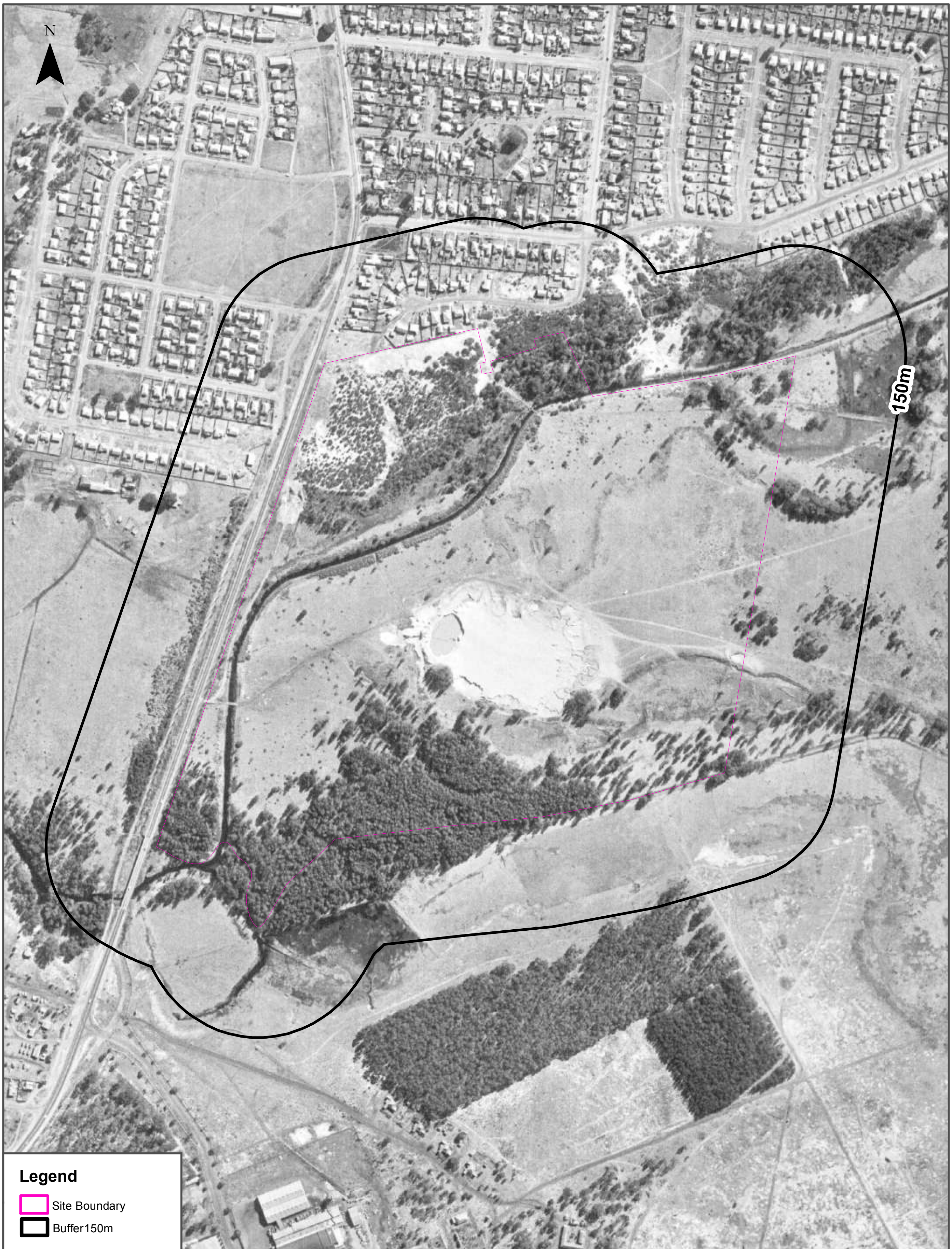
Aerial Imagery 1976

251 Adelaide Street, Raymond Terrace, NSW 2324

Scale: 0 80 160 240 320 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 03 September 2020

Aerial Imagery 1966

251 Adelaide Street, Raymond Terrace, NSW 2324



Legend

Site Boundary

Buffer150m

Scale: 0 80 160 240 320 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 03 September 2020

Aerial Imagery 1954

251 Adelaide Street, Raymond Terrace, NSW 2324

Legend

Site Boundary

Buffer150m

Scale: 0 80 160 240 320 Meters	Data Source Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 03 September 2020

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Appendix E – Field Sheets

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB1

Sheet of

CLIENT:
PROJECT:
LOCATION:
DRILL CONTRACTOR:

JOB NUMBER:
DATE COMMENCED: 1/9/20
DATE COMPLETED:
LOGGED BY: AC

Drill Model: Hole Angle: deg. Bore Size: RL:
Drilling Fluid: Orientation: deg. Co-ords:

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Field Records/Comments: Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
	0		0.1	Fill: silty SAND: w clay f-m grained FM = A.S.S. brown. tiles, ceramics	M		0.0		ASB to 2.0.	
	.5		0.5	" "			0.1			
				1.6						
				Fill: silty SAND w. fms. ceramics + clay. brown/grey.	M					
	1.0		1.0				0.1			
			1.5	increasing sand	M		0.1			
	1.5		2.0	↓			0.5			
				2.4	W					
	2.0		2.5	Nat. clayey SAND: f-m grained w silt (river sand). grey			0.2			
	2.5		3.0	↓	↓		0.7			
	3.0									
	3.5									
	4.0			EOH @ 4.8.						
	4.5									
	5.0									

Produced By: ____________
Checked By: ____________

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB2

Sheet of

CLIENT:
PROJECT:
LOCATION:
DRILL CONTRACTOR:

JOB NUMBER:
DATE COMMENCED: 1/9/20
DATE COMPLETED:
LOGGED BY: AC

Drill Model: Hole Angle: deg. Bore Size: RL:
Drilling Fluid: Orientation: deg. Co-ords:

Method/	Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Field Records/Comments: Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
		.0									
				0.1	Fill silty SAND, w clay, FM = ASS' f-m grained	D		0.7		Asb sample up to 0.5	
		.5		0.5	brown grey	M		0.4		Ins. sample after.	
				1.0	↓ increasing sand	M		0.2			
				1.5		M		0.6			
		.0		2.0		W		0.5			
					2.2						
				2.5	Nat. SAND m-c grained w. siltstone gravel,			1.3			
		.5		3.0	minor silt.			1.2		Slight organic smell.	
					EOH @ 3.6						
		.0									
		.5									
		.0									
		.5									
		.0									
		.5									
		.0									

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Checked By: __________

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB3

Sheet of

CLIENT:	JOB NUMBER:
PROJECT:	DATE COMMENCED: 1/9/20
LOCATION:	DATE COMPLETED:
DRILL CONTRACTOR:	LOGGED BY: AC

Drill Model:	Hole Angle:	deg.	Bore Size:	RL:	
Drilling Fluid:	Orientation:	deg.	Co-ords:		

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Field Records/Comments: Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
	.0		0.1	Fill silty SAND w. clay FM = Aggregate	D		0.1		Asb for 0.1 & 0.5 only	
			0.5	increasing clay. brown/grey 0.9	D		0.5			
	.5		1.0	Nat CLAY: m. plasticity grey. 1.2			0.4			
			1.5	Nat sand; m-c grained white/grey			0.6			
	.0		2.0	becomes grey			0.9			
			2.5	increasing clay.			0.7			
	.5		~~3.0~~							
	.0			EOH @ 3.6						
	.5									
	.0									
	.5									
	.0									
	.5									
	.0									

Produced By: __________

Checked By: __________

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB4

Sheet of

CLIENT:
PROJECT:
LOCATION:
DRILL CONTRACTOR:

JOB NUMBER:
DATE COMMENCED:
DATE COMPLETED:
LOGGED BY: AC

Drill Model: Hole Angle: deg. Bore Size: RL:
Drilling Fluid: Orientation: deg. Co-ords:

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USGS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Field Records/Comments: Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
	.0		0.1	Fill silty SAND: w clay cobbles, minor aggregate brown/grey	D		0.6			
	.5		0.5	" "	D					
				0.9	M		0.4			
	.0		1.0	Nat clay - mod plast. grey			0.7			
	.5			1.6						
	.0		1.5	Nat ~~SAND~~ clayey SAND. m-f grained grey			0.2			
			2.0				0.9			
	.5									
			2.5				0.7			
	.0									
				EOH @ 3-6						
	.5									
	.0									
	.5									
	.0									

Produced By: ___________
Checked By: ___________

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB5

Sheet of

CLIENT:
PROJECT:
LOCATION:
DRILL CONTRACTOR:

JOB NUMBER:
DATE COMMENCED:
DATE COMPLETED:
LOGGED BY:

Drill Model: Hole Angle: deg. Bore Size: RL:
Drilling Fluid: Orientation: deg. Co-ords:

Method/Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/Explosimeter	Sample Interval	Field Records/Comments: Sample ID, Insitu testing, groundwater observations/regime, additional information	Well construction details
	.0									
			0.1	Fill silty SAND w. clay fine grained FM - Aggregate.	D		0.5		Asb bags taken for 0.1 & 0.5 only.	
	.5		0.5		M		0.7			
				0.9						
	.0		1.0	Nat CLAY gry mod plast.	M		0.9			
				1.4						
	.5		1.5	Nat ~~SAND~~ clayey SAND m-c grained	W		8.1			
	.0		2.0		W		0.7			
	.5		2.5		W		0.6			
	.0			EOH @ 3.6m						
	.5									
	.0									
	.5									
	.0									

Produced By: __________
Checked By: __________

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB6

Sheet of

CLIENT:
PROJECT:
LOCATION:
DRILL CONTRACTOR:

JOB NUMBER:
DATE COMMENCED: 1/9/20
DATE COMPLETED:
LOGGED BY: AC

Drill Model: | Hole Angle: deg. | Bore Size: | RL:
Drilling Fluid: | Orientation: deg. | Co-ords:

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Field Records/Comments: Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
	.0									
			0.1	Fill: silty SAND w. clay FM = Aggregate light brown	D		0.5		QS1 / QS1(A)	
	.5		0.5	dark brown.	D		0.9		Ins. sample for Asb.	
				0.9						
	.0		1.0	Nat Clay mod plast. grey.	M		0.3			
				1.4						
	.5		1.5	Nat ~~sand~~ clayey SAND.	W		1.0			
	.0		2.0				0.7			
	.5		2.5				0.8			
	.0			EOH @ 3.6						
	.5									
	.0									
	.5									
	.0									

Produced By: ____________
Checked By: ____________

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB7

Sheet of

CLIENT:
PROJECT:
LOCATION:
DRILL CONTRACTOR: NUMAC

JOB NUMBER:
DATE COMMENCED: 8/9/20
DATE COMPLETED:
LOGGED BY: AC

Drill Model: Hole Angle: deg. Bore Size: RL:
Drilling Fluid: Orientation: deg. Co-ords:

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Field Records/Comments: Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
	.0									
				Nat (clayey) SAND: m-f, some ~~[illegible]~~ silt-stone gravels		D	0.6	0.1	QS3 / QS3A 1A6 @ 0.1	
	.5			~~[illegible]~~		M	0.9	0.5		
	.0									
				Ref. @ 0.8						
	.5									
	.0									
	.5									
	.0									
	.5									
	.0									
	.5									
	.0									

Produced By: ____________
Checked By: ____________

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: 288

Sheet of

CLIENT:	**JOB NUMBER:**
PROJECT:	**DATE COMMENCED:**
LOCATION:	**DATE COMPLETED:** 8/9/20
DRILL CONTRACTOR: NUNAR	**LOGGED BY:** AL

Drill Model:	Hole Angle:	deg.	Bore Size:		RL:
Drilling Fluid:	Orientation:	deg.	Co-ords:		

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Field Records/Comments: Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
	.0									
				Not clayey SAND: mf grained.			0.5	0.1		
	.5						0.8	0.5		
	.0									
				Ref. @ 0.8						
	.5									
	.0									
	.5									
	.0									
	.5									
	.0									
	.5									
	.0									

Produced By: ____________

Checked By: ____________

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB9

Sheet of

CLIENT:
PROJECT:
LOCATION:
DRILL CONTRACTOR: NWMA

JOB NUMBER:
DATE COMMENCED:
DATE COMPLETED: 8/9/20
LOGGED BY: AC

Drill Model: Hole Angle: deg. Bore Size: RL:
Drilling Fluid: Orientation: deg. Co-ords:

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Field Records/Comments: Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
	.0			Fill silty SANDY gravelly: f-m grained Brown/red 0.2			0.2	0.1	1 Asb taken	
	.5			Nat clayey SAND: beige/grey. m-f grained			0.6	0.5		
	.0									
	.5			Ref. @ 0.6						
	.0									
	.5									
	.0									
	.5									
	.0									
	.5									
	.0									

Produced By: ____________
Checked By: ____________

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB10

Sheet of

CLIENT:	JOB NUMBER:
PROJECT:	DATE COMMENCED: ~~9/8~~ 8/9/20
LOCATION:	DATE COMPLETED:
DRILL CONTRACTOR: UMAC -	LOGGED BY:

Drill Model:	Hole Angle: deg.	Bore Size:	RL:
Drilling Fluid:	Orientation: deg.	Co-ords:	

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour, secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Field Records/Comments: Sample ID, Insitu testing, groundwater observations/regime, additional information	Well construction details
	.0			~~Excavate~~ refusal on ASS. "Concrete" surface sample collected.			~~0.2~~ 0.1	-0.1	Ab Sample collected	
	.5			Fill silty SANDY Gravel FM = Conc., tiles. ~~Gravel~~						
	.0			EOH @ 0.2						
	.5									
	.0									
	.5									
	.0									
	.5									
	.0									
	.5									
	.0									

Produced By:
Checked By:

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB16

Sheet of

CLIENT:	**JOB NUMBER:**
PROJECT:	**DATE COMMENCED:**
LOCATION:	**DATE COMPLETED:**
DRILL CONTRACTOR:	**LOGGED BY:**

Drill Model: Hole Angle: deg. Bore Size: RL:

Drilling Fluid: Orientation: deg. Co-ords:

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Field Records/Comments: Sample ID, Insitu testing, groundwater observations/regime, additional information	Well construction details
	.0									
	.5			Concrete Refusal On Approx. "Concrete" surface sample collected			0.1-0.1		Asb sample collected	
	.0			Fill: silty sandy Gravel FM = Conc. tiles						
				EOH @ 0.2						
	.5									
	.0									
	.5									
	.0									
	.5									
	.0									
	.5									
	.0									

Produced By: ___________

Checked By: ___________

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB12

Sheet of

CLIENT:
PROJECT:
LOCATION:
DRILL CONTRACTOR: NUMAC

JOB NUMBER:
DATE COMMENCED:
DATE COMPLETED:
LOGGED BY: AC

Drill Model: Hole Angle: deg. Bore Size: RL:
Drilling Fluid: Orientation: deg. Co-ords:

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
	.0			Fill: silty sandy gravel. m-f grained brown/grey/red			0.5	0.1	ASB @ 0.1 & 0-5	
	.5						1.8	0.5		
				0.9						
	.0			Nat sandy CLAY: mod plast. dark grey mott. brown			0.5	1.0		
	.5			1.4						
				Nat clayey SAND: minor clay. m-grained beige.						
	.0						0.4	1.5		
	.5						0.5	2.0		
	.0									
				EOH @ 2.7						
	.5									
	.0									
	.5									
	.0									

Produced By: ______
Checked By: ______

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB13

Sheet of

CLIENT:	JOB NUMBER:
PROJECT:	DATE COMMENCED: 8/9/20
LOCATION:	DATE COMPLETED:
DRILL CONTRACTOR: Numac	LOGGED BY: AC

Drill Model:	Hole Angle: deg.	Bore Size:	RL:
Drilling Fluid:	Orientation: deg.	Co-ords:	

Method/Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/Explosimeter	Sample Interval	Field Records/Comments: Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
	0.0			Fill: silty SAND Gravel: m-f grained	D		0.7	0.1	ASB to 1.0	
				0.4 — gravelly sand; m-f sand	D		0.4	0.5		
	0.5									
				1.1 sandy clay red grey	M		0.2	1.0		
	1.0				M			1.5		
				1.8						
	1.5			Nat sandy CLAY: mod-high plast. dark grey w. organic	M			2.0		
	2.0				M			2.5		
	2.5			EOH @ 2.7						
	3.0									
	3.5									
	4.0									
	4.5									
	5.0									

Produced By: ____________

Checked By: ____________

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB14
Sheet of

CLIENT:	JOB NUMBER:
PROJECT:	DATE COMMENCED: 8/9/20
LOCATION:	DATE COMPLETED:
DRILL CONTRACTOR: NUMAL	LOGGED BY: AC

Drill Model: Hole Angle: deg. Bore Size: RL:
Drilling Fluid: Orientation: deg. Co-ords:

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg. fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
	.0									
				Fill: silty SAND minor clay m-f grained grey/brown 0.4	D		0.2	0.1	Asb to 0.1 only.	
	.5									
	.0			Nat Clay m plast. grey mott. brown 0.9	M		0.3	0.5		
	.5									
				Nat SAND. m-c grained light/dark grey minor silt & clay.	M		0.7	1.0		
	.0									
	.5				W		0.8	1.5	QS4/QS4A	
	.0			EOH @ 1.5						
	.5									
	.0									
	.5									
	.0									

Produced By: ____________
Checked By: ____________

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB15

Sheet of

CLIENT:	**JOB NUMBER:**
PROJECT:	**DATE COMMENCED:** 8/9/20
LOCATION:	**DATE COMPLETED:**
DRILL CONTRACTOR: NUMAC	**LOGGED BY:** AC

Drill Model:	Hole Angle: deg.	Bore Size:	RL:	
Drilling Fluid:	Orientation: deg.	Co-ords:		

Method/Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/Explosimeter	Sample Interval	Field Records/Comments: Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
	.0									
				Fill: SAND f. grained beige.	D	S	0.3	0.1	Ab to 0.5	
	.5			0.3						
				Fill: sandy gravel. m-f grained	D		0.6	0.5		
	.0									
				1.4	H		0.2	1.0		
	.5			Nat sandy CLAY: grey high plast.	M		0.4	1.5		
	.0				W		0.7	2.0		
	.5			EOH @ 2.7						
	.0									
	.5									
	.0									
	.5									
	.0									

Produced By: ___________

Checked By: ___________

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB16

Sheet of

CLIENT:
PROJECT:
LOCATION:
DRILL CONTRACTOR: NUMAC

JOB NUMBER:
DATE COMMENCED:
DATE COMPLETED: 8/9/20
LOGGED BY: AC

Drill Model: Hole Angle: deg. Bore Size: RL:
Drilling Fluid: Orientation: deg. Co-ords:

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg, fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Sample ID, insitu testing, groundwater observations/regime, additional information	Well construction details
	.0			Fill silty SAND: f-m grained. grey/brown.			0.4	0.1	taken Asb @ 0.1, 0.5, 1.0	
				0.3						
	.5			Fill sandy Gravel: f-m grained			1.1	0.5		
	.0			1.4			2.2	1.0		
				Nat CLAY: mod plast. dark grey.			2.6	1.5		
	.5			1.8 ~~2.0~~			1.7	2.0		
	.0			Nat SAND: m-c grained. minor clay						
	.5									
				EOH @ 2.7						
	.0									
	.5									
	.0									
	.5									
	.0									

Produced By:
Checked By:

REFER TO WORK INSTRUCTION GRP-FWW005

CONSULTING EARTH SCIENTISTS

BOREHOLE LOG

Borehole No: SB17
Sheet of

CLIENT:	JOB NUMBER:
PROJECT:	DATE COMMENCED: 8/9/20
LOCATION:	DATE COMPLETED:
DRILL CONTRACTOR: NUMAC	LOGGED BY: AC

Drill Model: Hole Angle: deg. Bore Size: RL:
Drilling Fluid: Orientation: deg. Co-ords:

Method/ Casing	Depth (m)	Penetration (S, M, H, R)	USCS Classification	Material Description: TYPE; plasticity / particle size, colour; secondary / minor components; moisture; consistency / density; additional observations; geologic origin (eg. fill, residual, alluvium)	Moisture/SWL	Consistency	PID/ Explosimeter	Sample Interval	Field Records/Comments: Sample ID, insitu testing, groundwater observations/regime; additional information	Well construction details
	.0									
				Fill: silty SAND; dark grey/brown m-f grained	D	S	0.4	0.1	Asb for 0.1 only	
	.5			more gravely ↓	D	St	0.5	0.5	ins. sample for Asb	
	.0			ref. @ 0.8.						
	.5									
	.0									
	.5									
	.0									
	.5									
	.0									
	.5									
	.0									

Produced By:
Checked By:

REFER TO WORK INSTRUCTION GRP-FWW005

Grab Sample Sheet

Project: RAYMOND TERRACE SEDIMENT SAMPLING

Sample ID	Date	QAQC	Description
S1	25/8/20	QS1 QS1A	silty CLAY : dark grey / yellow/brown high plast. minor gravels. Depth @ ~ 9m WET
S2		–	" " no gravels. Depth @ ~ 14m WET
S3		–	" " Depth @ ~ 14m WET
S4		–	" " Depth @ ~ 13m WET
S5		–	" " Depth @ ~ 5m WET

Grab Sample Sheet

Project: RAYMOND TERRACE SEDIMENT SAMPLING

Sample ID	Date	QAQC	Description
S6	25/8/20	–	silty CLAY: dark grey/yellow/brown high plast. Depth @ ~ 4m WET
S7	↓	–	" " Depth @ ~ 11m WET
S8	↓	–	" " Depth @ ~ 8m WET
S9	↓	–	" " Depth @ ~ 7m WET
S10	↓	–	" " Depth @ ~ 5m WET

CONSULTING EARTH SCIENTISTS

FIELD DATA SHEET : Surface-Water Monitoring

Client:	~~Sydney Zoo~~ Phoenix Build	CES Project Code:	CES150404-EXC
Project:	~~Baseline Surface Water Sampling – Eastern Creek~~ Raymond Terrace	Date:	25/8/20
Sampler (s):	Signature(s):	Project Manager:	~~E. Millar~~ A. Cameron

Sample ID	Site	Date	Time	DO $mg.l^{-1}$	EC $uS.cm^{-1}$	pH -	Eh mV	Temp. °C	Turbidity NTU	Comments (flow conditions, water odour, algal growth, debris, etc.)
SW1		25/8/20	10am	9.64	368.1	7.79	163.7	13.5	–	stagnant no algal light brown, low turb.
SW2		" "	1020	9.72	366.3	7.75	138.8	13.4	–	" "
SW3		" "	1040	9.88	363.8	7.66	138.0	13.4	-	" " Filter at the day only (not dissolved)
SW4			1055	9.76	363.0	7.63	131.2	13.5	-	" "
SW5			1105	9.53	362.9	7.62	116.9	13.6	-	" "
SW6			1120	9.46	363.2	7.67	128.3	13.6	–	" "
SW7			1130	9.59	363.4	7.60	119.3	13.6	–	" "
SW8			1140	9.34	363.2	7.64	124.2	13.6	–	" "
SW9			1150	9.69	363.1	7.53	100.5	13.8	–	" "
SW10			1200	9.91	365.8	7.54	84.3	14.1		" "
SW11			13:00	11.30	888	7.00	135.2	12.0	–	Slightly turb'd, low flow, light grey ~~clear~~ no odour
SW12			1312	8.65	888.1	6.77	150.6	12.8	–	clear, low flow no [illegible] odours
SW13		↓	133	5.06	509	6.41	89.6	13.5	–	" "

Grab Sample Sheet

Project: RAYMOND TERRACE ~~GRAB~~ BUND SAMPLING

Sample ID	Date	QAQC	Description
G1	7/9/20	–	Bund located adjacent to abandoned building. silty sand gravel, m-f grained, un organic. FM = tiles, concrete, brick fragments. light grey/brown 10L screen – No Asb.
G2	7/9/20	–	Bund located NE of access bridge silty sandy Gravel, f-grained. FM = tiles, ceramic fragments (from power lines?),. 10L Screen – No Asb
G3	8/9/20	–	Northern Bund clayey ~~silty~~ SAND. ~~...~~ w/ silt, & gravels high organic content (roots / rootlets). FM = concrete gravels. 10L Screen – No Asb
G4	8/9/20	–	Northern Bund " " 10L Screen – No Asb

Appendix F – Laboratory Certificates

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

CERTIFICATE OF ANALYSIS 250313

Client Details

Client	Consulting Earth Scientists Pty Ltd
Attention	Andrew Carras
Address	Suite 3, Level 1, 55 Grandview Street, Pymble, NSW, 2073

Sample Details

Your Reference	**CES200502-PHB**
Number of Samples	41 Soil
Date samples received	03/09/2020
Date completed instructions received	09/09/2020

Analysis Details

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

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

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

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

Report Details

Date results requested by	16/09/2020
Date of Issue	15/09/2020

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

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

Results Approved By
Dragana Tomas, Senior Chemist
Loren Bardwell, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

TRH in Soil (C6-C9) NEPM						
Our Reference		250313-5	250313-9	250313-16	250313-23	250313-28
Your Reference	UNITS	SB1	SB2	SB3	SB4	SB5
Depth		2.0	0.5	0.5	1.0	0.5
Date Sampled		01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
Surrogate aaa-Trifluorotoluene	%	125	112	104	92	119

TRH in Soil (C6-C9) NEPM				
Our Reference		250313-33	250313-39	250313-41
Your Reference	UNITS	SB6	QS2	MW1
Depth		0.1	-	1.0
Date Sampled		01/09/2020	01/09/2020	31/08/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	10/09/2020	10/09/2020	10/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25
Surrogate aaa-Trifluorotoluene	%	117	126	108

svTRH (C10-C40) in Soil						
Our Reference		250313-5	250313-9	250313-16	250313-23	250313-28
Your Reference	UNITS	SB1	SB2	SB3	SB4	SB5
Depth		2.0	0.5	0.5	1.0	0.5
Date Sampled		01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Date analysed	-	10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	86	100	88	87	84

svTRH (C10-C40) in Soil				
Our Reference		250313-33	250313-39	250313-41
Your Reference	UNITS	SB6	QS2	MW1
Depth		0.1	-	1.0
Date Sampled		01/09/2020	01/09/2020	31/08/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	10/09/2020	10/09/2020	10/09/2020
Date analysed	-	10/09/2020	10/09/2020	10/09/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	320	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	310	<100	<100
TRH >C_{34} -C_{40}	mg/kg	290	<100	<100
Surrogate o-Terphenyl	%	87	88	85

PAHs in Soil						
Our Reference		250313-5	250313-9	250313-16	250313-23	250313-28
Your Reference	UNITS	SB1	SB2	SB3	SB4	SB5
Depth		2.0	0.5	0.5	1.0	0.5
Date Sampled		01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Date analysed	-	10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.2	0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	0.2	0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.3	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.09	0.08	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	0.2	1.2	0.4	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	94	90	83	102	88

PAHs in Soil				
Our Reference		250313-33	250313-39	250313-41
Your Reference	UNITS	SB6	QS2	MW1
Depth		0.1	-	1.0
Date Sampled		01/09/2020	01/09/2020	31/08/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	10/09/2020	10/09/2020	10/09/2020
Date analysed	-	10/09/2020	10/09/2020	10/09/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.1
Pyrene	mg/kg	<0.1	<0.1	0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.07
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	0.4
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	94	99	85

Acid Extractable metals in soil						
Our Reference		250313-5	250313-9	250313-16	250313-23	250313-28
Your Reference	UNITS	SB1	SB2	SB3	SB4	SB5
Depth		2.0	0.5	0.5	1.0	0.5
Date Sampled		01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Date analysed	-	10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Arsenic	mg/kg	11	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	20	5	13	36	8
Copper	mg/kg	3	5	9	15	4
Lead	mg/kg	10	4	11	10	11
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	4	8	10	3
Zinc	mg/kg	12	18	44	18	11

Acid Extractable metals in soil				
Our Reference		250313-33	250313-39	250313-41
Your Reference	UNITS	SB6	QS2	MW1
Depth		0.1	-	1.0
Date Sampled		01/09/2020	01/09/2020	31/08/2020
Type of sample		Soil	Soil	Soil
Date prepared	-	10/09/2020	10/09/2020	10/09/2020
Date analysed	-	10/09/2020	10/09/2020	10/09/2020
Arsenic	mg/kg	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	9	13	19
Copper	mg/kg	7	8	8
Lead	mg/kg	7	11	8
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	5	7	9
Zinc	mg/kg	22	21	25

Moisture						
Our Reference		250313-5	250313-9	250313-16	250313-23	250313-28
Your Reference	UNITS	SB1	SB2	SB3	SB4	SB5
Depth		2.0	0.5	0.5	1.0	0.5
Date Sampled		01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Moisture	%	25	17	12	26	15

Moisture				
Our Reference		250313-33	250313-39	250313-41
Your Reference	UNITS	SB6	QS2	MW1
Depth		0.1	-	1.0
Date Sampled		01/09/2020	01/09/2020	31/08/2020
Type of sample		Soil	Soil	Soil
Date prepared	-	10/09/2020	10/09/2020	10/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020
Moisture	%	14	15	20

Asbestos ID - soils NEPM - ASB-001				
Our Reference		250313-5	250313-9	250313-16
Your Reference	UNITS	SB1	SB2	SB3
Depth		2.0	0.5	0.5
Date Sampled		01/09/2020	01/09/2020	01/09/2020
Type of sample		Soil	Soil	Soil
Date analysed	-	14/09/2020	14/09/2020	14/09/2020
Sample mass tested	g	362.21	571.08	285.27
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–
FA and AF Estimation*	g	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001

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

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. ‘EQ PQL’values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. ‘EQ zero’values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. ‘EQ half PQL’values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. 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.

QUALITY CONTROL: TRH in Soil (C6-C9) NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			10/09/2020	[NT]	[NT]	[NT]	[NT]	10/09/2020	[NT]
Date analysed	-			11/09/2020	[NT]	[NT]	[NT]	[NT]	11/09/2020	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	111	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	111	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	122	[NT]	[NT]	[NT]	[NT]	121	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			10/09/2020	[NT]	[NT]	[NT]	[NT]	10/09/2020	[NT]
Date analysed	-			10/09/2020	[NT]	[NT]	[NT]	[NT]	10/09/2020	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	132	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	118	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	118	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	132	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	118	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	118	[NT]
Surrogate o-Terphenyl	%		Org-020	95	[NT]	[NT]	[NT]	[NT]	119	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			10/09/2020	[NT]	[NT]	[NT]	[NT]	10/09/2020	[NT]
Date analysed	-			10/09/2020	[NT]	[NT]	[NT]	[NT]	10/09/2020	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	88	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	95	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date prepared	-			10/09/2020	[NT]	[NT]	[NT]	[NT]	10/09/2020	[NT]
Date analysed	-			10/09/2020	[NT]	[NT]	[NT]	[NT]	10/09/2020	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	107	[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]	93	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

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

Note: All samples analysed as received. However, samples 250313-5, 9, 16 are below the minimum 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Consulting Earth Scientists Pty Ltd
Attention	Andrew Carras

Sample Login Details	
Your reference	CES200502-PHB
Envirolab Reference	250313
Date Sample Received	03/09/2020
Date Instructions Received	03/09/2020
Date Results Expected to be Reported	On Hold

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	41 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	9.8
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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Sample ID	TRH in Soil (C6-C9) NEPM	svTRH (C10-C40) in Soil	PAHs in Soil - Low Level	Acid Extractable metalsin soil	Misc Inorg - Soil	PAHs in Water Leach - Low Level	Metals-ASLP Neutral (ICP-MS)	On Hold
SB1-0.1								✓
SB1-0.5								✓
SB1-1.0								✓
SB1-1.5								✓
SB1-2.0								✓
SB1-2.5								✓
SB1-3.0								✓
SB2-0.1								✓
SB2-0.5								✓
SB2-1.0								✓
SB2-1.5								✓
SB2-2.0								✓
SB2-2.5								✓
SB2-3.0								✓
SB3-0.1								✓
SB3-0.5								✓
SB3-1.0								✓
SB3-1.5								✓
SB3-2.0								✓
SB3-2.5								✓
SB4-0.1								✓
SB4-0.5								✓
SB4-1.0								✓
SB4-1.5								✓
SB4-2.0								✓
SB4-2.5								✓
SB5-0.1								✓
SB5-0.5								✓
SB5-1.0								✓
SB5-1.5								✓
SB5-2.0								✓
SB5-2.5								✓

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Sample ID	TRH in Soil (C6-C9) NEPM	svTRH (C10-C40) in Soil	PAHs in Soil - Low Level	Acid Extractable metalsin soil	Misc Inorg - Soil	PAHs in Water Leach - Low Level	Metals-ASLP Neutral (ICP-MS)	On Hold
SB6-0.1								✓
SB6-0.5								✓
SB6-1.0								✓
SB6-1.5								✓
SB6-2.0								✓
SB6-2.5								✓
QS2								✓
QS2A								✓
MW1-1.0								✓

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

Additional Info
Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Updated COC 09/09/2020 10:00

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP - National phone number 1300 42 43 44

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph 03 9763 2500 / melbourne@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph 07 3266 9532 / brisbane@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 0406 350 706 / adelaide@envirolab.com.au

Client: Consulting Earth Scientists
Contact Person: A.Carras
Project Mgr: A.Carras
Sampler: A.Carras
Address: Level 1 Suite 3, 55-65 Grandview Street, Pymble NSW
Phone: (02) 8569 2200 **Mob:** 0497 018 918
Email: andrew.carras@consultingearth.com.au

Client Project Name / Number / Site etc (ie report title): CES200502-PHB
PO No.:
Envirolab Quote No. :
Date results required:
Or choose: **standard** / same day / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharges apply
Report format: esdat / equis /
Lab Comments: 250313.

Sample information					Tests Required															Comments
Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Combo 3a (NEPM WA Asb)	Combination 3	vTRH/BTEX	NEPM 2013 - Soil Characteristics	SPOCAS										Hold	Provide as much information about the sample as you can
1	SB1/0.1		1/09/2020	Soil															X	1 chem, 1 asb
2	SB1/0.5		1/09/2020	Soil															X	1 chem, 1 asb
3	SB1/1.0		1/09/2020	Soil															X	1 chem, 1 asb
4	SB1/1.5		1/09/2020	Soil															X	1 chem, 1 asb
5	SB1/2.0		1/09/2020	Soil	X															1 chem
6	SB1/2.5		1/09/2020	Soil															X	1 chem
7	SB1/3.0		1/09/2020	Soil															X	1 chem
8	SB2/0.1		1/09/2020	Soil															X	1 chem, 1 asb
9	SB2/0.5		1/09/2020	Soil	X															1 chem, 1 asb
10	SB2/1.0		1/09/2020	Soil															X	1 chem
11	SB2/1.5		1/09/2020	Soil															X	1 chem
12	SB2/2.0		1/09/2020	Soil															X	1 chem
13	SB2/2.5		1/09/2020	Soil															X	1 chem
14	SB2/3.0		1/09/2020	Soil															X	1 chem
15	SB3/0.1		1/09/2020	Soil															X	1 chem, 1 asb
16	SB3/0.5		1/09/2020	Soil	X															1 chem, 1 asb
17	SB3/1.0		1/09/2020	Soil															X	1 chem
18	SB3/1.5		1/09/2020	Soil															X	1 chem
19	SB3/2.0		1/09/2020	Soil															X	1 chem
20	SB3/2.5		1/09/2020	Soil															X	1 chem
21	SB4/0.1		1/09/2020	Soil															X	1 chem, 1 asb
22	SB4/0.5		1/09/2020	Soil															X	1 chem, 1 asb
23	SB4/1.0		1/09/2020	Soil		X														1 chem
24	SB4/1.5		1/09/2020	Soil															X	1 chem
25	SB4/2.0		1/09/2020	Soil															X	1 chem
26	SB4/2.5		1/09/2020	Soil															X	1 chem
27	SB5/0.1		1/09/2020	Soil															X	1 chem, 1 asb
28	SB5/0.5		1/09/2020	Soil		X														1 chem, 1 asb
29	SB5/1.0		1/09/2020	Soil															X	1 chem
30	SB5/1.5		1/09/2020	Soil															X	1 chem
31	SB5/2.0		1/09/2020	Soil															X	1 chem
32	SB5/2.5		1/09/2020	Soil															X	1 chem
33	SB6/0.1		1/09/2020	Soil	X															1 chem, 1 asb
34	SB6/0.5		1/09/2020	Soil															X	1 chem
35	SB6/1.0		1/09/2020	Soil															X	1 chem
36	SB6/1.5		1/09/2020	Soil															X	1 chem
37	SB6/2.0		1/09/2020	Soil															X	1 chem
38	SB6/2.5		1/09/2020	Soil															X	1 chem
39.	QS2		1/09/2020	Soil	X															1 chem, 1 asb
—	QS2A		1/09/2020	Soil	X															Send to ALS (1 chem, 1 a
41	MW1/1.0		31/08/2020	Soil		X														1 chem

Relinquished by (Company): CES
Print Name: A.Carras
Date & Time: 9-Sep-20
Signature:

Received by (Company):
Print Name:
Date & Time:
Signature:

Lab use only:
Samples Received: Cool or Ambient (circle one)
Temperature Received at: (if applicable)
Transported by: Hand delivered / courier

White - Lab copy / Blue - Client copy / Pink - Retain in Book Page No:

Revised COC 04/09/2020 09:17

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP - National phone number 1300 42 43 44

Client: Consulting Earth Scientists	Client Project Name / Number / Site etc (ie report title): CES200502-PHB
Contact Person: A.Carras	
Project Mgr: A.Carras	PO No.:
Sampler: A.Carras	Envirolab Quote No. :
Address: Level 1 Suite 3, 55-65 Grandview Street, Pymble NSW	Date results required: Or choose: **standard** / same day / 1 day / 2 day / 3 day. *Note: Inform lab in advance if urgent turnaround is required - surcharges apply*
Phone: (02) 8569 2200 Mob: 0497 018 918	Report format: esdat / equis /
Email: andrew.carras@consultingearth.com.au	Lab Comments: 250313.

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph 03 9763 2500 / melbourne@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph 07 3266 9532 / brisbane@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 0406 350 706 / adelaide@envirolab.com.au

Sample information					Tests Required															Comments
Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Metals	TRH	PAH	ASLP Metals	ASLP PAH	TOC	pH								Hold	Provide as much information about the sample as you can
1	SB1/0.1		1/09/2020	Soil															X	
2	SB1/0.5		1/09/2020	Soil															X	
3	SB1/1.0		1/09/2020	Soil															X	
4	SB1/1.5		1/09/2020	Soil															X	
5	SB1/2.0		1/09/2020	Soil															X	
6	SB1/2.5		1/09/2020	Soil															X	
7	SB1/3.0		1/09/2020	Soil															X	
8	SB2/0.1		1/09/2020	Soil															X	
9	SB2/0.5		1/09/2020	Soil															X	
10	SB2/1.0		1/09/2020	Soil															X	
11	SB2/1.5		1/09/2020	Soil															X	
12	SB2/2.0		1/09/2020	Soil															X	
13	SB2/2.5		1/09/2020	Soil															X	
14	SB2/3.0		1/09/2020	Soil															X	
15	SB3/0.1		1/09/2020	Soil															X	
16	SB3/0.5		1/09/2020	Soil															X	
17	SB3/1.0		1/09/2020	Soil															X	
18	SB3/1.5		1/09/2020	Soil															X	
19	SB3/2.0		1/09/2020	Soil															X	
20	SB3/2.5		1/09/2020	Soil															X	
21	SB4/0.1		1/09/2020	Soil															X	
22	SB4/0.5		1/09/2020	Soil															X	
23	SB4/1.0		1/09/2020	Soil															X	
24	SB4/1.5		1/09/2020	Soil															X	
25	SB4/2.0		1/09/2020	Soil															X	
26	SB4/2.5		1/09/2020	Soil															X	
27	SB5/0.1		1/09/2020	Soil															X	
28	SB5/0.5		1/09/2020	Soil															X	
29	SB5/1.0		1/09/2020	Soil															X	
30	SB5/1.5		1/09/2020	Soil															X	
31	SB5/2.0		1/09/2020	Soil															X	
32	SB5/2.5		1/09/2020	Soil															X	
33	SB6/0.1		1/09/2020	Soil															X	
34	SB6/0.5		1/09/2020	Soil															X	
35	SB6/1.0		1/09/2020	Soil															X	
36	SB6/1.5		1/09/2020	Soil															X	
37	SB6/2.0		1/09/2020	Soil															X	
38	SB6/2.5		1/09/2020	Soil															X	
39	QS2		1/09/2020	Soil															X	
40	QS2A		1/09/2020	Soil															X	
41	MW1/1.0		31/08/2020	Soil															X	

Relinquished by (Company): CES	Received by (Company):	*Lab use only:*
Print Name: A.Carras	Print Name:	Samples Received: Cool or Ambient (circle one)
Date & Time: 2-Sep-20	Date & Time:	Temperature Received at: (if applicable)
Signature:	Signature:	Transported by: Hand delivered / courier

White - Lab copy / Blue - Client copy / Pink - Retain in Book Page No:

ENVIROLAB GROUP

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP - National phone number 1300 42 43 44

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
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1A Dalmore Drive Scoresby VIC 3179
Ph 03 9763 2500 / melbourne@envirolab.com.au

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Ph 07 3266 9532 / brisbane@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 0406 350 706 / adelaide@envirolab.com.au

Client: Consulting Earth Scientists
Contact Person: A.Carras
Project Mgr: A.Carras
Sampler: A.Carras
Address: Level 1 Suite 3, 55-65 Grandview Street, Pymble NSW
Phone: (02) 8569 2200 Mob: 0497 018 918
Email: andrew.carras@consultingearth.com.au

Client Project Name / Number / Site etc (ie report title): CES200502-PMB
PO No.:
Envirolab Quote No. :
Date results required:
Or choose: **standard** / same day / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharges apply
Report format: esdat / equis /
Lab Comments:

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 250313
Date Received: 2-9-20
Time Received: 1530
Received By: MO
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Sample Information					Tests Required														Comments
Envirolab Sample ID	Client Sample ID or Information	Depth	Date sampled	Type of sample	Metals	TRH	PAH	ASLP Metals	ASLP PAH	TOC	pH							Hold	Provide as much information about the sample as you can
1	SB1/0.1		1/09/2020	Soil														X	1 Jar 1 Asb
2	SB1/0.5		1/09/2020	Soil														X	" "
3	SB1/1.0		1/09/2020	Soil														X	"
4	SB1/1.5		1/09/2020	Soil														X	"
5	SB1/2.0		1/09/2020	Soil														X	"
6	SB1/2.5		1/09/2020	Soil														X	1 Jar
7	SB1/3.0		1/09/2020	Soil														X	"
~~8~~	~~SB1/3.0~~		1/09/2020	Soil														X	"
8 ~~9~~	SB2/0.1		1/09/2020	Soil														X	1 Jar 1 Asb
9 ~~10~~	SB2/0.5		1/09/2020	Soil														X	1 Jar
10 ~~11~~	SB2/1.0		1/09/2020	Soil														X	"
11 ~~12~~	SB2/1.5		1/09/2020	Soil														X	"
12 ~~13~~	SB2/2.0		1/09/2020	Soil														X	"
13 ~~14~~	SB2/2.5		1/09/2020	Soil														X	"
	~~SB2/[illegible]~~		~~1/09/2020~~	~~Soil~~														X	~~"~~
14 ~~15~~	SB2/3.0		1/09/2020	Soil														X	"
15 ~~16~~	SB3/0.1		1/09/2020	Soil														X	1 Jar 1 Asb
16 ~~17~~	SB3/0.5		1/09/2020	Soil														X	"
17 ~~18~~	SB3/1.0		1/09/2020	Soil														X	1 Jar
18 ~~19~~	SB3/1.5		1/09/2020	Soil														X	"
19 ~~20~~	SB3/2.0		1/09/2020	Soil														X	"
20 ~~21~~	SB3/2.5		1/09/2020	Soil														X	"
21	SB4/0.1		1/09/2020	Soil														X	1 Jar 1 Asb
22	SB4/0.5		1/09/2020	Soil														X	"
23	SB4/1.0		1/09/2020	Soil														X	1 Jar
24	SB4/1.5		1/09/2020	Soil												*		X	"
25	SB4/2.0		1/09/2020	Soil														X	"
26	SB4/2.5		1/09/2020	Soil														X	"
27	SB5/0.1		1/09/2020	Soil														X	1 Jar 1 Asb
28	SB5/0.5		1/09/2020	Soil														X	"
29	SB5/1.0		1/09/2020	Soil														X	1 Jar
30	SB5/1.5		1/09/2020	Soil														X	
31 ~~32~~	SB5/2.0		1/09/2020	Soil														X	
32	SB5/2.5		1/09/2020	Soil														X	
33	SB6/0.1		1/09/2020	Soil														X	
34	SB6/0.5		1/09/2020	Soil														X	
35	SB6/1.0		1/09/2020	Soil														X	
36	SB6/1.5		1/09/2020	Soil														X	
~~38~~ 37	SB6/2.0		1/09/2020	Soil														X	
38	SB6/2.5		1/09/2020	Soil														X	
39 ~~40~~	QS1		1/09/2020	Soil														X	
40	QS1A		1/09/2020	Soil														X	
41 ~~42~~	MW1/1.0		31/08/2020	Soil														X	

Relinquished by (Company): CES
Print Name: A.Carras
Date & Time: 2-Sep-20
Signature:

Received by (Company): ELS
Print Name: Michael Opie
Date & Time: 2-9-20 1530
Signature:

Lab use only:
Samples Received: Cool or Ambient (circle one)
Temperature Received at: 9.8 (if applicable)
Transported by: Hand delivered / courier

Envirolab Services Pty Ltd
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CERTIFICATE OF ANALYSIS 250828

Client Details

Client	Consulting Earth Scientists Pty Ltd
Attention	Andrew Carras
Address	Suite 3, Level 1, 55 Grandview Street, Pymble, NSW, 2073

Sample Details

Your Reference	**CES200502-PHB**
Number of Samples	46 Soil, 1 Water
Date samples received	09/09/2020
Date completed instructions received	10/09/2020

Analysis Details

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

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

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

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

Report Details

Date results requested by	16/09/2020
Date of Issue	16/09/2020

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

Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor
Josh Williams, Senior Chemist
Lucy Zhu, Asbestos Supervisor
Nick Sarlamis, Inorganics Supervisor
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		250828-2	250828-3	250828-4	250828-6	250828-7
Your Reference	UNITS	SB7/0.5	SB8/0.1	SB9/0.1	SB10/0.1	SB11/0.1
Date Sampled		08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	93	93	88	88	84

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		250828-11	250828-15	250828-21	250828-24	250828-29
Your Reference	UNITS	SB12/1.5	SB13/1.0	SB14/1.0	SB15/0.5	SB16/1.0
Date Sampled		08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	89	91	87	94	84

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		250828-32	250828-39	250828-40	250828-41	250828-42
Your Reference	UNITS	SB17/0.1	G2	G3	G4	MW2/1.0
Date Sampled		08/09/2020	07/08/2020	08/09/2020	08/09/2020	07/08/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	95	92	92	89	91

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		250828-43	250828-46	250828-47
Your Reference	UNITS	MW3/3.0	TS	TB
Date Sampled		08/09/2020	07/08/2020	07/08/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020
TRH C_6 - C_9	mg/kg	<25	[NA]	<25
TRH C_6 - C_{10}	mg/kg	<25	[NA]	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	[NA]	<25
Benzene	mg/kg	<0.2	116%	<0.2
Toluene	mg/kg	<0.5	112%	<0.5
Ethylbenzene	mg/kg	<1	100%	<1
m+p-xylene	mg/kg	<2	99%	<2
o-Xylene	mg/kg	<1	100%	<1
naphthalene	mg/kg	<1	[NA]	<1
Total +ve Xylenes	mg/kg	<3	[NA]	<3
Surrogate aaa-Trifluorotoluene	%	90	90	94

svTRH (C10-C40) in Soil						
Our Reference		250828-2	250828-3	250828-4	250828-6	250828-7
Your Reference	UNITS	SB7/0.5	SB8/0.1	SB9/0.1	SB10/0.1	SB11/0.1
Date Sampled		08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	12/09/2020	12/09/2020	12/09/2020	12/09/2020	12/09/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	90	83	81	93	82

svTRH (C10-C40) in Soil						
Our Reference		250828-11	250828-15	250828-21	250828-24	250828-29
Your Reference	UNITS	SB12/1.5	SB13/1.0	SB14/1.0	SB15/0.5	SB16/1.0
Date Sampled		08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	12/09/2020	12/09/2020	12/09/2020	12/09/2020	12/09/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	77	74	77	75	84

svTRH (C10-C40) in Soil						
Our Reference		250828-32	250828-39	250828-40	250828-41	250828-42
Your Reference	UNITS	SB17/0.1	G2	G3	G4	MW2/1.0
Date Sampled		08/09/2020	07/08/2020	08/09/2020	08/09/2020	07/08/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	12/09/2020	12/09/2020	12/09/2020	12/09/2020	12/09/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	85	74	83	88	79

svTRH (C10-C40) in Soil			
Our Reference		250828-43	250828-47
Your Reference	UNITS	MW3/3.0	TB
Date Sampled		08/09/2020	07/08/2020
Type of sample		Soil	Soil
Date extracted	-	11/09/2020	11/09/2020
Date analysed	-	12/09/2020	12/09/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	87	82

PAHs in Soil						
Our Reference		250828-2	250828-3	250828-4	250828-6	250828-7
Your Reference	UNITS	SB7/0.5	SB8/0.1	SB9/0.1	SB10/0.1	SB11/0.1
Date Sampled		08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	101	96	95	96	95

PAHs in Soil						
Our Reference	UNITS	250828-11	250828-15	250828-21	250828-24	250828-29
Your Reference		SB12/1.5	SB13/1.0	SB14/1.0	SB15/0.5	SB16/1.0
Date Sampled		08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.3	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.2	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	1.9	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	98	96	100	94	102

PAHs in Soil						
Our Reference	UNITS	250828-32	250828-39	250828-40	250828-41	250828-42
Your Reference		SB17/0.1	G2	G3	G4	MW2/1.0
Date Sampled		08/09/2020	07/08/2020	08/09/2020	08/09/2020	07/08/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.08	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	0.4	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	99	98	101	99	99

PAHs in Soil			
Our Reference		250828-43	250828-47
Your Reference	UNITS	MW3/3.0	TB
Date Sampled		08/09/2020	07/08/2020
Type of sample		Soil	Soil
Date extracted	-	11/09/2020	11/09/2020
Date analysed	-	11/09/2020	11/09/2020
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	99	103

Acid Extractable metals in soil						
Our Reference		250828-2	250828-3	250828-4	250828-6	250828-7
Your Reference	UNITS	SB7/0.5	SB8/0.1	SB9/0.1	SB10/0.1	SB11/0.1
Date Sampled		08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	5	2	5	6	10
Copper	mg/kg	14	<1	2	4	5
Lead	mg/kg	10	<1	2	3	4
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	<1	2	4	6
Zinc	mg/kg	30	2	8	17	14
Iron	mg/kg	3,600	570	1,700	4,400	7,100

Acid Extractable metals in soil						
Our Reference		250828-11	250828-15	250828-21	250828-24	250828-29
Your Reference	UNITS	SB12/1.5	SB13/1.0	SB14/1.0	SB15/0.5	SB16/1.0
Date Sampled		08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	5	6	35	4	22
Copper	mg/kg	3	10	17	5	13
Lead	mg/kg	3	10	11	8	11
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	4	8	4	16
Zinc	mg/kg	5	33	13	32	31
Iron	mg/kg	1,100	5,600	8,700	8,000	11,000

Acid Extractable metals in soil						
Our Reference		250828-32	250828-39	250828-40	250828-41	250828-42
Your Reference	UNITS	SB17/0.1	G2	G3	G4	MW2/1.0
Date Sampled		08/09/2020	07/08/2020	08/09/2020	08/09/2020	07/08/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	2	12	21	21	5
Copper	mg/kg	<1	6	12	17	6
Lead	mg/kg	<1	5	11	17	2
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	5	10	10	2
Zinc	mg/kg	3	13	47	110	5
Iron	mg/kg	800	7,200	13,000	9,400	4,500

Acid Extractable metals in soil				
Our Reference		250828-43	250828-47	250828-48
Your Reference	UNITS	MW3/3.0	TB	SB7/0.5 - [TRIPLICATE]
Date Sampled		08/09/2020	07/08/2020	08/09/2020
Type of sample		Soil	Soil	Soil
Date prepared	-	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	11/09/2020	11/09/2020	11/09/2020
Arsenic	mg/kg	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	21	<1	6
Copper	mg/kg	13	<1	15
Lead	mg/kg	11	<1	8
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	8	<1	3
Zinc	mg/kg	43	<1	24
Iron	mg/kg	8,000	660	3,600

Moisture						
Our Reference		250828-2	250828-3	250828-4	250828-6	250828-7
Your Reference	UNITS	SB7/0.5	SB8/0.1	SB9/0.1	SB10/0.1	SB11/0.1
Date Sampled		08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Moisture	%	35	14	9.1	15	21

Moisture						
Our Reference		250828-11	250828-15	250828-21	250828-24	250828-29
Your Reference	UNITS	SB12/1.5	SB13/1.0	SB14/1.0	SB15/0.5	SB16/1.0
Date Sampled		08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Moisture	%	18	12	32	7.6	39

Moisture						
Our Reference		250828-32	250828-39	250828-40	250828-41	250828-42
Your Reference	UNITS	SB17/0.1	G2	G3	G4	MW2/1.0
Date Sampled		08/09/2020	07/08/2020	08/09/2020	08/09/2020	07/08/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Moisture	%	6.8	9.2	25	28	18

Moisture		
Our Reference		250828-43
Your Reference	UNITS	MW3/3.0
Date Sampled		08/09/2020
Type of sample		Soil
Date prepared	-	11/09/2020
Date analysed	-	14/09/2020
Moisture	%	27

sPOCAS + %S w/w			
Our Reference		250828-42	250828-43
Your Reference	UNITS	MW2/1.0	MW3/3.0
Date Sampled		07/08/2020	08/09/2020
Type of sample		Soil	Soil
Date prepared	-	14/09/2020	14/09/2020
Date analysed	-	14/09/2020	14/09/2020
pH_{kcl}	pH units	4.1	4.3
TAA pH 6.5	moles H^+ /t	22	30
s-TAA pH 6.5	%w/w S	0.03	0.05
pH_{Ox}	pH units	4.2	3.7
TPA pH 6.5	moles H^+ /t	31	100
s-TPA pH 6.5	%w/w S	0.05	0.16
TSA pH 6.5	moles H^+ /t	9	70
s-TSA pH 6.5	%w/w S	0.02	0.11
ANC_E	% $CaCO_3$	NA	NA
a-ANC_E	moles H^+ /t	NA	NA
s-ANC_E	%w/w S	NA	NA
S_{KCl}	%w/w S	0.009	0.02
S_P	%w/w	0.02	0.04
S_{POS}	%w/w	0.009	0.03
a-S_{POS}	moles H^+ /t	5	17
Ca_{KCl}	%w/w	0.005	0.1
Ca_P	%w/w	0.007	0.11
Ca_A	%w/w	<0.005	0.010
Mg_{KCl}	%w/w	<0.005	0.040
Mg_P	%w/w	0.011	0.049
Mg_A	%w/w	0.010	0.009
S_{HCl}	%w/w S	0.019	0.023
S_{NAS}	%w/w S	0.010	0.006
a-S_{NAS}	moles H^+ /t	<5	<5
s-S_{NAS}	%w/w S	<0.01	<0.01
Fineness Factor	-	1.5	1.5
a-Net Acidity	moles H^+ /t	32	50
s-Net Acidity	%w/w S	0.05	0.08
Liming rate	kg $CaCO_3$ /t	2.4	3.8
s-Net Acidity without -ANCE	%w/w S	0.051	0.081
a-Net Acidity without ANCE	moles H^+ /t	32	50
Liming rate without ANCE	kg $CaCO_3$ /t	2.4	3.8

Asbestos ID - soils NEPM - ASB-001						
Our Reference		250828-4	250828-6	250828-7	250828-15	250828-29
Your Reference	UNITS	SB9/0.1	SB10/0.1	SB11/0.1	SB13/1.0	SB16/1.0
Date Sampled		08/09/2020	08/09/2020	08/09/2020	08/09/2020	08/09/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Sample mass tested	g	664.15	625.61	686.91	339.17	361.96
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Grey coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001					
Our Reference		250828-32	250828-39	250828-40	250828-41
Your Reference	UNITS	SB17/0.1	G2	G3	G4
Date Sampled		08/09/2020	07/08/2020	08/09/2020	08/09/2020
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Sample mass tested	g	558.73	515.25	479.11	405.79
Sample Description	-	Brown sandy soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–
FA and AF Estimation*	g	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001

vTRH(C6-C10)/BTEXN in Water		
Our Reference		250828-45
Your Reference	UNITS	RB1
Date Sampled		08/09/2020
Type of sample		Water
Date extracted	-	10/09/2020
Date analysed	-	11/09/2020
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	100
Surrogate toluene-d8	%	99
Surrogate 4-BFB	%	97

svTRH (C10-C40) in Water		
Our Reference		250828-45
Your Reference	UNITS	RB1
Date Sampled		08/09/2020
Type of sample		Water
Date extracted	-	16/09/2020
Date analysed	-	16/09/2020
TRH C_{10} - C_{14}	μg/L	<50
TRH C_{15} - C_{28}	μg/L	<100
TRH C_{29} - C_{36}	μg/L	<100
TRH >C_{10} - C_{16}	μg/L	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	μg/L	<50
TRH >C_{16} - C_{34}	μg/L	<100
TRH >C_{34} - C_{40}	μg/L	<100
Surrogate o-Terphenyl	%	97

PAHs in Water		
Our Reference		250828-45
Your Reference	UNITS	RB1
Date Sampled		08/09/2020
Type of sample		Water
Date extracted	-	16/09/2020
Date analysed	-	16/09/2020
Naphthalene	µg/L	<1
Acenaphthylene	µg/L	<1
Acenaphthene	µg/L	<1
Fluorene	µg/L	<1
Phenanthrene	µg/L	<1
Anthracene	µg/L	<1
Fluoranthene	µg/L	<1
Pyrene	µg/L	<1
Benzo(a)anthracene	µg/L	<1
Chrysene	µg/L	<1
Benzo(b,j+k)fluoranthene	µg/L	<2
Benzo(a)pyrene	µg/L	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1
Dibenzo(a,h)anthracene	µg/L	<1
Benzo(g,h,i)perylene	µg/L	<1
Benzo(a)pyrene TEQ	µg/L	<5
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	84

Metals in Waters - Acid extractable		
Our Reference		250828-45
Your Reference	UNITS	RB1
Date Sampled		08/09/2020
Type of sample		Water
Date prepared	-	11/09/2020
Date analysed	-	11/09/2020
Arsenic - Total	mg/L	<0.05
Cadmium - Total	mg/L	<0.01
Chromium - Total	mg/L	<0.01
Copper - Total	mg/L	<0.01
Lead - Total	mg/L	<0.03
Mercury - Total	mg/L	<0.0005
Nickel - Total	mg/L	<0.02
Zinc - Total	mg/L	<0.02

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-064	sPOCAS determined using titrimetric and ICP-AES techniques. Based on Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).

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

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	250828-4
Date extracted	-			11/09/2020	2	11/09/2020	11/09/2020		11/09/2020	11/09/2020
Date analysed	-			11/09/2020	2	11/09/2020	11/09/2020		11/09/2020	11/09/2020
TRH C_6 - C_9	mg/kg	25	Org-023	<25	2	<25	<25	0	104	97
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	2	<25	<25	0	104	97
Benzene	mg/kg	0.2	Org-023	<0.2	2	<0.2	<0.2	0	102	88
Toluene	mg/kg	0.5	Org-023	<0.5	2	<0.5	<0.5	0	103	89
Ethylbenzene	mg/kg	1	Org-023	<1	2	<1	<1	0	93	112
m+p-xylene	mg/kg	2	Org-023	<2	2	<2	<2	0	112	99
o-Xylene	mg/kg	1	Org-023	<1	2	<1	<1	0	98	88
naphthalene	mg/kg	1	Org-023	<1	2	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	102	2	93	82	13	113	94

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	39	11/09/2020	11/09/2020		[NT]	[NT]
Date analysed	-			[NT]	39	11/09/2020	11/09/2020		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	39	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	39	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	39	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	39	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	39	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	39	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	39	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-023	[NT]	39	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	39	92	96	4	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	250828-4
Date extracted	-			11/09/2020	2	11/09/2020	11/09/2020		11/09/2020	11/09/2020
Date analysed	-			12/09/2020	2	12/09/2020	12/09/2020		12/09/2020	12/09/2020
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	2	<50	<50	0	105	103
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	2	<100	<100	0	89	89
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	2	<100	<100	0	95	92
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	2	<50	<50	0	105	103
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	2	<100	<100	0	89	89
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	2	<100	<100	0	95	92
Surrogate o-Terphenyl	%		Org-020	86	2	90	91	1	112	115

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	39	11/09/2020	11/09/2020		[NT]	[NT]
Date analysed	-			[NT]	39	12/09/2020	12/09/2020		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	39	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	39	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	39	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	39	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	39	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	39	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	39	74	74	0	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	250828-4
Date extracted	-			11/09/2020	2	11/09/2020	11/09/2020		11/09/2020	11/09/2020
Date analysed	-			11/09/2020	2	11/09/2020	11/09/2020		11/09/2020	11/09/2020
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	108	103
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	91	86
Fluorene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	98	93
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	99	95
Anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	100	95
Pyrene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	104	98
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	112	106
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	2	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	2	<0.05	<0.05	0	102	97
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	2	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	95	2	101	98	3	102	97

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	39	11/09/2020	11/09/2020		[NT]	[NT]
Date analysed	-			[NT]	39	11/09/2020	11/09/2020		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	39	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	39	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	39	98	97	1	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	250828-4
Date prepared	-			11/09/2020	2	11/09/2020	11/09/2020		11/09/2020	11/09/2020
Date analysed	-			11/09/2020	2	11/09/2020	11/09/2020		11/09/2020	11/09/2020
Arsenic	mg/kg	4	Metals-020	<4	2	<4	<4	0	105	91
Cadmium	mg/kg	0.4	Metals-020	<0.4	2	<0.4	<0.4	0	100	78
Chromium	mg/kg	1	Metals-020	<1	2	5	3	50	91	83
Copper	mg/kg	1	Metals-020	<1	2	14	6	80	93	94
Lead	mg/kg	1	Metals-020	<1	2	10	6	50	91	85
Mercury	mg/kg	0.1	Metals-021	<0.1	2	<0.1	<0.1	0	91	80
Nickel	mg/kg	1	Metals-020	<1	2	3	1	100	92	77
Zinc	mg/kg	1	Metals-020	<1	2	30	17	55	90	83
Iron	mg/kg	10	Metals-020	<10	2	3600	2300	44	93	#

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	39	11/09/2020	11/09/2020		[NT]	[NT]
Date analysed	-			[NT]	39	11/09/2020	11/09/2020		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	39	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	39	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	39	12	12	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	39	6	6	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	39	5	5	0	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	39	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	39	5	5	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	39	13	13	0	[NT]	[NT]
Iron	mg/kg	10	Metals-020	[NT]	39	7200	6500	10	[NT]	[NT]

QUALITY CONTROL: sPOCAS + %S w/w						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	[NT]
Date prepared	-			14/09/2020	42	14/09/2020	14/09/2020		14/09/2020	[NT]
Date analysed	-			14/09/2020	42	14/09/2020	14/09/2020		14/09/2020	[NT]
pH $_{kcl}$	pH units		Inorg-064	[NT]	42	4.1	4.1	0	97	[NT]
TAA pH 6.5	moles H^+/t	5	Inorg-064	<5	42	22	22	0	96	[NT]
s-TAA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	42	0.03	0.04	29	[NT]	[NT]
pH $_{Ox}$	pH units		Inorg-064	[NT]	42	4.2	3.8	10	105	[NT]
TPA pH 6.5	moles H^+/t	5	Inorg-064	<5	42	31	45	37	86	[NT]
s-TPA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	42	0.05	0.07	33	[NT]	[NT]
TSA pH 6.5	moles H^+/t	5	Inorg-064	<5	42	9	23	88	[NT]	[NT]
s-TSA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	42	0.02	0.04	67	[NT]	[NT]
ANC_E	% $CaCO_3$	0.05	Inorg-064	<0.05	42	NA	NA		[NT]	[NT]
a-ANC_E	moles H^+/t	5	Inorg-064	<5	42	NA	NA		[NT]	[NT]
s-ANC_E	%w/w S	0.05	Inorg-064	<0.05	42	NA	NA		[NT]	[NT]
S_{KCl}	%w/w S	0.005	Inorg-064	<0.005	42	0.009	0.009	0	[NT]	[NT]
S_P	%w/w	0.005	Inorg-064	<0.005	42	0.02	0.02	0	[NT]	[NT]
S_{POS}	%w/w	0.005	Inorg-064	<0.005	42	0.009	0.009	0	[NT]	[NT]
a-S_{POS}	moles H^+/t	5	Inorg-064	<5	42	5	5	0	[NT]	[NT]
Ca_{KCl}	%w/w	0.005	Inorg-064	<0.005	42	0.005	0.007	33	[NT]	[NT]
Ca_P	%w/w	0.005	Inorg-064	<0.005	42	0.007	0.007	0	[NT]	[NT]
Ca_A	%w/w	0.005	Inorg-064	<0.005	42	<0.005	<0.005	0	[NT]	[NT]
Mg_{KCl}	%w/w	0.005	Inorg-064	<0.005	42	<0.005	<0.005	0	[NT]	[NT]
Mg_P	%w/w	0.005	Inorg-064	<0.005	42	0.011	0.012	9	[NT]	[NT]
Mg_A	%w/w	0.005	Inorg-064	<0.005	42	0.010	0.011	10	[NT]	[NT]
S_{HCl}	%w/w S	0.005	Inorg-064	<0.005	42	0.019	0.019	0	[NT]	[NT]
S_{NAS}	%w/w S	0.005	Inorg-064	<0.005	42	0.010	0.010	0	[NT]	[NT]
a-S_{NAS}	moles H^+/t	5	Inorg-064	<5	42	<5	<5	0	[NT]	[NT]
s-S_{NAS}	%w/w S	0.01	Inorg-064	<0.01	42	<0.01	<0.01	0	[NT]	[NT]
Fineness Factor	-	1.5	Inorg-064	<1.5	42	1.5	1.5	0	[NT]	[NT]
a-Net Acidity	moles H^+/t	5	Inorg-064	<5	42	32	33	3	[NT]	[NT]
s-Net Acidity	%w/w S	0.01	Inorg-064	<0.01	42	0.05	0.05	0	[NT]	[NT]
Liming rate	kg $CaCO_3$/t	0.75	Inorg-064	<0.75	42	2.4	2.5	4	[NT]	[NT]
s-Net Acidity without -ANCE	%w/w S	0.01	Inorg-064	<0.01	42	0.051	0.052	2	[NT]	[NT]

QUALITY CONTROL: sPOCAS + %S w/w						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	[NT]
a-Net Acidity without ANCE	moles H^+/t	5	Inorg-064	<5	42	32	33	3	[NT]	[NT]
Liming rate without ANCE	kg $CaCO_3$/t	0.75	Inorg-064	<0.75	42	2.4	2.5	4	[NT]	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			11/09/2020	[NT]	[NT]	[NT]	[NT]	10/09/2020	[NT]
Date analysed	-			11/09/2020	[NT]	[NT]	[NT]	[NT]	11/09/2020	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	110	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	110	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	108	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	97	[NT]
Surrogate toluene-d8	%		Org-023	99	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	96	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			16/09/2020	[NT]	[NT]	[NT]	[NT]	16/09/2020	[NT]
Date analysed	-			16/09/2020	[NT]	[NT]	[NT]	[NT]	16/09/2020	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	87	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	103	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	87	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	103	[NT]
Surrogate o-Terphenyl	%		Org-020	74	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: PAHs in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			16/09/2020	[NT]	[NT]	[NT]	[NT]	16/09/2020	[NT]
Date analysed	-			16/09/2020	[NT]	[NT]	[NT]	[NT]	16/09/2020	[NT]
Naphthalene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Acenaphthylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Fluorene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Phenanthrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Benzo(a)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	83	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	81	[NT]	[NT]	[NT]	[NT]	86	[NT]

QUALITY CONTROL: Metals in Waters - Acid extractable					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			11/09/2020	[NT]	[NT]	[NT]	[NT]	11/09/2020	[NT]
Date analysed	-			11/09/2020	[NT]	[NT]	[NT]	[NT]	11/09/2020	[NT]
Arsenic - Total	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	95	[NT]
Cadmium - Total	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	94	[NT]
Chromium - Total	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	94	[NT]
Copper - Total	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	101	[NT]
Lead - Total	mg/L	0.03	Metals-020	<0.03	[NT]	[NT]	[NT]	[NT]	101	[NT]
Mercury - Total	mg/L	0.0005	Metals-021	<0.0005	[NT]	[NT]	[NT]	[NT]	100	[NT]
Nickel - Total	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	99	[NT]
Zinc - Total	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	98	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

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

Note: All samples analysed as received. However, samples 250828-15, 29, 32, 39, 40, 41 are below the minimum 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

Acid Extractable Metals in Soil:
-The laboratory RPD acceptance criteria has been exceeded for 250828-2 for Cu,Pb,Zn and Fe. Therefore a triplicate result has been issued as laboratory sample number 250828-48.
-# Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Envirolab Services Pty Ltd
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ph 02 9910 6200   fax 02 9910 6201
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SAMPLE RECEIPT ADVICE

Client Details	
Client	Consulting Earth Scientists Pty Ltd
Attention	Andrew Carras

Sample Login Details	
Your reference	CES200502-PHB
Envirolab Reference	250828
Date Sample Received	09/09/2020
Date Instructions Received	09/09/2020
Date Results Expected to be Reported	16/09/2020

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	46 Soil, 1 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	9.3
Cooling Method	Ice, Ice pack
Sampling Date Provided	YES

Comments
Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	sPOCAS + %S w/w	Asbestos ID - soils NEPM - ASB-001	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHsin Water	HM in water - dissolved	On Hold
SB7/0.1											✓
SB7/0.5	✓	✓	✓	✓							
SB8/0.1											✓
SB9/0.1	✓	✓	✓	✓		✓					
SB9/0.5											✓
SB10/0.1	✓	✓	✓	✓		✓					
SB11/0.1	✓	✓	✓	✓		✓					
SB12/0.1											✓
SB12/0.5											✓
SB12/1.0											✓
SB12/1.5	✓	✓	✓	✓							
SB12/2.0											✓
SB13/0.1											✓
SB13/0.5											✓
SB13/1.0	✓	✓	✓	✓		✓					
SB13/1.5											✓
SB13/2.0											✓
SB13/2.5											✓
SB14/0.1											✓
SB14/0.5											✓
SB14/1.0	✓	✓	✓	✓							
SB14/1.5											✓
SB15/0.1											✓
SB15/0.5	✓	✓	✓	✓		✓					
SB15/1.0											✓
SB15/2.0											✓
SB16/0.1											✓
SB16/0.5											✓
SB16/1.0	✓	✓	✓	✓		✓					
SB16/1.5											✓
SB16/2.0											✓
SB17/0.1	✓	✓	✓	✓		✓					

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	sPOCAS + %S w/w	Asbestos ID - soils NEPM - ASB-001	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHsin Water	HM in water - dissolved	On Hold
SB17/0.5											✓
QS3											✓
QS3A											✓
QS4											✓
QS4A											✓
G1											✓
G2	✓	✓	✓	✓		✓					
G3	✓	✓	✓	✓		✓					
G4	✓	✓	✓	✓		✓					
MW2/1.0	✓	✓	✓	✓	✓						
MW3/3.0	✓	✓	✓	✓	✓						
MW3/10.0											✓
RB1							✓	✓	✓	✓	
TS	✓										
TB	✓	✓	✓	✓							

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

Additional Info

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

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

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

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

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP - National phone number 1300 42 43 44

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph 03 9763 2500 / melbourne@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph 07 3266 9532 / brisbane@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 0406 350 706 / adelaide@envirolab.com.au

Client: Consulting Earth Scientists	Client Project Name / Number / Site etc (ie report title): CES200502-PHB
Contact Person: A.Carras	PO No.:
Project Mgr: A.Carras	Envirolab Quote No. :
Sampler: A.Carras	Date results required: Or choose: **standard** / same day / 1 day / 2 day / 3 day *Note: Inform lab in advance if urgent turnaround is required - surcharges apply*
Address: Level 1 Suite 3, 55-65 Grandview Street, Pymble NSW	
Phone: (02) 8569 2200 Mob: 0497 018 918	Report format: esdat / equis /
Email: andrew.carras@consultingearth.com.au	Lab Comments:

Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Combo 3a (NEPM WA Asb)	Combination 3	vTRH/BTEX	NEPM 2013 - Soil Characteristics	SPOCAS	Hold	Comments: Provide as much information about the sample as you can
1	SB7/0.1		8/09/2020	Soil						X	1 chem, 1 asb
2	SB7/0.5		8/09/2020	Soil		X					1 chem
3	SB8/0.1		8/09/2020	Soil						X	1 chem
NR	SB8/0.5		8/09/2020	Soil		X					1 chem
4	SB9/0.1		8/09/2020	Soil	X						1 chem, 1asb
5	SB9/0.5		8/09/2020	Soil						X	1 chem
6	SB10/0.1		8/09/2020	Soil	X						1 chem, 1 asb
7	SB11/0.1		8/09/2020	Soil	X						1 chem, 1 asb
8	SB12/0.1		8/09/2020	Soil						X	1 chem, 1 asb
9	SB12/0.5		8/09/2020	Soil						X	1 chem, 1 asb
10	SB12/1.0		8/09/2020	Soil						X	1 chem
11	SB12/1.5		8/09/2020	Soil		X					1 chem
12	SB12/2.0		8/09/2020	Soil						X	1 chem
13	SB13/0.1		8/09/2020	Soil						X	1 chem, 1 asb
14	SB13/0.5		8/09/2020	Soil						X	1 chem, 1 asb
15	SB13/1.0		8/09/2020	Soil	X						1 chem, 1 asb
16	SB13/1.5		8/09/2020	Soil						X	1 chem
17	SB13/2.0		8/09/2020	Soil						X	1 chem
18	SB13/2.5		8/09/2020	Soil						X	1 chem
19	SB14/0.1		8/09/2020	Soil						X	1 cehm, 1 asb
20	SB14/0.5		8/09/2020	Soil						X	1 chem
21	SB14/1.0		8/09/2020	Soil		X					1 chem
22	SB14/1.5		8/09/2020	Soil						X	1 chem
23	SB15/0.1		8/09/2020	Soil						X	1 chem, 1 asb
24	SB15/0.5		8/09/2020	Soil	X						1 chem, 1 asb
25	SB15/1.0		8/09/2020	Soil						X	1 chem, 1 asb
NR	SB15/1.5		8/09/2020	Soil						X	1 chem
26	SB15/2.0		8/09/2020	Soil						X	1 chem
27	SB16/0.1		8/09/2020	Soil						X	1 chem, 1 asb
28	SB16/0.5		8/09/2020	Soil						X	1 chem, 1 asb
29	SB16/1.0		8/09/2020	Soil	X						1 chem, 1-asb
30	SB16/1.5		8/09/2020	Soil						X	1 chem
31	SB16/2.0		8/09/2020	Soil						X	1 chem
32	SB17/0.1		8/09/2020	Soil	X						1 chem, 1 asb
33	SB17/0.5		8/09/2020	Soil						X	1 chem
34	QS3		8/09/2020	Soil						X	1 chem
35	QS3A		8/09/2020	Soil						X	1 chem
36	QS4		8/09/2020	Soil						X	1 chem
37	QS4A		8/09/2020	Soil						X	1 chem
38	G1		7/08/2020	Soil						X	1 chem, 1 asb
39	G2		7/08/2020	Soil	X						1 chem, 1 asb
40	G3		8/09/2020	Soil	X						1 chem, 1 asb
41	G4		8/09/2020	Soil	X						1 chem, 1 asb
42	MW2/1.0		7/08/2020	Soil		X			X		1 chem, 1 ASS
43	MW3/3.0		8/09/2020	Soil		X			X		1 chem, 1 ASS
44	MW3/10.0		8/09/2020	Soil						X	1 ASS
45	RB1		8/09/2020	Water		X					Total Metals
46	TS		7/08/2020	Soil			X				
47	TB		7/08/2020	Soil		X					

Relinquished by (Company): CES	Received by (Company): ELS	*Lab use only:*
Print Name: A.Carras	Print Name: Michael Opie	Samples Received: Cool or Ambient (circle one)
Date & Time: 9-Sep-20	Date & Time: 9.9.20 1100	Temperature Received at: 9.3 (if applicable)
Signature:	Signature:	Transported by: Hand delivered / courier

White - Lab copy / Blue - Client copy / Pink - Retain in Book Page No:

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

Job No: 250828
Date Received: 9.9.20
Time Received: 1100
Received By: MO
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

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CERTIFICATE OF ANALYSIS 254263

Client Details	
Client	Consulting Earth Scientists Pty Ltd
Attention	Andrew Carras
Address	Suite 3, Level 1, 55 Grandview Street, Pymble, NSW, 2073

Sample Details	
Your Reference	CES200502-PHB
Number of Samples	4 Soil
Date samples received	26/10/2020
Date completed instructions received	27/10/2020

Analysis Details

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

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

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

Report Details	
Date results requested by	02/11/2020
Date of Issue	30/10/2020

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

Results Approved By
Dragana Tomas, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor
Josh Williams, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		254263-1	254263-2	254263-3
Your Reference	UNITS	MW5	MW4	QS5
Depth		0.5	1.0	-
Date Sampled		22/10/2020	23/10/2020	22/10/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	28/10/2020	28/10/2020	28/10/2020
Date analysed	-	29/10/2020	29/10/2020	29/10/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	83	83	112

svTRH (C10-C40) in Soil				
Our Reference		254263-1	254263-2	254263-3
Your Reference	UNITS	MW5	MW4	QS5
Depth		0.5	1.0	-
Date Sampled		22/10/2020	23/10/2020	22/10/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	28/10/2020	28/10/2020	28/10/2020
Date analysed	-	28/10/2020	29/10/2020	29/10/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50
Surrogate o-Terphenyl	%	77	80	79

PAHs in Soil				
Our Reference		254263-1	254263-2	254263-3
Your Reference	UNITS	MW5	MW4	QS5
Depth		0.5	1.0	-
Date Sampled		22/10/2020	23/10/2020	22/10/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	28/10/2020	28/10/2020	28/10/2020
Date analysed	-	28/10/2020	28/10/2020	28/10/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	98	103	103

Acid Extractable metals in soil				
Our Reference		254263-1	254263-2	254263-3
Your Reference	UNITS	MW5	MW4	QS5
Depth		0.5	1.0	-
Date Sampled		22/10/2020	23/10/2020	22/10/2020
Type of sample		Soil	Soil	Soil
Date prepared	-	28/10/2020	28/10/2020	28/10/2020
Date analysed	-	28/10/2020	28/10/2020	28/10/2020
Arsenic	mg/kg	<4	7	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	36	29	35
Copper	mg/kg	18	24	18
Lead	mg/kg	11	11	11
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	7	29	8
Zinc	mg/kg	17	50	18

Moisture				
Our Reference		254263-1	254263-2	254263-3
Your Reference	UNITS	MW5	MW4	QS5
Depth		0.5	1.0	-
Date Sampled		22/10/2020	23/10/2020	22/10/2020
Type of sample		Soil	Soil	Soil
Date prepared	-	28/10/2020	28/10/2020	28/10/2020
Date analysed	-	29/10/2020	29/10/2020	29/10/2020
Moisture	%	29	49	29

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-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			28/10/2020	[NT]	[NT]	[NT]	[NT]	28/10/2020	[NT]
Date analysed	-			29/10/2020	[NT]	[NT]	[NT]	[NT]	29/10/2020	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	95	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	95	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	113	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	93	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	74	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	98	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	94	[NT]	[NT]	[NT]	[NT]	94	[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	-			28/10/2020	[NT]	[NT]	[NT]	[NT]	28/10/2020	[NT]
Date analysed	-			28/10/2020	[NT]	[NT]	[NT]	[NT]	28/10/2020	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	96	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	96	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	96	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	96	[NT]
Surrogate o-Terphenyl	%		Org-020	86	[NT]	[NT]	[NT]	[NT]	75	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			28/10/2020	[NT]	[NT]	[NT]	[NT]	28/10/2020	[NT]
Date analysed	-			28/10/2020	[NT]	[NT]	[NT]	[NT]	28/10/2020	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	116	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	97	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	101	[NT]	[NT]	[NT]	[NT]	108	[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	-			28/10/2020	[NT]	[NT]	[NT]	[NT]	28/10/2020	[NT]
Date analysed	-			28/10/2020	[NT]	[NT]	[NT]	[NT]	28/10/2020	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	102	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	97	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Consulting Earth Scientists Pty Ltd
Attention	Andrew Carras

Sample Login Details	
Your reference	CES200502
Envirolab Reference	254263
Date Sample Received	26/10/2020
Date Instructions Received	26/10/2020
Date Results Expected to be Reported	On Hold

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	4 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	3.4
Cooling Method	Ice
Sampling Date Provided	YES

Comments
Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils	On Hold
MW5-0.5									✓
MW4-1.0									✓
QS5									✓
QS5A									✓

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

Additional Info
Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Updated CoC.

ENVIROLAB

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP - National phone number 1300 42 43 44

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph 03 9763 2500 / melbourne@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph 07 3266 9532 / brisbane@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 0406 350 706 / adelaide@envirolab.com.au

Client: Consulting Earth Scientists
Contact Person: A.Carras
Project Mgr: A.Carras
Sampler: A.Carras
Address: Level 1 Suite 3, 55-65 Grandview Street, Pymble NSW
Phone: (02) 8569 2200 **Mob:** 0497 018 918
Email: andrew.carras@consultingearth.com.au

Client Project Name / Number / Site etc (ie report title): CES200502-PHB
PO No.:
Envirolab Quote No. :
Date results required:
Or choose: standard / same day / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharges apply
Report format: esdat / equis /
Lab Comments:

Sample information					Tests Required														Comments
Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Combo 3a (NEPM WA Asb)	Combination 3	vTRH/BTEX	NEPM 2013 - Soil Characteristics	SPOCAS									Hold	Provide as much information about the sample as you can
2	MW4/1.0		23/10/2020	Soil		X													
1	MW5/0.5		22/10/2020	Soil		X													
3	QS5		22/10/2020	Soil		X													
ALS	QS5A		22/10/2020	Soil		X													Send to ALS

Relinquished by (Company): CES
Print Name: A.Carras
Date & Time: 27-Oct-20
Signature:

Received by (Company): ELS Sydney
Print Name:
Date & Time: 26/10/2020 15:05
Signature:

Lab use only:
Samples Received: Cool or Ambient (circle one)
Temperature Received at: 3.4 (if applicable)
Transported by: Hand delivered / courier

White - Lab copy / Blue - Client copy / Pink - Retain in Book Page No:

CoC 27/10/2020 08:52

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP

ENVIROLAB GROUP - National phone number 1300 42 43 44

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph 03 9763 2500 / melbourne@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph 07 3266 9532 / brisbane@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 0406 350 706 / adelaide@envirolab.com.au

Client: [redacted] CONSULTING EARTH

Contact Person: [redacted] A. CARRAS

Project Mgr: [redacted] A. CARRAS

Sampler: [redacted] A CARRAS

Address: Level 1 Suite 3, 55-65 Grandview Street, Pymble NSW

Phone: **Mob:** 0403 273 626

Email: [redacted]
andrew.carras@consultingearth.com.au
[redacted]

Client Project Name / Number / Site etc (ie report title): [redacted]

PO No.: CES200502

Envirolab Quote No. :

Date results required: [redacted]

Or choose: standard / same day / 1 day / 2 day / 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Report format: esdat / equis /

Lab Comments:

Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	~~Asbestos~~	HOLD	Comments: Provide as much information about the sample as you can
1	~~QS5~~ MW5/0.5	0.5	22/10/20	Soil	X	X	
2	MW4/~~...~~ 1.0	1.0	23/10/20			X	
3	QS5	–	22/10/20			X	
4	QS5A	–	22/10/20			X	

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 254263
Date Received: 26.10.2020
Time Received: 15:05
Received By: KG
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by (Company): Consulting Earth Scientists
Print Name: ANDREW CARRAS
Date & Time: 26/10/20
Signature:

Received by (Company): ELS Syd
Print Name: K. Gore
Date & Time: 26.10.2020 15:05
Signature:

Lab use only:
Samples Received: Cool or Ambient (circle one)
Temperature Received at: 3.4 (if applicable)
Transported by: Hand delivered / courier

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2031890**	Page	: 1 of 6
Client	: **CONSULTING EARTH SCIENTISTS**	Laboratory	: Environmental Division Sydney
Contact	: ANDREW CARRAS	Contact	: Customer Services ES
Address	: Suite 3, Level 1 55-65 Grandview Street PYMBLE NSW, AUSTRALIA 2073	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: CES200502-PHB	Date Samples Received	: 09-Sep-2020 17:00
Order number	: ----	Date Analysis Commenced	: 11-Sep-2020
C-O-C number	: ----	Issue Date	: 16-Sep-2020 13:49
Sampler	: ANDREW CARRAS		
Site	: ----		
Quote number	: SYBQ/521/16		
No. of samples received	: 1		
No. of samples analysed	: 1		

ilac-MRA NATA

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	QS2A	----	----	----	----
			Client sampling date / time	01-Sep-2020 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2031890-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**13.1**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**10**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**8**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**8**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**6**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**20**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----

Analytical Results

Sub-Matrix: SOIL
(Matrix: SOIL)

Compound	CAS Number	LOR	Unit	QS2A	----	----	----	----
Client sampling date / time				01-Sep-2020 00:00	----	----	----	----
				ES2031890-001	--------	--------	--------	--------
				Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
C10 - C14 Fraction	----	50	mg/kg	<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg	<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg	<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg	<50	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg	<0.2	----	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg	<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**93.9**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**89.4**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**74.7**	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**97.8**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	**97.7**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**96.4**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**81.0**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	**80.1**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	QS2A	----	----	----	----
			Client sampling date / time	01-Sep-2020 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2031890-001	--------	--------	--------	--------
				Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	0.2	%	81.4	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2031890**

Client	: **CONSULTING EARTH SCIENTISTS**	Laboratory	: Environmental Division Sydney
Contact	: ANDREW CARRAS	Contact	: Customer Services ES
Address	: Suite 3, Level 1 55-65 Grandview Street PYMBLE NSW, AUSTRALIA 2073	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: andrew.carras@consultingearth.com.au	E-mail	: ALSEnviro.Sydney@ALSGlobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CES200502-PHB	Page	: 1 of 2
Order number	: ----	Quote number	: ES2017CONEAR0001 (SYBQ/521/16)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: ANDREW CARRAS		

Dates

Date Samples Received	: 09-Sep-2020 17:00	Issue Date	: 09-Sep-2020
Client Requested Due Date	: 17-Sep-2020	Scheduled Reporting Date	: **17-Sep-2020**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 7.6'C - Ice Bricks present
Receipt Detail	: ESKY	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	SOIL - EA055-103 Moisture Content	SOIL - S-26 8 metals/TRH/BTEXN/PAH
ES2031890-001	01-Sep-2020 00:00	QS2A	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ANDREW CARRAS

- *AU Certificate of Analysis - NATA (COA)	Email	andrew.carras@consultingearth.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	andrew.carras@consultingearth.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	andrew.carras@consultingearth.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	andrew.carras@consultingearth.com.au
- A4 - AU Tax Invoice (INV)	Email	andrew.carras@consultingearth.com.au
- Chain of Custody (CoC) (COC)	Email	andrew.carras@consultingearth.com.au
- EDI Format - ENMRG (ENMRG)	Email	andrew.carras@consultingearth.com.au
- EDI Format - ESDAT (ESDAT)	Email	andrew.carras@consultingearth.com.au

KAY LOWE

- A4 - AU Tax Invoice (INV)	Email	kay.lowe@consultingearth.com.au

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2031890**	Page	: 1 of 4
Client	: **CONSULTING EARTH SCIENTISTS**	Laboratory	: Environmental Division Sydney
Contact	: ANDREW CARRAS	Telephone	: +61-2-8784 8555
Project	: CES200502-PHB	Date Samples Received	: 09-Sep-2020
Site	: ----	Issue Date	: 16-Sep-2020
Sampler	: ANDREW CARRAS	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055) QS2A	**01-Sep-2020**	**----**	----	----	**11-Sep-2020**	15-Sep-2020	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) QS2A	**01-Sep-2020**	**11-Sep-2020**	28-Feb-2021	✓	**14-Sep-2020**	28-Feb-2021	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) QS2A	**01-Sep-2020**	**11-Sep-2020**	29-Sep-2020	✓	**14-Sep-2020**	29-Sep-2020	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) QS2A	**01-Sep-2020**	**11-Sep-2020**	15-Sep-2020	✓	**14-Sep-2020**	21-Oct-2020	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071) QS2A	**01-Sep-2020**	**11-Sep-2020**	15-Sep-2020	✓	**11-Sep-2020**	21-Oct-2020	✓
Soil Glass Jar - Unpreserved (EP080) QS2A	**01-Sep-2020**	**11-Sep-2020**	15-Sep-2020	✓	**14-Sep-2020**	15-Sep-2020	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP071) QS2A	**01-Sep-2020**	**11-Sep-2020**	15-Sep-2020	✓	**11-Sep-2020**	21-Oct-2020	✓
Soil Glass Jar - Unpreserved (EP080) QS2A	**01-Sep-2020**	**11-Sep-2020**	15-Sep-2020	✓	**14-Sep-2020**	15-Sep-2020	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) QS2A	**01-Sep-2020**	**11-Sep-2020**	15-Sep-2020	✓	**14-Sep-2020**	15-Sep-2020	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Updated COC 09/09/2020 10:00

CHAIN OF CUSTODY - Client

ENVIROLAB

ENVIROLAB GROUP - National phone number 1300 42 43 44

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph 03 9763 2500 / melbourne@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph 07 3266 9532 / brisbane@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 0406 350 706 / adelaide@envirolab.com.au

Client: Consulting Earth Scientists
Contact Person: A.Carras
Project Mgr: A.Carras
Sampler: A.Carras
Address: Level 1 Suite 3, 55-65 Grandview Street, Pymble NSW
Phone: (02) 8569 2200 Mob: 0492 018 918
Email: andrew.carras@consultingearth.com.au

Client Project Name / Number / Site etc (ie report title): CES200802-PHB
PO No.:
Envirolab Quote No. :
Date results required:
Or choose: standard / same day / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharges apply
Report format: esdat / equis /
Lab Comments: 250813.

Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Combo 3a (NEPM WA Asb)	Combination 3	VTRH/BTEX	NEPM 2013 - Soil Characteristics	SPOCAS	Hold	Comments: Provide as much information about the sample as you can
1	SB1/0.1		1/09/2020	Soil						X	1 chem, 1 asb
2	SB1/0.5		1/09/2020	Soil						X	1 chem, 1 asb
3	SB1/1.0		1/09/2020	Soil						X	1 chem, 1 asb
4	SB1/1.5		1/09/2020	Soil						X	1 chem, 1 asb
5	SB1/2.0		1/09/2020	Soil	X						1 chem
6	SB1/2.5		1/09/2020	Soil						X	1 chem
7	SB1/3.0		1/09/2020	Soil						X	1 chem
8	SB2/0.1		1/09/2020	Soil						X	1 chem, 1 asb
9	SB2/0.5		1/09/2020	Soil	X						1 chem, 1 asb
10	SB2/1.0		1/09/2020	Soil						X	1 chem
11	SB2/1.5		1/09/2020	Soil						X	1 chem
12	SB2/2.0		1/09/2020	Soil						X	1 chem
13	SB2/2.5		1/09/2020	Soil						X	1 chem
14	SB2/3.0		1/09/2020	Soil						X	1 chem
15	SB3/0.1		1/09/2020	Soil						X	1 chem, 1 asb
16	SB3/0.5		1/09/2020	Soil	X						1 chem, 1 asb
17	SB3/1.0		1/09/2020	Soil						X	1 chem
18	SB3/1.5		1/09/2020	Soil						X	1 chem
19	SB3/2.0		1/09/2020	Soil						X	1 chem
20	SB3/2.5		1/09/2020	Soil						X	1 chem
21	SB4/0.1		1/09/2020	Soil						X	1 chem, 1 asb
22	SB4/0.5		1/09/2020	Soil						X	1 chem, 1 asb
23	SB4/1.0		1/09/2020	Soil		X					1 chem
24	SB4/1.5		1/09/2020	Soil						X	1 chem
25	SB4/2.0		1/09/2020	Soil						X	1 chem
26	SB4/2.5		1/09/2020	Soil						X	1 chem
27	SB5/0.1		1/09/2020	Soil						X	1 chem, 1 asb
28	SB5/0.5		1/09/2020	Soil		X					1 chem, 1 asb
29	SB5/1.0		1/09/2020	Soil						X	1 chem
30	SB5/1.5		1/09/2020	Soil						X	1 chem
31	SB5/2.0		1/09/2020	Soil						X	1 chem
32	SB5/2.5		1/09/2020	Soil						X	1 chem
33	SB6/0.1		1/09/2020	Soil	X						1 chem, 1 asb
34	SB6/0.5		1/09/2020	Soil						X	1 chem
35	SB6/1.0		1/09/2020	Soil						X	1 chem
36	SB6/1.5		1/09/2020	Soil						X	1 chem
37	SB6/2.0		1/09/2020	Soil						X	1 chem
38	SB6/2.5		1/09/2020	Soil						X	1 chem
[redacted]	[redacted]		1/09/2020	Soil	X						[redacted]
[redacted]	[redacted]		1/09/2020	Soil	X						[redacted], 1 a
[redacted]	[redacted]		31/08/2020	Soil		X					1 chem

Relinquished by (Company):	CES	ELS	Received by (Company):
Print Name:	A.Carras	Ma	Print Name:
Date & Time:	9-Sep-20	9/9/1010	Date & Time: 9/9/20
Signature:			Signature:

Lab use only
Samples Received: Cool or Ambient (circle one)
Temperature Received at: (if applicable)
Transported by: Hand delivered / courier

White - Lab copy / Blue - Client copy / Pink - Retain in Book

Page No:

Environmental Division
Sydney
Work Order Reference
ES2031890

Telephone : + 61-2-8784 8555

Form: 302 - Chain of Custody-Client, Issued 22/06/12, Version 5, Page 1 of 1.

CERTIFICATE OF ANALYSIS

Work Order	: **ES2037708**	Page	: 1 of 6
Client	: **CONSULTING EARTH SCIENTISTS**	Laboratory	: Environmental Division Sydney
Contact	: ANDREW CARRAS	Contact	: Customer Services ES
Address	: Suite 3, Level 1 55-65 Grandview Street PYMBLE NSW, AUSTRALIA 2073	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: CES200502-PHB	Date Samples Received	: 27-Oct-2020 14:00
Order number	: ----	Date Analysis Commenced	: 28-Oct-2020
C-O-C number	: ----	Issue Date	: 03-Nov-2020 14:11
Sampler	: ANDREW CARRAS		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL**)

Compound	CAS Number	LOR	Unit	QS5A	----	----	----	----
			Client sampling date / time	22-Oct-2020 00:00	----	----	----	----
				ES2037708-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**27.8**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**8**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**34**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**18**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**12**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**7**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**17**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----

Analytical Results

Sub-Matrix: **SOIL**
(Matrix: **SOIL)**

Compound	CAS Number	LOR	Unit	QS5A	----	----	----	----
			Client sample ID	**QS5A**	----	----	----	----
			Client sampling date / time	22-Oct-2020 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES2037708-001**	--------	--------	--------	--------
				Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
C10 - C14 Fraction	----	50	mg/kg	<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg	<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg	<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg	<50	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg	<0.2	----	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg	<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**93.7**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**99.6**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**83.6**	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**110**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	**110**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**98.8**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**90.1**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	**91.7**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	QS5A	----	----	----	----
			Client sampling date / time	22-Oct-2020 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2037708-001	--------	--------	--------	--------
				Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	0.2	%	103	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **ES2037708**		
Client	: **CONSULTING EARTH SCIENTISTS**	Laboratory	: Environmental Division Sydney
Contact	: ANDREW CARRAS	Contact	: Customer Services ES
Address	: Suite 3, Level 1 55-65 Grandview Street PYMBLE NSW, AUSTRALIA 2073	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: andrew.carras@consultingearth.com.au	E-mail	: ALSEnviro.Sydney@ALSGlobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CES200502-PHB	Page	: 1 of 2
Order number	: ----	Quote number	: ES2020CONEAR0002 (EN/333)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: ANDREW CARRAS		

Dates

Date Samples Received	: 27-Oct-2020 14:00	Issue Date	: 28-Oct-2020
Client Requested Due Date	: 03-Nov-2020	Scheduled Reporting Date	: **03-Nov-2020**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 8.9 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	SOIL - EA055-103 Moisture Content	SOIL - S-26 8 metals/TRH/BTEXN/PAH
ES2037708-001	22-Oct-2020 00:00	QS5A	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ANDREW CARRAS

- *AU Certificate of Analysis - NATA (COA)	Email	andrew.carras@consultingearth.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	andrew.carras@consultingearth.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	andrew.carras@consultingearth.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	andrew.carras@consultingearth.com.au
- A4 - AU Tax Invoice (INV)	Email	andrew.carras@consultingearth.com.au
- Chain of Custody (CoC) (COC)	Email	andrew.carras@consultingearth.com.au
- EDI Format - ESDAT (ESDAT)	Email	andrew.carras@consultingearth.com.au
- EDI Format - XTab (XTAB)	Email	andrew.carras@consultingearth.com.au

KAY LOWE

- A4 - AU Tax Invoice (INV)	Email	kay.lowe@consultingearth.com.au

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2037708**	Page	: 1 of 4
Client	: **CONSULTING EARTH SCIENTISTS**	Laboratory	: Environmental Division Sydney
Contact	: ANDREW CARRAS	Telephone	: +61-2-8784 8555
Project	: CES200502-PHB	Date Samples Received	: 27-Oct-2020
Site	: ----	Issue Date	: 03-Nov-2020
Sampler	: ANDREW CARRAS	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055) QS5A	**22-Oct-2020**	**----**	----	----	**02-Nov-2020**	05-Nov-2020	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) QS5A	**22-Oct-2020**	**02-Nov-2020**	20-Apr-2021	✓	**02-Nov-2020**	20-Apr-2021	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) QS5A	**22-Oct-2020**	**02-Nov-2020**	19-Nov-2020	✓	**03-Nov-2020**	19-Nov-2020	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) QS5A	**22-Oct-2020**	**30-Oct-2020**	05-Nov-2020	✓	**31-Oct-2020**	09-Dec-2020	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) QS5A	**22-Oct-2020**	**28-Oct-2020**	05-Nov-2020	✓	**02-Nov-2020**	05-Nov-2020	✓
Soil Glass Jar - Unpreserved (EP071) QS5A	**22-Oct-2020**	**30-Oct-2020**	05-Nov-2020	✓	**31-Oct-2020**	09-Dec-2020	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) QS5A	**22-Oct-2020**	**28-Oct-2020**	05-Nov-2020	✓	**02-Nov-2020**	05-Nov-2020	✓
Soil Glass Jar - Unpreserved (EP071) QS5A	**22-Oct-2020**	**30-Oct-2020**	05-Nov-2020	✓	**31-Oct-2020**	09-Dec-2020	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) QS5A	**22-Oct-2020**	**28-Oct-2020**	05-Nov-2020	✓	**02-Nov-2020**	05-Nov-2020	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Updated COC.

CHAIN OF CUSTODY - Client

ENVIROLAB

ENVIROLAB GROUP - National phone number 1300 42 43 44

Client: Consulting Earth Scientists	Client Project Name / Number / Site etc (ie report title): CES200502-PHS
Contact Person: A.Carras	PO No.:
Project Mgr: A.Carras	Envirolab Quote No. :
Sampler: A.Carras	Date results required:
Address: Level 1 Suite 3, 55-65 Grandview Street, Pymble NSW	Or choose: **standard** / same day / 1 day / 2 day / 3 day Note: Inform lab in advance if urgent turnaround is required - surcharges apply
Phone: (02) 9988 1200 Mob: 0487 018 938	Report format: esdat / equis /
Email: andrew.carras@consultingearth.com.au	Lab Comments:

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Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 0406 350 706 / adelaide@envirolab.com.au

Sample information					Tests Required						Comments
Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Combo 3a (NEPM WA Asb)	Combination 3	vTRH/BTEX	NEPM 2013 - Soil Characteristics	SPOCAS	Hold	Provide as much information about the sample as you can
2	MW4/1.0		23/10/2020	Soil		X					
1	MW5/0.5		22/10/2020	Soil		X					
3	QS5		22/10/2020	Soil		X					
ALS	QS5A		22/10/2020	Soil		X					Send to ALS

Relinquished by (Company): CES ELS	Received by (Company): ELS Sydney	Lab use only:
Print Name: A.Carras MW	Print Name:	Samples Received: Cool or Ambient (circle one)
Date & Time: 27-Oct-20 27/10/2020	Date & Time: 26/10/2020 15:05	Temperature Received at: 3.4 (if applicable)
Signature:	Signature:	Transported by: Hand delivered / courier

254263

White - Lab copy / Blue - Client copy / Pink - Retain in Book Page No:

COC 27/10/2020 08:52

Rec:- SOSftho
27/10/20 1400
8.9 C

Environmental Division
Sydney
Work Order Reference
ES2037708

Telephone : + 61-2-8784 8555

Form: 302 - Chain of Custody-Client, Issued 22/06/12, Version 5, Page 1 of 1.

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ph 02 9910 6200 fax 02 9910 6201
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www.envirolab.com.au

CERTIFICATE OF ANALYSIS 249813

Client Details

Client	Consulting Earth Scientists Pty Ltd
Attention	Andrew Carras
Address	Suite 3, Level 1, 55 Grandview Street, Pymble, NSW, 2073

Sample Details

Your Reference	**CES200502-PHB**
Number of Samples	11 Sediment, 1 Water
Date samples received	26/08/2020
Date completed instructions received	26/08/2020

Analysis Details

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

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

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

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

Report Details

Date results requested by	02/09/2020
Date of Issue	02/09/2020

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Results Approved By
Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor
Josh Williams, Senior Chemist
Loren Bardwell, Senior Chemist
Manju Dewendrage, Chemist
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

TRH in Soil (C6-C9) NEPM						
Our Reference		249813-1	249813-2	249813-3	249813-4	249813-5
Your Reference	UNITS	S1	S2	S3	S4	S5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date extracted	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
Surrogate aaa-Trifluorotoluene	%	70	71	71	75	82

TRH in Soil (C6-C9) NEPM						
Our Reference		249813-6	249813-7	249813-8	249813-9	249813-10
Your Reference	UNITS	S6	S7	S8	S9	S10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date extracted	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
Surrogate aaa-Trifluorotoluene	%	83	79	79	70	78

TRH in Soil (C6-C9) NEPM		
Our Reference		249813-11
Your Reference	UNITS	QS1
Date Sampled		25/08/2020
Type of sample		Sediment
Date extracted	-	28/08/2020
Date analysed	-	28/08/2020
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
Surrogate aaa-Trifluorotoluene	%	75

svTRH (C10-C40) in Soil						
Our Reference		249813-1	249813-2	249813-3	249813-4	249813-5
Your Reference	UNITS	S1	S2	S3	S4	S5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date extracted	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	90	118	82	100	84

svTRH (C10-C40) in Soil						
Our Reference		249813-6	249813-7	249813-8	249813-9	249813-10
Your Reference	UNITS	S6	S7	S8	S9	S10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date extracted	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	88	80	81	87	84

svTRH (C10-C40) in Soil		
Our Reference		249813-11
Your Reference	UNITS	QS1
Date Sampled		25/08/2020
Type of sample		Sediment
Date extracted	-	28/08/2020
Date analysed	-	29/08/2020
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_{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	%	95

PAHs in Soil - Low Level						
Our Reference		249813-1	249813-2	249813-3	249813-4	249813-5
Your Reference	UNITS	S1	S2	S3	S4	S5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date extracted	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Date analysed	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Naphthalene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b,j+k)fluoranthene	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)pyrene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(g,h,i)perylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Total +ve PAH's	mg/kg	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	94	96	95	102	95

PAHs in Soil - Low Level						
Our Reference		249813-6	249813-7	249813-8	249813-9	249813-10
Your Reference	UNITS	S6	S7	S8	S9	S10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date extracted	-	31/08/2020	31/08/2020	28/08/2020	31/08/2020	31/08/2020
Date analysed	-	31/08/2020	31/08/2020	28/08/2020	31/08/2020	31/08/2020
Naphthalene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b,j+k)fluoranthene	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)pyrene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(g,h,i)perylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Total +ve PAH's	mg/kg	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	91	95	118	94	98

PAHs in Soil - Low Level		
Our Reference		249813-11
Your Reference	UNITS	QS1
Date Sampled		25/08/2020
Type of sample		Sediment
Date extracted	-	31/08/2020
Date analysed	-	31/08/2020
Naphthalene	mg/kg	<0.01
Acenaphthylene	mg/kg	<0.01
Acenaphthene	mg/kg	<0.01
Fluorene	mg/kg	<0.01
Phenanthrene	mg/kg	<0.01
Anthracene	mg/kg	<0.01
Fluoranthene	mg/kg	<0.01
Pyrene	mg/kg	<0.01
Benzo(a)anthracene	mg/kg	<0.01
Chrysene	mg/kg	<0.01
Benzo(b,j+k)fluoranthene	mg/kg	<0.02
Benzo(a)pyrene	mg/kg	<0.01
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.01
Dibenzo(a,h)anthracene	mg/kg	<0.01
Benzo(g,h,i)perylene	mg/kg	<0.01
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.05
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.05
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.05
Total +ve PAH's	mg/kg	NIL (+)VE
Surrogate p-Terphenyl-d14	%	92

Acid Extractable metals in soil						
Our Reference		249813-1	249813-2	249813-3	249813-4	249813-5
Your Reference	UNITS	S1	S2	S3	S4	S5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date prepared	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Arsenic	mg/kg	8	8	11	11	11
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	44	48	47	48	42
Copper	mg/kg	20	23	26	25	22
Lead	mg/kg	13	15	14	14	14
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	26	28	31	31	27
Zinc	mg/kg	70	78	57	58	68

Acid Extractable metals in soil						
Our Reference		249813-6	249813-7	249813-8	249813-9	249813-10
Your Reference	UNITS	S6	S7	S8	S9	S10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date prepared	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Arsenic	mg/kg	8	8	11	7	10
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	40	38	37	51	44
Copper	mg/kg	26	24	21	23	22
Lead	mg/kg	11	12	14	16	15
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	30	28	27	29	26
Zinc	mg/kg	56	55	65	82	78

Acid Extractable metals in soil		
Our Reference		249813-11
Your Reference	UNITS	QS1
Date Sampled		25/08/2020
Type of sample		Sediment
Date prepared	-	28/08/2020
Date analysed	-	28/08/2020
Arsenic	mg/kg	9
Cadmium	mg/kg	<0.4
Chromium	mg/kg	43
Copper	mg/kg	20
Lead	mg/kg	13
Mercury	mg/kg	<0.1
Nickel	mg/kg	26
Zinc	mg/kg	65

Moisture						
Our Reference		249813-1	249813-2	249813-3	249813-4	249813-5
Your Reference	UNITS	S1	S2	S3	S4	S5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date prepared	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Moisture	%	76	79	66	71	78

Moisture						
Our Reference		249813-6	249813-7	249813-8	249813-9	249813-10
Your Reference	UNITS	S6	S7	S8	S9	S10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date prepared	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Moisture	%	62	63	72	75	79

Moisture		
Our Reference		249813-11
Your Reference	UNITS	QS1
Date Sampled		25/08/2020
Type of sample		Sediment
Date prepared	-	28/08/2020
Date analysed	-	31/08/2020
Moisture	%	78

Misc Inorg - Soil						
Our Reference		249813-1	249813-2	249813-3	249813-4	249813-5
Your Reference	UNITS	S1	S2	S3	S4	S5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date prepared	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Date analysed	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
pH 1:5 soil:water	pH Units	5.1	5.1	5.5	5.7	4.9
Total Organic Carbon (Combustion)	mg/kg	31,000	37,000	26,000	23,000	46,000

Misc Inorg - Soil						
Our Reference		249813-6	249813-7	249813-8	249813-9	249813-10
Your Reference	UNITS	S6	S7	S8	S9	S10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date prepared	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Date analysed	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
pH 1:5 soil:water	pH Units	6.2	6.2	4.2	4.9	4.9
Total Organic Carbon (Combustion)	mg/kg	20,000	23,000	34,000	35,000	42,000

Misc Inorg - Soil		
Our Reference		249813-11
Your Reference	UNITS	QS1
Date Sampled		25/08/2020
Type of sample		Sediment
Date prepared	-	31/08/2020
Date analysed	-	31/08/2020
pH 1:5 soil:water	pH Units	5.0
Total Organic Carbon (Combustion)	mg/kg	33,000

PAHs in Water Leach - Low Level						
Our Reference		249813-1	249813-2	249813-3	249813-4	249813-5
Your Reference	UNITS	S1	S2	S3	S4	S5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date extracted	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Date analysed	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Naphthalene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	74	90	72	73	77

PAHs in Water Leach - Low Level						
Our Reference		249813-6	249813-7	249813-8	249813-9	249813-10
Your Reference	UNITS	S6	S7	S8	S9	S10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date extracted	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Date analysed	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Naphthalene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	73	74	81	73	94

Metals-ASLP Neutral (ICP-MS)						
Our Reference		249813-1	249813-2	249813-3	249813-4	249813-5
Your Reference	UNITS	S1	S2	S3	S4	S5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date extracted	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Date analysed	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
pH of final Leachate	pH units	6.8	6.9	6.3	6.5	6.6
Arsenic in ASLP	µg/L	3	2	4	5	2
Cadmium in ASLP	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium in ASLP	µg/L	7	6	12	15	6
Copper in ASLP	µg/L	5	5	8	5	5
Lead in ASLP	µg/L	2	1	4	5	1
Mercury in ASLP	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel in ASLP	µg/L	5	4	8	9	4
Zinc in ASLP	µg/L	8	7	17	21	7

Metals-ASLP Neutral (ICP-MS)						
Our Reference		249813-6	249813-7	249813-8	249813-9	249813-10
Your Reference	UNITS	S6	S7	S8	S9	S10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Sediment	Sediment	Sediment	Sediment	Sediment
Date extracted	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
Date analysed	-	31/08/2020	31/08/2020	31/08/2020	31/08/2020	31/08/2020
pH of final Leachate	pH units	7.2	7.0	6.3	6.9	7.0
Arsenic in ASLP	µg/L	2	7	4	2	2
Cadmium in ASLP	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium in ASLP	µg/L	9	21	11	10	10
Copper in ASLP	µg/L	4	18	10	11	8
Lead in ASLP	µg/L	2	9	4	4	2
Mercury in ASLP	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel in ASLP	µg/L	6	13	8	6	7
Zinc in ASLP	µg/L	13	36	17	18	14

vTRH in Water (C6-C9) NEPM		
Our Reference		249813-12
Your Reference	UNITS	RB1
Date Sampled		25/08/2020
Type of sample		Water
Date extracted	-	31/08/2020
Date analysed	-	31/08/2020
TRH C_6 - C_9	µg/L	<10
TRH C_6 - C_{10}	µg/L	<10
Surrogate Dibromofluoromethane	%	103
Surrogate toluene-d8	%	101
Surrogate 4-BFB	%	101

svTRH (C10-C40) in Water		
Our Reference		249813-12
Your Reference	UNITS	RB1
Date Sampled		25/08/2020
Type of sample		Water
Date extracted	-	28/08/2020
Date analysed	-	28/08/2020
TRH C_{10} - C_{14}	μg/L	<50
TRH C_{15} - C_{28}	μg/L	<100
TRH C_{29} - C_{36}	μg/L	<100
TRH >C_{10} - C_{16}	μg/L	<50
TRH >C_{16} - C_{34}	μg/L	<100
TRH >C_{34} - C_{40}	μg/L	<100
Surrogate o-Terphenyl	%	134

PAHs in Water - Low Level		
Our Reference		249813-12
Your Reference	UNITS	RB1
Date Sampled		25/08/2020
Type of sample		Water
Date extracted	-	28/08/2020
Date analysed	-	28/08/2020
Naphthalene	µg/L	<0.2
Acenaphthylene	µg/L	<0.1
Acenaphthene	µg/L	<0.1
Fluorene	µg/L	<0.1
Phenanthrene	µg/L	<0.1
Anthracene	µg/L	<0.1
Fluoranthene	µg/L	<0.1
Pyrene	µg/L	<0.1
Benzo(a)anthracene	µg/L	<0.1
Chrysene	µg/L	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2
Benzo(a)pyrene	µg/L	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5
Total +ve PAH's	µg/L	<0.1
Surrogate p-Terphenyl-d14	%	87

Metals in Waters - Acid extractable		
Our Reference		249813-12
Your Reference	UNITS	RB1
Date Sampled		25/08/2020
Type of sample		Water
Date prepared	-	28/08/2020
Date analysed	-	28/08/2020
Arsenic - Total	mg/L	<0.05
Cadmium - Total	mg/L	<0.01
Chromium - Total	mg/L	<0.01
Copper - Total	mg/L	<0.01
Lead - Total	mg/L	<0.03
Mercury - Total	mg/L	<0.0005
Nickel - Total	mg/L	<0.02
Zinc - Total	mg/L	<0.02

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-128	Dissolved or Total Carbon or Dissolved or Total Organic/Inorganic Carbon using the combustion method, high temperature catalytic combustion with NDIR.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-021 ASLP	Determination of Mercury by Cold Vapour AAS following neutral water leaching by AS 4439.3 - 1997.
Metals-022	Determination of various metals by ICP-MS following leaching using neutralised deionised water by AS 4439.3 - 1997.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.

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

QUALITY CONTROL: TRH in Soil (C6-C9) NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	249813-2
Date extracted	-			28/08/2020	1	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Date analysed	-			28/08/2020	1	28/08/2020	28/08/2020		28/08/2020	28/08/2020
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	113	90
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	113	90
Surrogate aaa-Trifluorotoluene	%		Org-023	107	1	70	71	1	100	79

QUALITY CONTROL: TRH in Soil (C6-C9) NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	28/08/2020	28/08/2020		[NT]	[NT]
Date analysed	-			[NT]	11	28/08/2020	28/08/2020		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	75	73	3	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	249813-2
Date extracted	-			28/08/2020	1	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Date analysed	-			28/08/2020	1	28/08/2020	28/08/2020		28/08/2020	28/08/2020
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	119	85
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	102	79
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	92	88
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	119	85
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	102	79
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	92	88
Surrogate o-Terphenyl	%		Org-020	90	1	90	98	9	109	132

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	28/08/2020	28/08/2020		[NT]	[NT]
Date analysed	-			[NT]	11	29/08/2020	29/08/2020		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	11	95	92	3	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil - Low Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			31/08/2020	1	31/08/2020	31/08/2020		31/08/2020	[NT]
Date analysed	-			31/08/2020	1	31/08/2020	31/08/2020		31/08/2020	[NT]
Naphthalene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	86	[NT]
Acenaphthylene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
Acenaphthene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	94	[NT]
Fluorene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	95	[NT]
Phenanthrene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	89	[NT]
Anthracene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
Fluoranthene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	89	[NT]
Pyrene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	88	[NT]
Benzo(a)anthracene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
Chrysene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	94	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.02	Org-022/025	<0.02	1	<0.02	<0.02	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	92	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	96	1	94	94	0	89	[NT]

QUALITY CONTROL: PAHs in Soil - Low Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	31/08/2020	31/08/2020		[NT]	[NT]
Date analysed	-			[NT]	11	31/08/2020	31/08/2020		[NT]	[NT]
Naphthalene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Acenaphthene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Fluorene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Phenanthrene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Anthracene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Fluoranthene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Pyrene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Chrysene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.02	Org-022/025	[NT]	11	<0.02	<0.02	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.01	Org-022/025	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	92	102	10	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	249813-2
Date prepared	-			31/08/2020	1	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Date analysed	-			31/08/2020	1	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Arsenic	mg/kg	4	Metals-020	<4	1	8	9	12	98	87
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	91	78
Chromium	mg/kg	1	Metals-020	<1	1	44	43	2	94	81
Copper	mg/kg	1	Metals-020	<1	1	20	21	5	97	92
Lead	mg/kg	1	Metals-020	<1	1	13	14	7	96	83
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	112	97
Nickel	mg/kg	1	Metals-020	<1	1	26	25	4	96	83
Zinc	mg/kg	1	Metals-020	<1	1	70	72	3	97	76

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	28/08/2020	28/08/2020		[NT]	[NT]
Date analysed	-			[NT]	11	28/08/2020	28/08/2020		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	11	9	10	11	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	11	43	45	5	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	11	20	21	5	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	11	13	14	7	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	11	26	27	4	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	11	65	67	3	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date prepared	-			27/08/2020	1	31/08/2020	27/08/2020		27/08/2020	[NT]
Date analysed	-			27/08/2020	1	31/08/2020	27/08/2020		27/08/2020	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	1	5.1	[NT]		101	[NT]
Total Organic Carbon (Combustion)	mg/kg	100	Inorg-128	<100	1	31000	35000	12	117	[NT]

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	5	31/08/2020	31/08/2020		[NT]	[NT]
Date analysed	-			[NT]	5	31/08/2020	31/08/2020		[NT]	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	5	4.9	4.7	4	[NT]	[NT]
Total Organic Carbon (Combustion)	mg/kg	100	Inorg-128	[NT]	5	46000	[NT]		[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	31/08/2020	31/08/2020		[NT]	[NT]
Date analysed	-			[NT]	11	31/08/2020	31/08/2020		[NT]	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	11	5.0	5.0	0	[NT]	[NT]
Total Organic Carbon (Combustion)	mg/kg	100	Inorg-128	[NT]	11	33000	35000	6	[NT]	[NT]

QUALITY CONTROL: PAHs in Water Leach - Low Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	249813-10
Date extracted	-			01/09/2020	9	01/09/2020	01/09/2020		01/09/2020	01/09/2020
Date analysed	-			01/09/2020	9	01/09/2020	01/09/2020		01/09/2020	01/09/2020
Naphthalene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	83	80
Acenaphthylene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	95	92
Fluorene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	96	96
Phenanthrene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	98	[NT]
Anthracene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	97	97
Pyrene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	102	95
Benzo(a)anthracene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	92	102
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025 ASLP	<0.2	9	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	84	104
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025 ASLP	<0.1	9	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	99	9	73	81	10	100	81

QUALITY CONTROL: Metals-ASLP Neutral (ICP-MS)					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	249813-10
Date extracted	-			31/08/2020	9	31/08/2020	31/08/2020		31/08/2020	31/08/2020
Date analysed	-			31/08/2020	9	31/08/2020	31/08/2020		31/08/2020	31/08/2020
Arsenic in ASLP	µg/L	1	Metals-022	<1	9	2	3	40	96	98
Cadmium in ASLP	µg/L	0.1	Metals-022	<0.1	9	<0.1	<0.1	0	97	105
Chromium in ASLP	µg/L	1	Metals-022	<1	9	10	9	11	99	94
Copper in ASLP	µg/L	1	Metals-022	<1	9	11	8	32	97	98
Lead in ASLP	µg/L	1	Metals-022	<1	9	4	3	29	103	97
Mercury in ASLP	µg/L	0.05	Metals-021 ASLP	<0.05	9	<0.05	<0.05	0	114	103
Nickel in ASLP	µg/L	1	Metals-022	<1	9	6	5	18	92	96
Zinc in ASLP	µg/L	1	Metals-022	<1	9	18	14	25	98	107

QUALITY CONTROL: vTRH in Water (C6-C9) NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			31/08/2020	[NT]	[NT]	[NT]	[NT]	31/08/2020	[NT]
Date analysed	-			31/08/2020	[NT]	[NT]	[NT]	[NT]	31/08/2020	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate Dibromofluoromethane	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate toluene-d8	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	104	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			28/08/2020	[NT]	[NT]	[NT]	[NT]	28/08/2020	[NT]
Date analysed	-			28/08/2020	[NT]	[NT]	[NT]	[NT]	28/08/2020	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	112	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	103	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	112	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	103	[NT]
Surrogate o-Terphenyl	%		Org-020	92	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: PAHs in Water - Low Level					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			[NT]	[NT]	[NT]	[NT]	[NT]	28/08/2020	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	28/08/2020	[NT]
Naphthalene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	78	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	79	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	77	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	99	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: Metals in Waters - Acid extractable					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			28/08/2020	12	28/08/2020	28/08/2020		28/08/2020	[NT]
Date analysed	-			28/08/2020	12	28/08/2020	28/08/2020		28/08/2020	[NT]
Arsenic - Total	mg/L	0.05	Metals-020	<0.05	12	<0.05	[NT]		99	[NT]
Cadmium - Total	mg/L	0.01	Metals-020	<0.01	12	<0.01	[NT]		98	[NT]
Chromium - Total	mg/L	0.01	Metals-020	<0.01	12	<0.01	[NT]		100	[NT]
Copper - Total	mg/L	0.01	Metals-020	<0.01	12	<0.01	[NT]		113	[NT]
Lead - Total	mg/L	0.03	Metals-020	<0.03	12	<0.03	[NT]		111	[NT]
Mercury - Total	mg/L	0.0005	Metals-021	<0.0005	12	<0.0005	<0.0005	0	111	[NT]
Nickel - Total	mg/L	0.02	Metals-020	<0.02	12	<0.02	[NT]		103	[NT]
Zinc - Total	mg/L	0.02	Metals-020	<0.02	12	<0.02	[NT]		108	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

moisture: wet clay samples

PAH_S_LL: PQL has been raised due to the wet sample matrix. CG

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Consulting Earth Scientists Pty Ltd
Attention	Andrew Carras

Sample Login Details	
Your reference	CES200502-PHB
Envirolab Reference	249813
Date Sample Received	26/08/2020
Date Instructions Received	26/08/2020
Date Results Expected to be Reported	02/09/2020

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	11 Sediment, 1 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	4.2
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	TRH in Soil (C6-C9) NEPM	svTRH (C10-C40) in Soil	PAHs in Soil - Low Level	Acid Extractable metalsin soil	Misc Inorg - Soil	PAHs in Water Leach - Low Level	Metals-ASLP Neutral (ICP-MS)	vTRH in Water (C6-C9) NEPM	svTRH (C10-C40) in Water	PAHs in Water - Low Level	Metals in Waters -Acid extractable
S1	✓	✓	✓	✓	✓	✓	✓				
S2	✓	✓	✓	✓	✓	✓	✓				
S3	✓	✓	✓	✓	✓	✓	✓				
S4	✓	✓	✓	✓	✓	✓	✓				
S5	✓	✓	✓	✓	✓	✓	✓				
S6	✓	✓	✓	✓	✓	✓	✓				
S7	✓	✓	✓	✓	✓	✓	✓				
S8	✓	✓	✓	✓	✓	✓	✓				
S9	✓	✓	✓	✓	✓	✓	✓				
S10	✓	✓	✓	✓	✓	✓	✓				
QS1	✓	✓	✓	✓	✓						
RB1								✓	✓	✓	✓

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

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

CHAIN OF CUSTODY - Client

ENVIROLAB

ENVIROLAB GROUP - National phone number 1300 42 43 44

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph 03 9763 2500 / melbourne@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph 07 3266 9532 / brisbane@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 0406 350 706 / adelaide@envirolab.com.au

Client: Consulting Earth Scientists	**Client Project Name / Number / Site etc (ie report title):** CES200502-PHB
Contact Person: A.Carras	**PO No.:**
Project Mgr: A.Carras	**Envirolab Quote No. :**
Sampler: A.Carras	**Date results required:**
Address: Level 1 Suite 3, 55-65 Grandview Street, Pymble NSW	**Or choose: standard** / same day / 1 day / 2 day / 3 day *Note: Inform lab in advance if urgent turnaround is required - surcharges apply*
Phone: (02) 8569 2200 **Mob:** 0497 018 918	**Report format:** esdat / equis /
Email: mark.challoner@consultingearth.com.au; andrew.carras@consultingearth.com.au	**Lab Comments:**

Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Metals	TRH	PAH (LOW)	ASLP Metals	ASLP PAH (LOW)	TOC	pH	Comments: Provide as much information about the sample as you can
1	S1	-	25.08.20	Sediment	X	X	X	X	X	X	X	
2	S2	-	25.08.20	Sediment	X	X	X	X	X	X	X	
3	S3	-	25.08.20	Sediment	X	X	X	X	X	X	X	
4	S4	-	25.08.20	Sediment	X	X	X	X	X	X	X	
5	S5	-	25.08.20	Sediment	X	X	X	X	X	X	X	
6	S6	-	25.08.20	Sediment	X	X	X	X	X	X	X	
7	S7	-	25.08.20	Sediment	X	X	X	X	X	X	X	
8	S8	-	25.08.20	Sediment	X	X	X	X	X	X	X	
9	S9	-	25.08.20	Sediment	X	X	X	X	X	X	X	
10	S10	-	25.08.20	Sediment	X	X	X	X	X	X	X	
11	QS1	-	25.08.20	Sediment	X	X	X			X	X	
–	QS1A	-	25.08.20	Sediment	X	X	X			X	X	Send to ALS
	RB1	-	25.08.20	Water	X	X	X					Total Metals

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 249873
Date Received: 26/8/20
Time Received: 1305
Received by: CM
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by (Company): CES	**Received by (Company):** ELS SYD	*Lab use only:*	
Print Name: A.Carras	**Print Name:** C.Mullen	**Samples Received: Cool or Ambient (circle one)**	
Date & Time: 26.08.20	**Date & Time:** 26/8/20 1305	**Temperature Received at:** 4.2 **(if applicable)**	
Signature:	**Signature:**	**Transported by: Hand delivered / courier**	

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2030224**	Page	: 1 of 6
Client	: **CONSULTING EARTH SCIENTISTS**	Laboratory	: Environmental Division Sydney
Contact	: ANDREW CARRAS	Contact	: Customer Services ES
Address	: Suite 3, Level 1 55-65 Grandview Street PYMBLE NSW, AUSTRALIA 2073	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: CES200502-PHB	Date Samples Received	: 27-Aug-2020 16:30
Order number	: ----	Date Analysis Commenced	: 31-Aug-2020
C-O-C number	: ----	Issue Date	: 07-Sep-2020 13:53
Sampler	: ANDREW CARRAS		
Site	: ----		
Quote number	: SYBQ/521/16		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP132: Particular samples required dilution prior to extraction due to matrix interferences. LOR values have been adjusted accordingly.
- EP132: Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	QS1A	----	----	----	----
			Client sampling date / time	25-Aug-2020 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2030224-001	--------	--------	--------	--------
				Result	----	----	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**6.7**	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**73.5**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**13**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**44**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**23**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**14**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**31**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**70**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	**2.70**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	**60**	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	**150**	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	**160**	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	**370**	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	**50**	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	**230**	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	**240**	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	**520**	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	**50**	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Client sample ID	QS1A	----	----	----	----
			Client sampling date / time	25-Aug-2020 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2030224-001	--------	--------	--------	--------
				Result	----	----	----	----
EP080: BTEXN - Continued								
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	10	µg/kg	<10	----	----	----	----
2-Methylnaphthalene	91-57-6	10	µg/kg	<10	----	----	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	10	µg/kg	<10	----	----	----	----
Acenaphthene	83-32-9	10	µg/kg	<10	----	----	----	----
Acenaphthylene	208-96-8	10	µg/kg	<10	----	----	----	----
Anthracene	120-12-7	10	µg/kg	<10	----	----	----	----
Benz(a)anthracene	56-55-3	10	µg/kg	**20**	----	----	----	----
Benzo(a)pyrene	50-32-8	10	µg/kg	**20**	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	10	µg/kg	**20**	----	----	----	----
Benzo(e)pyrene	192-97-2	10	µg/kg	**10**	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	10	µg/kg	**20**	----	----	----	----
Benzo(k)fluoranthene	207-08-9	10	µg/kg	<10	----	----	----	----
Chrysene	218-01-9	10	µg/kg	**10**	----	----	----	----
Coronene	191-07-1	10	µg/kg	<10	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	10	µg/kg	<10	----	----	----	----
Fluoranthene	206-44-0	10	µg/kg	**20**	----	----	----	----
Fluorene	86-73-7	10	µg/kg	<10	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	10	µg/kg	**10**	----	----	----	----
N-2-Fluorenyl Acetamide	53-96-3	100	µg/kg	<100	----	----	----	----
Naphthalene	91-20-3	10	µg/kg	<10	----	----	----	----
Perylene	198-55-0	10	µg/kg	**90**	----	----	----	----
Phenanthrene	85-01-8	10	µg/kg	<10	----	----	----	----
Pyrene	129-00-0	10	µg/kg	**20**	----	----	----	----
^ Sum of PAHs	----	10	µg/kg	**240**	----	----	----	----
Benzo(a)pyrene TEQ (zero)	----	10	µg/kg	<50	----	----	----	----
Benzo(a)pyrene TEQ (half LOR)	----	10	µg/kg	<50	----	----	----	----
Benzo(a)pyrene TEQ (LOR)	----	10	µg/kg	<50	----	----	----	----

Analytical Results

Sub-Matrix: **SEDIMENT**
(Matrix: **SOIL)**

Compound	CAS Number	LOR	Unit	QS1A	----	----	----	----
			Client sampling date / time	25-Aug-2020 00:00	----	----	----	----
				ES2030224-001	--------	--------	--------	--------
				Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	94.4	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	106	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	95.1	----	----	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	10	%	97.5	----	----	----	----
Anthracene-d10	1719-06-8	10	%	109	----	----	----	----
4-Terphenyl-d14	1718-51-0	10	%	87.6	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	27	131
Anthracene-d10	1719-06-8	35	139
4-Terphenyl-d14	1718-51-0	30	164

Environmental

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: **ES2030224**		
Client	: **CONSULTING EARTH SCIENTISTS**	Laboratory	: Environmental Division Sydney
Contact	: ANDREW CARRAS	Contact	: Customer Services ES
Address	: Suite 3, Level 1 55-65 Grandview Street PYMBLE NSW, AUSTRALIA 2073	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: andrew.carras@consultingearth.com.au	E-mail	: ALSEnviro.Sydney@ALSGlobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CES200502-PHB	Page	: 1 of 3
Order number	: ----	Quote number	: ES2017CONEAR0001 (SYBQ/521/16)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: ANDREW CARRAS		

Dates

Date Samples Received	: 27-Aug-2020 16:30	Issue Date	: 28-Aug-2020
Client Requested Due Date	: 08-Sep-2020	Scheduled Reporting Date	: **08-Sep-2020**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 11.3 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **TOC analysis will be conducted by ALS Brisbane.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	SOIL - EA002 pH (1:5)	SOIL - EA055-103 Moisture Content	SOIL - EP003 Total Organic Carbon (TOC) in Soil	SOIL - EP132B Ultratrace PAH's	SOIL - S-02 8 Metals (incl. Digestion)	SOIL - TPH only TRH (C6 - C40)
ES2030224-001	25-Aug-2020 00:00	QS1A	✓	✓	✓	✓	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ANDREW CARRAS

- *AU Certificate of Analysis - NATA (COA)	Email	andrew.carras@consultingearth.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	andrew.carras@consultingearth.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	andrew.carras@consultingearth.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	andrew.carras@consultingearth.com.au
- Chain of Custody (CoC) (COC)	Email	andrew.carras@consultingearth.com.au
- EDI Format - ENMRG (ENMRG)	Email	andrew.carras@consultingearth.com.au
- EDI Format - ESDAT (ESDAT)	Email	andrew.carras@consultingearth.com.au
- EDI Format - XTab (XTAB)	Email	andrew.carras@consultingearth.com.au

KAY LOWE

- A4 - AU Tax Invoice (INV)	Email	kay.lowe@consultingearth.com.au

MARK CHALLONER

- *AU Certificate of Analysis - NATA (COA)	Email	mark.challoner@consultingearth.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	mark.challoner@consultingearth.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	mark.challoner@consultingearth.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	mark.challoner@consultingearth.com.au
- Chain of Custody (CoC) (COC)	Email	mark.challoner@consultingearth.com.au
- EDI Format - ENMRG (ENMRG)	Email	mark.challoner@consultingearth.com.au
- EDI Format - ESDAT (ESDAT)	Email	mark.challoner@consultingearth.com.au
- EDI Format - XTab (XTAB)	Email	mark.challoner@consultingearth.com.au

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2030224**	Page	: 1 of 6
Client	: **CONSULTING EARTH SCIENTISTS**	Laboratory	: Environmental Division Sydney
Contact	: ANDREW CARRAS	Telephone	: +61-2-8784 8555
Project	: CES200502-PHB	Date Samples Received	: 27-Aug-2020
Site	: ----	Issue Date	: 07-Sep-2020
Sampler	: ANDREW CARRAS	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP132B: Polynuclear Aromatic Hydrocarbons	ES2030224--001	QS1A	**Anthracene**	120-12-7	115 %	50.0-114%	**Recovery greater than upper data quality objective**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA002: pH 1:5 (Soils)							
Soil Glass Jar - Unpreserved (EA002) QS1A	**25-Aug-2020**	**01-Sep-2020**	01-Sep-2020	✓	**01-Sep-2020**	01-Sep-2020	✓
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055) QS1A	**25-Aug-2020**	**----**	----	----	**02-Sep-2020**	08-Sep-2020	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) QS1A	**25-Aug-2020**	**03-Sep-2020**	21-Feb-2021	✓	**03-Sep-2020**	21-Feb-2021	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) QS1A	**25-Aug-2020**	**03-Sep-2020**	22-Sep-2020	✓	**03-Sep-2020**	22-Sep-2020	✓
EP003: Total Organic Carbon (TOC) in Soil							
Pulp Bag (EP003) QS1A	**25-Aug-2020**	**04-Sep-2020**	22-Sep-2020	✓	**04-Sep-2020**	22-Sep-2020	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) QS1A	**25-Aug-2020**	**01-Sep-2020**	08-Sep-2020	✓	**01-Sep-2020**	08-Sep-2020	✓
Soil Glass Jar - Unpreserved (EP071) QS1A	**25-Aug-2020**	**31-Aug-2020**	08-Sep-2020	✓	**01-Sep-2020**	10-Oct-2020	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) QS1A	**25-Aug-2020**	**01-Sep-2020**	08-Sep-2020	✓	**01-Sep-2020**	08-Sep-2020	✓
Soil Glass Jar - Unpreserved (EP071) QS1A	**25-Aug-2020**	**31-Aug-2020**	08-Sep-2020	✓	**01-Sep-2020**	10-Oct-2020	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) QS1A	**25-Aug-2020**	**01-Sep-2020**	08-Sep-2020	✓	**01-Sep-2020**	08-Sep-2020	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP132) QS1A	**25-Aug-2020**	**02-Sep-2020**	08-Sep-2020	✓	**02-Sep-2020**	12-Oct-2020	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	3	**66.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM Schedule B(3).
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO2) is automatically measured by infra-red detector.
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	SOIL	In house: Referenced to USEPA 8270 GCMS Capiliary column, SIM mode.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Dry and Pulverise (up to 100g)	GEO30	SOIL	#
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.

Preparation Methods	Method	Matrix	Method Descriptions
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Tumbler Extraction of Solids/ Acetylation	ORG17A-AC	SOIL	In house: Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to 1 mL with exchange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis.

CHAIN OF CUSTODY - Client

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Client: Consulting Earth Scientists
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Project Mgr: A.Carras
Sampler: A.Carras
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Phone: (02) 8569 2200 **Mob:** 0497 018 918
Email: mark.challoner@consultingearth.com.au; andrew.carras@consultingearth.com.au

Client Project Name / Number / Site etc (ie report title): CES200502-PHB
PO No.:
Envirolab Quote No. :
Date results required:
Or choose: standard / same day / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharges apply
Report format: esdat / equis /
Lab Comments:

Subcon / Forward Lab / Split WO
Lab / Analysis: Envirolab / TOC
Organised By / Date:
Relinquished By / Date:
Connote / Courier:
WO No:
Attached By PO / Internal Sheet

Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Metals	TRH	PAH (LOW)	ASLP Metals	ASLP PAH (LOW)	TOC	pH	Comments
1	S1	-	25.08.20	Sediment	X	X	X	X	X	X	X	
2	S2	-	25.08.20	Sediment	X	X	X	X	X	X	X	
3	S3	-	25.08.20	Sediment	X	X	X	X	X	X	X	
4	S4	-	25.08.20	Sediment	X	X	X	X	X	X	X	249873
5	S5	-	25.08.20	Sediment	X	X	X	X	X	X	X	26/8/20
6	S6	-	25.08.20	Sediment	X	X	X	X	X	X	X	1335
7	S7	-	25.08.20	Sediment	X	X	X	X	X	X	X	
8	S8	-	25.08.20	Sediment	X	X	X	X	X	X	X	
9	S9	-	25.08.20	Sediment	X	X	X	X	X	X	X	
10	S10	-	25.08.20	Sediment	X	X	X	X	X	X	X	
11	QS1	-	25.08.20	Sediment	X	X	X			X	X	
	QS1A (t)	-	25.08.20	Sediment	X	X	X			X	X	Send to ALS
12	RB1	-	25.08.20	Water	X	X	X					Total Metals

Confirmed NEPM TOC with Andrew 28/8 re: TAT 27/8/20 4:30pm

Environmental Division
Sydney
Work Order Reference
ES2030224
Telephone : + 61-2-8784 8555

Relinquished by (Company):	CES	ELS Sydney	
Print Name:	A.Carras	C.Mulenzu	
Date & Time:	26.08.20	27/8/20 830	
Signature:			
Received by (Company):	ELS Syd		
Print Name:	C.Mullen		
Date & Time:	28/8/20 305		
Signature:			

Lab use only:
Samples Received: Cool or Ambient (circle one)
Temperature Received at: 4.2 (if applicable)
Transported by: Hand delivered / courier

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
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CERTIFICATE OF ANALYSIS 249817

Client Details

Client	Consulting Earth Scientists Pty Ltd
Attention	Andrew Carras
Address	Suite 3, Level 1, 55 Grandview Street, Pymble, NSW, 2073

Sample Details

Your Reference	**CES200502-PHB**
Number of Samples	14 Water
Date samples received	26/08/2020
Date completed instructions received	26/08/2020

Analysis Details

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

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

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

Report Details

Date results requested by	02/09/2020
Date of Issue	02/09/2020

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Results Approved By

Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Josh Williams, Senior Chemist
Loren Bardwell, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

vTRH in Water (C6-C9) NEPM						
Our Reference		249817-1	249817-2	249817-3	249817-4	249817-5
Your Reference	UNITS	SW1	SW2	SW3	SW4	SW5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10	<10
Surrogate Dibromofluoromethane	%	133	133	133	133	133
Surrogate toluene-d8	%	100	101	100	101	100
Surrogate 4-BFB	%	71	69	70	72	70

vTRH in Water (C6-C9) NEPM						
Our Reference		249817-6	249817-7	249817-8	249817-9	249817-10
Your Reference	UNITS	SW6	SW7	SW8	SW9	SW10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	27/08/2020	27/08/2020	27/08/2020	27/08/2020	27/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10	<10
Surrogate Dibromofluoromethane	%	136	133	132	131	133
Surrogate toluene-d8	%	102	100	102	100	101
Surrogate 4-BFB	%	70	71	68	72	69

vTRH in Water (C6-C9) NEPM					
Our Reference		249817-11	249817-12	249817-13	249817-14
Your Reference	UNITS	SW11	SW12	SW13	QW1
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water
Date extracted	-	27/08/2020	27/08/2020	27/08/2020	27/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020
TRH C_6 - C_9	µg/L	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10
Surrogate Dibromofluoromethane	%	133	136	134	134
Surrogate toluene-d8	%	101	103	100	100
Surrogate 4-BFB	%	71	70	70	71

svTRH (C10-C40) in Water						
Our Reference		249817-1	249817-2	249817-3	249817-4	249817-5
Your Reference	UNITS	SW1	SW2	SW3	SW4	SW5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Date analysed	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020	02/09/2020
TRH C_{10} - C_{14}	µg/L	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100	<100
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	102	97	95	96	99

svTRH (C10-C40) in Water						
Our Reference		249817-6	249817-7	249817-8	249817-9	249817-10
Your Reference	UNITS	SW6	SW7	SW8	SW9	SW10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Date analysed	-	02/09/2020	02/09/2020	02/09/2020	02/09/2020	02/09/2020
TRH C_{10} - C_{14}	µg/L	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100	<100
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	89	96	102	93	95

svTRH (C10-C40) in Water					
Our Reference		249817-11	249817-12	249817-13	249817-14
Your Reference	UNITS	SW11	SW12	SW13	QW1
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water
Date extracted	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Date analysed	-	02/09/2020	02/09/2020	02/09/2020	02/09/2020
TRH C_{10} - C_{14}	µg/L	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100
Surrogate o-Terphenyl	%	87	99	89	98

PAHs in Water						
Our Reference		249817-1	249817-2	249817-3	249817-4	249817-5
Your Reference	UNITS	SW1	SW2	SW3	SW4	SW5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Date analysed	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Naphthalene	µg/L	<1	<1	<1	<1	<1
Acenaphthylene	µg/L	<1	<1	<1	<1	<1
Acenaphthene	µg/L	<1	<1	<1	<1	<1
Fluorene	µg/L	<1	<1	<1	<1	<1
Phenanthrene	µg/L	<1	<1	<1	<1	<1
Anthracene	µg/L	<1	<1	<1	<1	<1
Fluoranthene	µg/L	<1	<1	<1	<1	<1
Pyrene	µg/L	<1	<1	<1	<1	<1
Benzo(a)anthracene	µg/L	<1	<1	<1	<1	<1
Chrysene	µg/L	<1	<1	<1	<1	<1
Benzo(b,j+k)fluoranthene	µg/L	<2	<2	<2	<2	<2
Benzo(a)pyrene	µg/L	<1	<1	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1	<1	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1	<1	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5	<5	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	90	87	97	91	92

PAHs in Water						
Our Reference		249817-6	249817-7	249817-8	249817-9	249817-10
Your Reference	UNITS	SW6	SW7	SW8	SW9	SW10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Date analysed	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Naphthalene	µg/L	<1	<1	<1	<1	<1
Acenaphthylene	µg/L	<1	<1	<1	<1	<1
Acenaphthene	µg/L	<1	<1	<1	<1	<1
Fluorene	µg/L	<1	<1	<1	<1	<1
Phenanthrene	µg/L	<1	<1	<1	<1	<1
Anthracene	µg/L	<1	<1	<1	<1	<1
Fluoranthene	µg/L	<1	<1	<1	<1	<1
Pyrene	µg/L	<1	<1	<1	<1	<1
Benzo(a)anthracene	µg/L	<1	<1	<1	<1	<1
Chrysene	µg/L	<1	<1	<1	<1	<1
Benzo(b,j+k)fluoranthene	µg/L	<2	<2	<2	<2	<2
Benzo(a)pyrene	µg/L	<1	<1	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1	<1	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1	<1	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5	<5	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	88	94	76	86	97

PAHs in Water					
Our Reference		249817-11	249817-12	249817-13	249817-14
Your Reference	UNITS	SW11	SW12	SW13	QW1
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water
Date extracted	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Date analysed	-	01/09/2020	01/09/2020	01/09/2020	01/09/2020
Naphthalene	µg/L	<1	<1	<1	<1
Acenaphthylene	µg/L	<1	<1	<1	<1
Acenaphthene	µg/L	<1	<1	<1	<1
Fluorene	µg/L	<1	<1	<1	<1
Phenanthrene	µg/L	<1	<1	<1	<1
Anthracene	µg/L	<1	<1	<1	<1
Fluoranthene	µg/L	<1	<1	<1	<1
Pyrene	µg/L	<1	<1	<1	<1
Benzo(a)anthracene	µg/L	<1	<1	<1	<1
Chrysene	µg/L	<1	<1	<1	<1
Benzo(b,j+k)fluoranthene	µg/L	<2	<2	<2	<2
Benzo(a)pyrene	µg/L	<1	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	83	93	95	79

HM in water - dissolved						
Our Reference		249817-1	249817-2	249817-3	249817-4	249817-5
Your Reference	UNITS	SW1	SW2	SW3	SW4	SW5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Arsenic-Dissolved	µg/L	<1	<1	<1	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	1	<1	<1
Copper-Dissolved	µg/L	72	54	<1	91	70
Lead-Dissolved	µg/L	1	<1	<1	1	1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	7	5	2	11	7
Zinc-Dissolved	µg/L	45	36	2	55	42

HM in water - dissolved						
Our Reference		249817-6	249817-7	249817-8	249817-9	249817-10
Your Reference	UNITS	SW6	SW7	SW8	SW9	SW10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Arsenic-Dissolved	µg/L	<1	<1	<1	<1	<1
Cadmium-Dissolved	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1	<1
Copper-Dissolved	µg/L	82	58	120	41	100
Lead-Dissolved	µg/L	2	1	1	1	1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	9	10	8	8	7
Zinc-Dissolved	µg/L	230	44	60	40	40

HM in water - dissolved					
Our Reference	UNITS	249817-11	249817-12	249817-13	249817-14
Your Reference		SW11	SW12	SW13	QW1
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water
Date prepared	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Date analysed	-	28/08/2020	28/08/2020	28/08/2020	28/08/2020
Arsenic-Dissolved	μg/L	<1	<1	<1	<1
Cadmium-Dissolved	μg/L	<0.1	0.1	0.1	<0.1
Chromium-Dissolved	μg/L	<1	<1	<1	<1
Copper-Dissolved	μg/L	50	110	81	1
Lead-Dissolved	μg/L	2	1	2	<1
Mercury-Dissolved	μg/L	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	μg/L	18	17	17	2
Zinc-Dissolved	μg/L	78	85	97	<1

Miscellaneous Inorganics						
Our Reference		249817-1	249817-2	249817-3	249817-4	249817-5
Your Reference	UNITS	SW1	SW2	SW3	SW4	SW5
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	26/08/2020	26/08/2020	26/08/2020	26/08/2020	26/08/2020
Date analysed	-	26/08/2020	26/08/2020	26/08/2020	26/08/2020	26/08/2020
pH	pH Units	7.6	7.5	7.5	7.5	7.5
Total Organic Carbon	mg/L	11	10	10	10	10

Miscellaneous Inorganics						
Our Reference		249817-6	249817-7	249817-8	249817-9	249817-10
Your Reference	UNITS	SW6	SW7	SW8	SW9	SW10
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	26/08/2020	26/08/2020	26/08/2020	26/08/2020	26/08/2020
Date analysed	-	26/08/2020	26/08/2020	26/08/2020	26/08/2020	26/08/2020
pH	pH Units	7.5	7.5	7.5	7.5	7.5
Total Organic Carbon	mg/L	10	10	10	10	10

Miscellaneous Inorganics					
Our Reference		249817-11	249817-12	249817-13	249817-14
Your Reference	UNITS	SW11	SW12	SW13	QW1
Date Sampled		25/08/2020	25/08/2020	25/08/2020	25/08/2020
Type of sample		Water	Water	Water	Water
Date prepared	-	26/08/2020	26/08/2020	26/08/2020	26/08/2020
Date analysed	-	26/08/2020	26/08/2020	26/08/2020	26/08/2020
pH	pH Units	5.7	6.0	6.1	7.4
Total Organic Carbon	mg/L	5	5	7	10

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-079	TOC determined using a TOC analyser using the combustion method. Dissolved requires filtering prior to determination. Analysis using APHA latest edition 5310B.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	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.

QUALITY CONTROL: vTRH in Water (C6-C9) NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			27/08/2020	1	27/08/2020	27/08/2020		27/08/2020	[NT]
Date analysed	-			28/08/2020	1	28/08/2020	28/08/2020		28/08/2020	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	1	<10	<10	0	102	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	1	<10	<10	0	102	[NT]
Surrogate Dibromofluoromethane	%		Org-023	131	1	133	120	10	110	[NT]
Surrogate toluene-d8	%		Org-023	101	1	100	103	3	101	[NT]
Surrogate 4-BFB	%		Org-023	70	1	71	67	6	84	[NT]

QUALITY CONTROL: vTRH in Water (C6-C9) NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	27/08/2020	27/08/2020		[NT]	[NT]
Date analysed	-			[NT]	11	28/08/2020	28/08/2020		[NT]	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	[NT]	11	<10	<10	0	[NT]	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	[NT]	11	<10	<10	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	[NT]	11	133	120	10	[NT]	[NT]
Surrogate toluene-d8	%		Org-023	[NT]	11	101	103	2	[NT]	[NT]
Surrogate 4-BFB	%		Org-023	[NT]	11	71	67	6	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			01/09/2020	1	01/09/2020	01/09/2020		01/09/2020	[NT]
Date analysed	-			01/09/2020	1	01/09/2020	01/09/2020		01/09/2020	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	<50	<50	0	105	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	<100	<100	0	92	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	<100	<100	0	92	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	<50	<50	0	105	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	<100	<100	0	92	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	<100	<100	0	92	[NT]
Surrogate o-Terphenyl	%		Org-020	99	1	102	89	14	72	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	01/09/2020	01/09/2020		[NT]	[NT]
Date analysed	-			[NT]	11	02/09/2020	02/09/2020		[NT]	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	[NT]	11	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	[NT]	11	<50	<50	0	[NT]	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	11	87	99	13	[NT]	[NT]

QUALITY CONTROL: PAHs in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			01/09/2020	1	01/09/2020	01/09/2020		01/09/2020	[NT]
Date analysed	-			01/09/2020	1	01/09/2020	01/09/2020		01/09/2020	[NT]
Naphthalene	µg/L	1	Org-022/025	<1	1	<1	<1	0	83	[NT]
Acenaphthylene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	<1	1	<1	<1	0	95	[NT]
Fluorene	µg/L	1	Org-022/025	<1	1	<1	<1	0	96	[NT]
Phenanthrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	98	[NT]
Anthracene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	<1	1	<1	<1	0	97	[NT]
Pyrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	102	[NT]
Benzo(a)anthracene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	<1	1	<1	<1	0	92	[NT]
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	<2	1	<2	<2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	87	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	99	1	90	96	6	100	[NT]

QUALITY CONTROL: PAHs in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	01/09/2020	01/09/2020		[NT]	[NT]
Date analysed	-			[NT]	11	01/09/2020	01/09/2020		[NT]	[NT]
Naphthalene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Acenaphthylene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Fluorene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Phenanthrene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Anthracene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Pyrene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Benzo(a)anthracene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	[NT]	11	<2	<2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	83	96	15	[NT]	[NT]

QUALITY CONTROL: HM in water - dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	249817-2
Date prepared	-			28/08/2020	1	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Date analysed	-			28/08/2020	1	28/08/2020	28/08/2020		28/08/2020	28/08/2020
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	96	85
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	91	83
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	109	87
Copper-Dissolved	µg/L	1	Metals-022	<1	1	72	73	1	109	95
Lead-Dissolved	µg/L	1	Metals-022	<1	1	1	1	0	104	83
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	109	108
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	7	7	0	101	86
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	45	46	2	98	97

QUALITY CONTROL: HM in water - dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	10	28/08/2020	28/08/2020		[NT]	[NT]
Date analysed	-			[NT]	10	28/08/2020	28/08/2020		[NT]	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	[NT]	10	<1	<1	0	[NT]	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	[NT]	10	<0.1	<0.1	0	[NT]	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	[NT]	10	<1	<1	0	[NT]	[NT]
Copper-Dissolved	µg/L	1	Metals-022	[NT]	10	100	100	0	[NT]	[NT]
Lead-Dissolved	µg/L	1	Metals-022	[NT]	10	1	1	0	[NT]	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	[NT]	10	<0.05	<0.05	0	[NT]	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	[NT]	10	7	7	0	[NT]	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	[NT]	10	40	41	2	[NT]	[NT]

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	249817-2
Date prepared	-			26/08/2020	1	26/08/2020	26/08/2020		26/08/2020	26/08/2020
Date analysed	-			26/08/2020	1	26/08/2020	26/08/2020		26/08/2020	26/08/2020
pH	pH Units		Inorg-001	[NT]	1	7.6	7.6	0	99	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	<1	1	11	10	10	96	101

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	26/08/2020	26/08/2020		[NT]	[NT]
Date analysed	-			[NT]	11	26/08/2020	26/08/2020		[NT]	[NT]
pH	pH Units		Inorg-001	[NT]	11	5.7	5.7	0	[NT]	[NT]
Total Organic Carbon	mg/L	1	Inorg-079	[NT]	11	5	5	0	[NT]	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Consulting Earth Scientists Pty Ltd
Attention	Andrew Carras

Sample Login Details	
Your reference	CES200502-PHB
Envirolab Reference	249817
Date Sample Received	26/08/2020
Date Instructions Received	26/08/2020
Date Results Expected to be Reported	02/09/2020

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	14 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	4.2
Cooling Method	Ice
Sampling Date Provided	YES

Comments
Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	vTRH in Water (C6-C9) NEPM	svTRH (C10-C40) in Water	PAHsin Water	HM in water - dissolved	pH	Total Organic Carbon
SW1	✓	✓	✓	✓	✓	✓
SW2	✓	✓	✓	✓	✓	✓
SW3	✓	✓	✓	✓	✓	✓
SW4	✓	✓	✓	✓	✓	✓
SW5	✓	✓	✓	✓	✓	✓
SW6	✓	✓	✓	✓	✓	✓
SW7	✓	✓	✓	✓	✓	✓
SW8	✓	✓	✓	✓	✓	✓
SW9	✓	✓	✓	✓	✓	✓
SW10	✓	✓	✓	✓	✓	✓
SW11	✓	✓	✓	✓	✓	✓
SW12	✓	✓	✓	✓	✓	✓
SW13	✓	✓	✓	✓	✓	✓
QW1	✓	✓	✓	✓	✓	✓

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

Additional Info
Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

CHAIN OF CUSTODY - Client

ENVIROLAB GROUP

ENVIROLAB GROUP - National phone number 1300 42 43 44

Sydney Lab - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

Perth Lab - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph 08 9317 2505 / lab@mpl.com.au

Melbourne Lab - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph 03 9763 2500 / melbourne@envirolab.com.au

Brisbane Office - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph 07 3266 9532 / brisbane@envirolab.com.au

Adelaide Office - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 0406 350 706 / adelaide@envirolab.com.au

Client: Consulting Earth Scientists
Contact Person: A.Carras
Project Mgr: A.Carras
Sampler: A.Carras
Address: Level 1 Suite 3, 55-65 Grandview Street, Pymble NSW

Phone: (02) 8569 2200 **Mob:** 0497 018 918
Email: mark.challoner@consultingearth.com.au; andrew.carras@consultingearth.com.au

Client Project Name / Number / Site etc (ie report title): CES200502-PHB
PO No.:
Envirolab Quote No. :
Date results required:
Or choose: **standard** / same day / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharges apply
Report format: esdat / equis /
Lab Comments:

Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Metals (Low)	TRH	PAH	ASLP Metals	ASLP PAH	TOC	pH								Comments: Provide as much information about the sample as you can
1	SW1	-	25.08.20	Water	X	X	X			X	X								
2	SW2	-	25.08.20	Water	X	X	X			X	X								
3	SW3	-	25.08.20	Water	X	X	X			X	X								
4	SW4	-	25.08.20	Water	X	X	X			X	X								
5	SW5	-	25.08.20	Water	X	X	X			X	X								
6	SW6	-	25.08.20	Water	X	X	X			X	X								
7	SW7	-	25.08.20	Water	X	X	X			X	X								
8	SW8	-	25.08.20	Water	X	X	X			X	X								
9	SW9	-	25.08.20	Water	X	X	X			X	X								
10	SW10	-	25.08.20	Water	X	X	X			X	X								
11	SW11	-	25.08.20	Water	X	X	X			X	X								
12	SW12	-	25.08.20	Water	X	X	X			X	X								
13	SW13	-	25.08.20	Water	X	X	X			X	X								
14	QW1	-	25.08.20	Water	X	X	X			X	X								
—	QW1A	-	25.08.20	Water	X	X	X			X	X								Send to ALS

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 249877
Date Received: 26/8/20
Time Received: 1305
Received by: CM
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by (Company): CES
Print Name: A.Carras
Date & Time: 26.08.20
Signature:

Received by (Company): ELS SYD
Print Name: C. Mullen
Date & Time: 26/8/20 1305
Signature: CM

Lab use only:
Samples Received: Cool or Ambient (circle one)
Temperature Received at: 4.2 (if applicable)
Transported by: Hand delivered / courier

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12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 254589

Client Details

Client	Consulting Earth Scientists Pty Ltd
Attention	Andrew Carras
Address	Suite 3, Level 1, 55 Grandview Street, Pymble, NSW, 2073

Sample Details

Your Reference	**CES200502**
Number of Samples	7 water
Date samples received	29/10/2020
Date completed instructions received	29/10/2020

Analysis Details

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

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

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

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

Report Details

Date results requested by	05/11/2020
Date of Issue	19/11/2020
Reissue Details	This report replaces R00 created on 05/11/2020 due to: revised report with additional MW3 results. (Client request)

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Results Approved By
Diego Bigolin, Team Leader, Inorganics
Jaimie Loa-Kum-Cheung, Metals Supervisor
Josh Williams, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

vTRH in Water (C6-C9) NEPM						
Our Reference		254589-1	254589-2	254589-3	254589-4	254589-5
Your Reference	UNITS	MW1	MW2	MW3	MW4	MW5
Date Sampled		29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020
Type of sample		water	water	water	water	water
Date extracted	-	30/10/2020	30/10/2020	30/10/2020	30/10/2020	30/10/2020
Date analysed	-	02/11/2020	02/11/2020	02/11/2020	02/11/2020	02/11/2020
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10	<10
Surrogate Dibromofluoromethane	%	110	108	104	104	105
Surrogate toluene-d8	%	100	100	98	100	100
Surrogate 4-BFB	%	100	102	101	101	102

vTRH in Water (C6-C9) NEPM			
Our Reference		254589-6	254589-7
Your Reference	UNITS	MW3 (254589-A-3)	MW3 (254589-A-6)
Date Sampled		29/10/2020	29/10/2020
Type of sample		water	water
Date extracted	-	12/11/2020	12/11/2020
Date analysed	-	13/11/2020	13/11/2020
TRH C_6 - C_9	µg/L	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10
Surrogate Dibromofluoromethane	%	92	94
Surrogate toluene-d8	%	100	98
Surrogate 4-BFB	%	101	102

svTRH (C10-C40) in Water						
Our Reference		254589-1	254589-2	254589-3	254589-4	254589-5
Your Reference	UNITS	MW1	MW2	MW3	MW4	MW5
Date Sampled		29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020
Type of sample		water	water	water	water	water
Date extracted	-	02/11/2020	02/11/2020	02/11/2020	02/11/2020	02/11/2020
Date analysed	-	04/11/2020	04/11/2020	04/11/2020	04/11/2020	04/11/2020
TRH C_{10} - C_{14}	µg/L	<50	220	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	270	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100	<100
TRH >C_{10} - C_{16}	µg/L	<50	250	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	180	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	103	94	86	74	88

svTRH (C10-C40) in Water			
Our Reference		254589-6	254589-7
Your Reference	UNITS	MW3 (254589-A-3)	MW3 (254589-A-6)
Date Sampled		29/10/2020	29/10/2020
Type of sample		water	water
Date extracted	-	13/11/2020	13/11/2020
Date analysed	-	14/11/2020	14/11/2020
TRH C_{10} - C_{14}	µg/L	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100
TRH >C_{10} - C_{16}	µg/L	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100
Surrogate o-Terphenyl	%	79	79

PAHs in Water						
Our Reference		254589-1	254589-2	254589-3	254589-4	254589-5
Your Reference	UNITS	MW1	MW2	MW3	MW4	MW5
Date Sampled		29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020
Type of sample		water	water	water	water	water
Date extracted	-	02/11/2020	02/11/2020	02/11/2020	02/11/2020	02/11/2020
Date analysed	-	02/11/2020	02/11/2020	02/11/2020	02/11/2020	02/11/2020
Naphthalene	µg/L	<1	1	<1	<1	<1
Acenaphthylene	µg/L	<1	<1	<1	<1	<1
Acenaphthene	µg/L	<1	<1	<1	<1	<1
Fluorene	µg/L	<1	<1	<1	<1	<1
Phenanthrene	µg/L	<1	<1	<1	<1	<1
Anthracene	µg/L	<1	<1	<1	<1	<1
Fluoranthene	µg/L	<1	<1	<1	<1	<1
Pyrene	µg/L	<1	<1	<1	<1	<1
Benzo(a)anthracene	µg/L	<1	<1	<1	<1	<1
Chrysene	µg/L	<1	<1	<1	<1	<1
Benzo(b,j+k)fluoranthene	µg/L	<2	<2	<2	<2	<2
Benzo(a)pyrene	µg/L	<1	<1	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1	<1	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1	<1	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5	<5	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	1.4	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	88	80	84	85	109

PAHs in Water			
Our Reference		254589-6	254589-7
Your Reference	UNITS	MW3 (254589-A-3)	MW3 (254589-A-6)
Date Sampled		29/10/2020	29/10/2020
Type of sample		water	water
Date extracted	-	13/11/2020	13/11/2020
Date analysed	-	14/11/2020	14/11/2020
Naphthalene	µg/L	<1	<1
Acenaphthylene	µg/L	<1	<1
Acenaphthene	µg/L	<1	<1
Fluorene	µg/L	<1	<1
Phenanthrene	µg/L	<1	<1
Anthracene	µg/L	<1	<1
Fluoranthene	µg/L	<1	<1
Pyrene	µg/L	<1	<1
Benzo(a)anthracene	µg/L	<1	<1
Chrysene	µg/L	<1	<1
Benzo(b,j+k)fluoranthene	µg/L	<2	<2
Benzo(a)pyrene	µg/L	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	92	73

HM in water - dissolved						
Our Reference		254589-1	254589-2	254589-3	254589-4	254589-5
Your Reference	UNITS	MW1	MW2	MW3	MW4	MW5
Date Sampled		29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020
Type of sample		water	water	water	water	water
Date prepared	-	02/11/2020	02/11/2020	02/11/2020	02/11/2020	02/11/2020
Date analysed	-	02/11/2020	02/11/2020	02/11/2020	02/11/2020	02/11/2020
Arsenic-Dissolved	µg/L	7	2	<1	1	13
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	0.9
Chromium-Dissolved	µg/L	1	<1	1	<1	29
Copper-Dissolved	µg/L	28	33	17	42	70
Lead-Dissolved	µg/L	2	<1	3	1	4
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	8	4	9	6	590
Zinc-Dissolved	µg/L	250	230	160	77	2,900

HM in water - dissolved			
Our Reference		254589-6	254589-7
Your Reference	UNITS	MW3 (254589-A-3)	MW3 (254589-A-6)
Date Sampled		29/10/2020	29/10/2020
Type of sample		water	water
Date prepared	-	13/11/2020	13/11/2020
Date analysed	-	13/11/2020	13/11/2020
Arsenic-Dissolved	µg/L	1	8
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	1	1
Copper-Dissolved	µg/L	42	41
Lead-Dissolved	µg/L	3	3
Mercury-Dissolved	µg/L	<0.05	<0.05
Nickel-Dissolved	µg/L	8	8
Zinc-Dissolved	µg/L	150	140

Miscellaneous Inorganics						
Our Reference		254589-1	254589-2	254589-3	254589-4	254589-5
Your Reference	UNITS	MW1	MW2	MW3	MW4	MW5
Date Sampled		29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020
Type of sample		water	water	water	water	water
Date prepared	-	29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020
Date analysed	-	29/10/2020	29/10/2020	29/10/2020	29/10/2020	29/10/2020
pH	pH Units	6.6	6.0	6.0	5.8	3.7
Chloride, Cl	mg/L	270	320	86	220	740
Sulphate, SO4	mg/L	290	<1	65	67	2,700
Total Organic Carbon	mg/L	200	11	9	3	20

Miscellaneous Inorganics			
Our Reference		254589-6	254589-7
Your Reference	UNITS	MW3 (254589-A-3)	MW3 (254589-A-6)
Date Sampled		29/10/2020	29/10/2020
Type of sample		water	water
Date prepared	-	29/10/2020	29/10/2020
Date analysed	-	29/10/2020	29/10/2020
pH	pH Units	6.0	6.0
Chloride, Cl	mg/L	99	96
Sulphate, SO4	mg/L	91	86
Total Organic Carbon	mg/L	9	8

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-079	TOC determined using a TOC analyser using the combustion method. Dissolved requires filtering prior to determination. Analysis using APHA latest edition 5310B.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	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.

QUALITY CONTROL: vTRH in Water (C6-C9) NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			12/11/2020	[NT]	[NT]	[NT]	[NT]	02/11/2020	[NT]
Date analysed	-			13/11/2020	[NT]	[NT]	[NT]	[NT]	02/11/2020	[NT]
TRH C_6 - C_9	μg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	88	[NT]
TRH C_6 - C_{10}	μg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	88	[NT]
Surrogate Dibromofluoromethane	%		Org-023	85	[NT]	[NT]	[NT]	[NT]	96	[NT]
Surrogate toluene-d8	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate 4-BFB	%		Org-023	102	[NT]	[NT]	[NT]	[NT]	122	[NT]

QUALITY CONTROL: vTRH in Water (C6-C9) NEPM					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			[NT]	[NT]	[NT]	[NT]	[NT]	12/11/2020	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	13/11/2020	[NT]
TRH C_6 - C_9	μg/L	10	Org-023	[NT]	[NT]	[NT]	[NT]	[NT]	84	[NT]
TRH C_6 - C_{10}	μg/L	10	Org-023	[NT]	[NT]	[NT]	[NT]	[NT]	84	[NT]
Surrogate Dibromofluoromethane	%		Org-023	[NT]	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate toluene-d8	%		Org-023	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	[NT]	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	254589-2
Date extracted	-			13/11/2020	1	02/11/2020	13/11/2020		13/11/2020	02/11/2020
Date analysed	-			14/11/2020	1	04/11/2020	14/11/2020		14/11/2020	03/11/2020
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	1	<50	<50	0	85	89
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	1	<100	<100	0	73	85
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	1	<100	<100	0	65	77
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	1	<50	<50	0	85	89
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	1	<100	<100	0	73	85
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	1	<100	<100	0	65	77
Surrogate o-Terphenyl	%		Org-020	80	1	103	88	16	91	94

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			[NT]	[NT]	[NT]	[NT]	[NT]	02/11/2020	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	02/11/2020	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	[NT]	[NT]	[NT]	[NT]	[NT]	104	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	[NT]	[NT]	[NT]	[NT]	[NT]	88	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	[NT]	[NT]	[NT]	[NT]	[NT]	82	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	[NT]	[NT]	[NT]	[NT]	[NT]	104	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	[NT]	[NT]	[NT]	[NT]	[NT]	88	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	[NT]	[NT]	[NT]	[NT]	[NT]	82	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	[NT]	[NT]	[NT]	[NT]	115	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	254589-2
Date extracted	-			13/11/2020	1	02/11/2020	02/11/2020		02/11/2020	02/11/2020
Date analysed	-			13/11/2020	1	02/11/2020	02/11/2020		02/11/2020	02/11/2020
Naphthalene	µg/L	1	Org-022/025	<1	1	<1	<1	0	98	111
Acenaphthylene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	<1	1	<1	<1	0	100	107
Fluorene	µg/L	1	Org-022/025	<1	1	<1	<1	0	105	121
Phenanthrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	102	106
Anthracene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	<1	1	<1	<1	0	90	105
Pyrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	95	111
Benzo(a)anthracene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	<1	1	<1	<1	0	108	132
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	<2	1	<2	<2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	100	120
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	<1	1	<1	<1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	124	1	88	90	2	89	85

QUALITY CONTROL: PAHs in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			[NT]	[NT]	[NT]	[NT]	[NT]	13/11/2020	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	13/11/2020	[NT]
Naphthalene	µg/L	1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	74	[NT]
Acenaphthene	µg/L	1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	72	[NT]
Fluorene	µg/L	1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	82	[NT]
Phenanthrene	µg/L	1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	84	[NT]
Fluoranthene	µg/L	1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	71	[NT]
Pyrene	µg/L	1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	75	[NT]
Chrysene	µg/L	1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	82	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	70	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	113	[NT]

QUALITY CONTROL: HM in water - dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			02/11/2020	1	02/11/2020	02/11/2020		02/11/2020	[NT]
Date analysed	-			02/11/2020	1	02/11/2020	02/11/2020		02/11/2020	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	7	7	0	94	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	89	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	1	1	0	97	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	1	28	29	4	109	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	1	2	2	0	106	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	93	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	8	8	0	97	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	250	230	8	105	[NT]

QUALITY CONTROL: HM in water - dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			[NT]	[NT]	[NT]	[NT]	[NT]	13/11/2020	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	13/11/2020	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	96	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	96	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	89	[NT]
Copper-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	95	[NT]
Lead-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	94	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	[NT]	[NT]	[NT]	[NT]	[NT]	105	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	89	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	[NT]	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	254589-2
Date prepared	-			29/10/2020	1	29/10/2020	29/10/2020		29/10/2020	29/10/2020
Date analysed	-			29/10/2020	1	29/10/2020	29/10/2020		29/10/2020	29/10/2020
pH	pH Units		Inorg-001	[NT]	1	6.6	[NT]		100	[NT]
Chloride, Cl	mg/L	1	Inorg-081	[NT]	1	270	270	0	89	#
Sulphate, SO4	mg/L	1	Inorg-081	[NT]	1	290	300	3	110	75
Total Organic Carbon	mg/L	1	Inorg-079	<1	1	200	190	5	105	116

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

MISC_INORG

Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Results from report 254589-A have been added into this report as per client request.

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Consulting Earth Scientists Pty Ltd
Attention	Andrew Carras

Sample Login Details	
Your reference	CES200502
Envirolab Reference	254589-A
Date Sample Received	29/10/2020
Date Instructions Received	11/11/2020
Date Results Expected to be Reported	18/11/2020

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	6 water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	15.4
Cooling Method	Ice
Sampling Date Provided	YES

Comments
Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	vTRH in Water (C6-C9) NEPM	svTRH (C10-C40) in Water	PAHsin Water	HM in water - dissolved	pH	Chloride, Cl	Sulphate, SO4	Total Organic Carbon	On Hold
MW1									✓
MW2									✓
MW3	✓	✓	✓	✓	✓	✓	✓	✓	
MW4									✓
MW5									✓
MW3 - [DUPLICATE]	✓	✓	✓	✓	✓	✓	✓	✓	

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

Additional Info

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

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

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

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

CHAIN OF CUSTODY FORM - Client

ENVIROLAB GROUP
National phone number 1300 424 344

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02 9910 6200 | sydney@envirolab.com.au

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08 8967 1201 | darwin@envirolab.com.au

Client: Consulting Earth Scientists	Client Project Name/Number/Site etc (ie report title): CES200502
Contact Person: ANDREW CARRAS	PO No.:
Project Mgr: ANDREW CARRAS	Envirolab Quote No. :
Sampler: " "	Date results required:
Address:	Or choose: standard / same day / 1 day / 2 day / 3 day *Note: Inform lab in advance if urgent turnaround is required - surcharges apply*
Phone: 0430276466 Mob:	Additional report format: esdat / equis /
Email: andrew.carras@consultingearth.com.au	Lab Comments:

Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	Metals	PAH	TRH	TOC	PH	Soluble chloride / soluble sulphate									Comments: Provide as much information about the sample as you can
1	MW1	–	29/10/20	Water	X	X	X	X	X	X									
2	MW2	↓	↓	↓	↓	↓	↓	↓	↓	↓									
3	MW3	↓	↓	↓	↓	↓	↓	↓	↓	↓									
4	MW4	↓	↓	↓	↓	↓	↓	↓	↓	↓									
5	MW5	↓	↓	↓	↓	↓	↓	↓	↓	↓									

☐ *Please tick the box if observed settled sediment present in water samples is to be included in the extraction and/or analysis*

Relinquished by (Company): ~~CES~~ CES	Received by (Company): ELS Syd	*Lab Use Only*
Print Name: A - CARRAS	Print Name: R Hazeen	Job number: 254589 — Cooling: Ice / Ice pack / None
Date & Time: 29/10/20	Date & Time: 29/10/2020 16:32	Temperature: 14.3 — Security seal: Intact / Broken / None
Signature: [signature]	Signature: [signature]	TAT Req - SAME day / 1 / 2 / 3 / 4 / STD