SMITH BAY WHARF

DRAFT ENVIRONMENTAL IMPACT STATEMENT

APPENDIX L

PREPARED FOR KANGAROO ISLAND PLANTATION TIMBERS BY ENVIRONMENTAL PROJECTS

JANUARY 2019

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APPENDIX **L**

APPENDIX L – GEOLOGY, SOILS AND WATER

Appendix L – Smith Bay Site Investigation – Environmental Projects

environmental projects

Smith Bay Site Investigation

Smith Bay Kangaroo Island

10 October 2017

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1. INTRODUCTION

Environmental Projects (EP) completed a desktop review of previous investigations undertaken at the site and other available published information in order to determine geological, soil, surface water and groundwater conditions at the site.

1.1 Background

As part of the development of the proposed Smith Bay deep water wharf, major earthworks for site development and construction of on-shore facilities, such as timber storage areas (log and woodchip), site buildings, equipment for transfer of timber products to ships for export and supporting infrastructure, would be required.

The on-shore timber product storage area would consist of constructed plateaus to provide flat areas on the otherwise gently sloping site. Approximately half of the storage area site already has narrow plateaus that were formed to create level surfaces for previous abalone tanks; however, they will need to be modified to cater for practical timber product storage.

The preliminary design has a balance cut and fill to achieve wider plateaus for storage and placement of buildings and other infrastructure. The effect of the design is to have no export of soil from the site, with potentially importation of quarry material (that satisfy engineering specifications) for construction of the site surface hardstand.

A stormwater containment and retention system to capture all runoff from the site would also be constructed.

Geological, soil and groundwater conditions at the site needs to be understood for:

- detailing the existing environment, in relation to geology, soil, surface water and groundwater for the environmental impact statement (EIS) being prepared for the proposed development
- identification of any issues associated with historical site activities that may have contaminated soil or groundwater on the site
- assessment of aspects which require specific management during site preparation, development, construction or operation.

1.2 Objectives

The objective of the review was to:

- detail the existing geological, soil and groundwater conditions of the Project site within the context of the wider region (to identify potential site specific environmental impacts).

2. SITE INVESTIGATION

The data sources for this desktop review included

- preliminary site investigation (PSI) undertaken in 2016, which collates and assesses data from field investigations and desktop research, see Section 2.1

- published Coastal Acid Sulfate Soil (CASS) data for Kangaroo Island, see Section 2.2.

2.1 Preliminary Site Investigation

Site soil and groundwater condition were assessed by preliminary site investigation (PSI) undertaken in 2016 and reported in:

- Allotments 51 & 52 North Coast Road, Wisanger, South Australia, Preliminary Site Investigation, LBW|ep, 22 December 2016

The PSI included:

- site history investigations (Site History), summarised in Section 2.1.1
- intrusive soil and groundwater sampling, summarised in Section 2.1.2.

2.1.1 Site History

The Site History was undertaken with reference to the following sources:

- Edwards J. W., Van Alphen M and Langley A., Identification and Assessment of Contaminated Land: Improving Site History Appraisal. Contaminated Sites Monograph Series No 3, SA Health Commission, Adelaide (1994)
- National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM) 1999, as amended 2013
- Planning SA (2001) Site Contamination, Planning Advisory Notice 20 (PAN20)
- Section 50 and Schedule 3 Part 1 of the Environment Protection Regulations 2009.

Based on the desktop review of available information, it was likely that the site was used as farmland until 2001 when it was purchased by K.I Seafood Marketing, before being transferred to Kangaroo Island Abalone Pty Ltd in 2002. It was then used for onshore abalone farming until sometime before 2015, after which the site was disused.

Surrounding areas were predominantly used for farmland purposes with the exception of a commercial onshore abalone farm to the immediate east of site.

Of the likely and suspected historic on- and off-site uses, the most relevant with respect to potential contamination migrating to or being found on the subject site included:

- fill or soil importation
- agricultural activities
- aquaculture or fish processing.

The results of the site history investigation and identification of relevant potentially contaminating activities (PCAs), as defined by Schedule 3 Part 1 of the Environment Protection Regulations 2009, informed the subsequent intrusive assessment.

2.1.2 Intrusive Sampling

The intrusive investigations were undertaken with reference to the following sources:

- Environment Protection Authority, 2009, Guidelines for the Assessment and Remediation of Groundwater Contamination
- ASC NEPM
- Friebel E and Nadebaum P (2011) Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater: Part 2 Application Document, Technical Report No 10, CRC CARE Adelaide
- Standards Australia AS 4482.1-2005 Guide to the investigation and sampling of sites with potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds
- Standards Australia AS 4482.2-1999 Guide to the investigation of potentially contaminated soil – Part 2: Volatile substances.

A sampling plan was prepared based on initial findings of the site history, including a combination of systematic (grid-based) and judgemental (targeted) sampling and testing.

A sampling grid of 20 soil bore locations (BH01–BH20) across an approximate 80-m grid and six targeted boreholes (T1–T6) was adopted.

One groundwater sample was retrieved using groundwater grab sampling methodology from soil bore location BH13 after the recovery of the soil core.

A liquid grab sample, identified as GW02, was collected from a 100-mm PVC inspection point which was possibly part of a disused septic tank system.

The PSI report is provided in **Appendix A.**

2.2 CASS Review

The likely CASS status of site soils was determined on the basis of review of:

- Coastline—A Strategy for Implementing CPB Policies on Coastal Acid Sulfate Soils in South Australia, South Australian Coast Protection Board, 2003
- South Australian Inventory of Acid Sulfate Soil Risk (Atlas), CSIRO Land and Water, 2003
- Kangaroo Island Plan, South Australian Planning Strategy, Department of Planning and Local Government, 2011.

3. EXISTING ENVIRONMENT – REGIONAL SETTING

3.1 Geology

The northern coastal zone of Kangaroo Island, where the project area lies, comprises a dissected margin of a laterite surface, with occasional ridges and hills on metamorphics (DEWNR 2011, in EBS 2016). The 1:250,000 Kingscote geology map sheet SI-53-16 (Geological Survey of SA, Dept. of Mines 1962) indicates that the site is in an area underlain by a sequence of Quaternary and Cambrian age sediments, consisting of:

- Quaternary: consolidated dune limestone (eolianite) of the coastal areas; with numerous internal unconformities and fossil soil horizons; siliceous white sands and lesser sheet (soil) travertines extending inland

- Cambrian: Stokes Bay Sandstone formation, principally massive coarsely current and slump-bedded red and white sandstones and quartzites, with marbles and calcareous slates on the Fleurieu Peninsula.

There is a geological monument 2 km east of the site. This is the 'Smith Bay Glacial Pavements' which extends further along the coast towards Emu Bay for about 1 km.

3.2 Soils

Kangaroo Island soils include calcareous sand soil of minimal development, coherent sandy soils, sandy soils with mottled yellow clayey subsoil and cracking clays.

3.3 Coastal Acid Sulfate Soils

Coastal acid sulfate soils (CASS) are soils and sediments containing iron sulphides. When they are exposed to air due to drainage or disturbance, they produce sulphuric acid and increase the potential for release of metals into the environment.

Potential CASS are present in the coastal regions of South Australia where low-lying coastal sediments have been deposited. Based on site observation (elevation of escarpment and lower beach area) and available maps published by the Australian Soil Resource Information System (ASRIS) no CASS are likely to be present in the locality of the site; however, this evidence is not conclusive.

According to *Coastline—A Strategy for Implementing CPB Policies on Coastal Acid Sulfate Soils in South Australia*, Kangaroo Island does not have any known CASS sites (South Australian Coast Protection Board 2003). The Kangaroo Island Plan which was a volume of the South Australian Planning Strategy (Department of Planning and Local Government 2011) provides management policies for acid sulfate soils but does not identify locations at risk from CASS.

3.4 Groundwater

The South Australian Government Water Connect database identified four licensed wells within one kilometre radius of the site.

The following key information was identified from the database results:

- One registered bore was located just within the northern boundary of the site. Two other registered bores were located along the northern boundary.
- The wells along the northern boundary of the site were classed as water wells and were installed in 2015 for investigation purposes. Their current status was recorded as being backfilled.
- One registered bore was located off site adjacent to the eastern boundary. It was classed as a water well for stock purposes.
- The wells' drilled depths ranged from 20 m below ground level (mBGL) to 54 mBGL. Depth to groundwater was only recorded in one well (drilled to 54 mBGL) and was listed as 5 mBGL.
- Measured total dissolved solids (TDS) concentration recorded from the water well for stock purposes off site to the east was 11,192 mg/L on 5 January 1996. According to the Environment Protection (Water Quality) Policy (2015), groundwater with TDS concentrations exceeding 1,200 mg/L is deemed unsuitable for drinking water purposes.

Based on topography, regional groundwater beneath the site is anticipated to flow in a northerly direction towards Smith Bay.

3.5 Surface Water

The Smith Bay land area was observed during site inspection to generally consists of shallow, seasonal drainage lines, with occasional seasonal lagoons. Catchments for these drainage lines generally extend inland and deepen, extending south-east and south-west into higher-elevation hinterland. The most significant surface water body (though also seasonal) is Smith Creek, west (and off-site) of the development site, which has a shallow estuary into Smith Bay. The creek's catchment deepens rapidly as it extends higher into the south-east.

4. INVESTIGATION RESULTS

4.1 Lithology

The site surface usually consisted of a shallow reworked natural layer including various sand or clay mixtures. This fill may have been imported during development of the site for former land-based aquaculture use.

Natural soils typically consisted of various clay and silt mixtures from the surface.

The underlying natural soils were generally described as medium to high plasticity clays with various calcareous, silt and sand inclusions. Sandstone gravels and sandstone were usually encountered with depth.

Field observations indicated that the site soils were free from any physical evidence of contamination.

4.2 CASS

No CASS was intercepted during site investigation.

4.3 Groundwater

A groundwater grab sample was collected from a soil borehole location towards the northern boundary of site. The depth to water during drilling was measured at 1.65 mBGL. The total depth of the soil borehole was 2.25 mBGL. Groundwater recharge into the soil borehole was slow, suggesting low aquifer yield.

Groundwater in this location had TDS concentration of 18,000 mg/L, indicative of saline conditions. Groundwater is potentially connected to the marine environment.

4.4 Site Contamination Status

4.4.1 Soil

Concentrations of all analytes in samples tested were below the laboratory limit of reporting (LOR) and/or the applicable ASC NEPM 1999 (amended 2013) Health Investigation and Screening Levels (HIL/HSLs) for the proposed industrial use and Ecological Investigation and Screening Levels (EIL/ESLs).

The results indicated background levels of soil contaminant concentrations and therefore the absence of site contamination.

4.4.2 Groundwater

Iron and lead concentrations exceeded the criteria specified in the Australian and New Zealand Environment Conservation Council (ANZECC) aquaculture and human consumption for saltwater production.

Cobalt and copper concentrations exceeded the ANZECC aquatic marine ecosystems criteria.

Concentrations of TRH were reported in groundwater but retesting of the sample confirmed that no petroleum hydrocarbons were present.

Nitrite concentrations exceeded the criterion specified by the ANZECC aquaculture and human consumption for saltwater production.

Sulfate concentrations exceeded the National Health and Medical Research Council (NHMRC) recreational aesthetic criterion.

All other contaminants included in the extensive analytical suite for the groundwater grab sample had concentrations below the laboratory LOR.

The results did not suggest that previous site activities had caused groundwater contamination and detected concentrations were considered to be background levels for saline water.

5. CONCLUSIONS

Information collated as part of this review is relevant for describing the existing environment for geology, soils, surface water and groundwater for the subject site.

On the basis of the results of this desk-top review, the following conclusions could be drawn with regards to site soil and groundwater status:

- regional soils were likely to include calcareous sand soil of minimal development, coherent sandy soils, sandy soils with mottled yellow clayey subsoil and cracking clays. Site drilling intersected various clay and silt mixtures from the surface underlain by high plasticity clays with various calcareous, silt and sand inclusions. Sandstone gravels and sandstone were usually encountered with depth.
- CASS was unlikely to be present in the region and was not intersected during site drilling.
- Total dissolved solids (TDS) concentration recorded from the water well off site to the east was 11,192 mg/L on 5 January 1996. Based on topography, regional groundwater beneath the site was anticipated to flow in a northerly direction towards Smith Bay.
- Depth to groundwater measured during drilling was 1.65 mBGL, TDS concentration of 18,000 mg/L was indicative of saline conditions, recharge suggested low aquifer yield.
- The results of soil sample analysis indicated background levels of soil contaminant concentrations and therefore the absence of site contamination.
- The results of groundwater sample analysis did not suggest that previous site activities had caused groundwater contamination and detected concentrations were considered to be background levels for saline water.

Appendix A

Previous Investigation

LBW | environmental projects

Allotments 51 & 52 North Coast Road, Wisanger, South Australia Preliminary Site Investigation

Report for Kangaroo Island Plantation Timbers

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LBW | environmental projects

Allotments 51 & 52 North Coast Road, Wisanger, South Australia
Preliminary Site Investigation

Report for Kangaroo Island Plantation Timbers

LBW | ep

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LBW|ep

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LBW | ep

List of Acronyms

ADWG	Australian Drinking Water Guidelines 2011
AHD	Australian Height Datum
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended in 2013)
ASLP	Australian Standard Leaching Procedure (AS4439.3)
CSM	Conceptual Site Model
CT	Certificate of Title
COC	Chain of Custody
DEWNR	Department for Environment, Water and Natural Resources, Government of South Australia
EPA	Environment Protection Authority, Government of South Australia
EP Act	*Environment Protection Act 1993*, Government of South Australia
EPP-WQ	*Environment Protection (Water Quality) Policy 2015*, Government of South Australia
IWS	Intermediate Waste Soil
LBW | ep	LBW Environmental Projects Pty Ltd
LLCW	Low-Level Contaminated Waste
mAHD	metres Australian Height Datum
mBGL	metres below ground level
MEP	Multiple Extraction Procedure
NEPC	National Environment Protection Council
OCP	Organochlorine pesticides
OPP	Organophosphorus pesticides
PAH	Polycyclic aromatic hydrocarbons
PEV	Protected Environmental Value
PCA	Potentially contaminating activity
PSI	Preliminary Site Investigation
QA/QC	Quality Assurance / Quality Control
RWL	Relative Water Level
SA	South Australia
TDS	Total Dissolved Solids
UST	Underground storage tank
WF	Waste Fill
WQP	*Environment Protection (Water Quality) Policy 2015*, Government of South Australia

Executive Summary

1 Introduction

LBW Environmental Projects (LBW | ep) was commissioned by Kangaroo Island Plantation Timbers Pty Ltd (KIPT) to undertake a Preliminary Site Investigation (PSI) of the allotment identified as comprising pieces 51 and 52 of Deposited Plan 92343, North Coast Road, Wisanger, South Australia (the site). The PSI comprised a desktop site history investigation and a preliminary assessment of site soils and groundwater. A site location plan is provided as Figure 1 in Appendix A.

At the time of commissioning and based on the information provided, LBW | ep understood:

- The site had an approximate area of 11.7 ha;
- The site was historically used for agricultural purposes, cropping and grazing, and for land based abalone aquaculture;
- The history of potentially contaminating activities (PCAs) undertaken at the site was unknown;
- KIPT proposed to construct a deep water wharf with associated on-shore levelled tiers over an approximate 8 ha portion of the site, for storage of logs for shipment, access roads and other associated infrastructure;
- Prior to construction, KIPT sought to gain a better understanding of the potential contamination risks associated with PCAs that had occurred at the site.

1.1 Objectives

The objectives of the PSI – Site History were to:

- Research current and historical land uses and associated activities undertaken at or adjacent to the site to identify whether PCAs may have occurred on or near the subject site; and
- Provide a current desktop assessment of risk with respect to the likelihood that PCAs could have caused site contamination, with regards to the proposed commercial land use.

The objectives of the intrusive assessment were to:

- Characterise the contamination status of site soils in consideration of the PCAs and areas of interest identified in the Site History Review;
- Assess whether site soils were suitable for the proposed commercial land use, or whether remediation or management might be needed to achieve the desired outcome;
- Develop preliminary advice on waste classification for soils which may become surplus to needs during future redevelopment of the site, and
- Assess the groundwater contamination status with respect to the proposed commercial land use.

This investigation was undertaken in general accordance with LBW | ep's proposal to KIPT, dated 26 August 2016.

2 Regulatory Framework

In South Australia, the assessment, management and remediation of site contamination is regulated by the *Environment Protection Act 1993* (EP Act). The *EP Act 1993* defines site contamination in section 5B as follows:

(1) For the purposes of this Act, site contamination exists at a site if—

(a) chemical substances are present on or below the surface of the site in concentrations above the background concentrations (if any); and

(b) the chemical substances have, at least in part, come to be present there as a result of an activity at the site or elsewhere; and

(c) the presence of the chemical substances in those concentrations has resulted in—

(i) actual or potential harm to the health or safety of human beings that is not trivial, taking into account current or proposed land uses; or

(ii) actual or potential harm to water that is not trivial; or

(iii) other actual or potential environmental harm that is not trivial, taking into account current or proposed land uses.

(2) For the purposes of this Act, environmental harm is caused by the presence of chemical substances—

(a) whether the harm is a direct or indirect result of the presence of the chemical substances; and

(b) whether the harm results from the presence of the chemical substances alone or the combined effects of the presence of the chemical substances and other factors.

(3) For the purposes of this Act, site contamination does not exist at a site if circumstances of a kind prescribed by regulation apply to the site.

The first stage in determining whether or not site contamination exists is to assess whether chemical substances have been added to the site through an activity and whether these substances are above background concentrations. The second stage is to assess whether the chemical substances have resulted in actual or potential harm to the health or safety of human beings or the environment (including water) that is not trivial.

If site contamination is determined to be present at a site, the *EP Act 1993* provides mechanisms to assign responsibility for the contamination and appropriate assessment and/or remediation of the contamination.

The professional assessment of site contamination and consequential risk to human health and the environment is guided by the *National Environment Protection (Assessment of Site Contamination) Measure,* National Environment Protection Council (ASC NEPM) 1999, as amended 2013), Australian Standards and numerous other guidelines and technical publications prepared by the SA EPA and other scientific organisations.

3 Scope of Work and Methodology – Site History

3.1 Guidance

The PSI – Site History works were undertaken with reference to the guidance provided in the following documents:

- Edwards J. W., Van Alphen M and Langley A., Identification and Assessment of Contaminated Land: Improving Site History Appraisal. Contaminated Sites Monograph Series No 3, SA Health Commission, Adelaide (1994);
- ASC NEPM, and
- Planning SA (2001) Site Contamination, Planning Advisory Notice 20 (PAN20).

Assessment of PCAs was made with reference to Section 50 and Schedule 3 Part 1 of the *Environment Protection Regulations 2009* as well as PAN20.

3.2 Methodology

The history of PCAs undertaken on or adjacent to the site was researched using the following sources of information:

- Aerial photographic records provided by Mapland and other aerial image resources;
- Certificate of title information obtained from the Lands Titles Office;
- Published geology and topography maps of the region;
- Water Connect database of groundwater records, maintained by the Department for Environment, Water and Natural Resources (DEWNR);
- Local planning authority records;
- Environment Protection Authority (EPA) Public Register search under Section 7, Land and Business (Sales & Conveyancing) Act 1994 and interrogation of the Public Register Directory Site Contamination Index for the local area;
- SafeWork SA Dangerous Substances Register; and
- Observations and information gathered during a site inspection.

4 Site Information

4.1 Site Details and Identification

Site identification details are provided in Table 1. A copy of the current Certificates of Title (CTs) for the site are provided in Appendix B.

Table 1 Site Identification Details

Site address	1970B North Coast Road, Wisanger, SA
CT References	CT Volume 6127 Folio 273
Site Area	117,000 m² (approximately)
Current Site Owner	Cinerea Pty Ltd
Local Government Authority	Kangaroo Island Council
Zoning	Coastal Conservation
Current Land Use	Commercial
Proposed Land Use	Commercial

4.2 Topography

According to the topographic map of the Yorke Peninsula and Kangaroo Island (Dept. of Lands 1990), the site has an elevation of approximately 10-30 m Australian Height Datum (AHD), sloping to the north towards Smith Bay. The surrounding land generally slopes to the north, with a steep cliff face along the foreshore on the northern end of site.

4.3 Geology

The 1:250,000 Kingscote geology map sheet SI-53-16 (Geological Survey of SA, Dept. of Mines 1962), indicated that the site was in an area underlain by a sequence of Quaternary and Cambrian age sediments, consisting of:

- Quaternary: consolidated dune limestone (eolianite) of the coastal areas; with numerous internal unconformities and fossil soil horizons; siliceous white sands and lesser sheet (soil) travertines extend inland; and
- Cambrian: Stokes Bay Sandstone formation: principally massive coarsely current and slump-bedded red and white sandstones and quartzites, with marbles and calcareous slates on the Fleurieu Peninsula.

4.4 Hydrogeology

Regional groundwater beneath the site is anticipated to flow towards Smith Bay, in a northerly direction.

In September 2016, a search of the South Australian Government *Water Connect* database identified 4 wells within a 1 km radius of the site. A copy of the search results is provided in Appendix C.

The following key information was identified from the database results:

- One registered bore was located just within the northern boundary of the site. Two other registered bores were located along the northern boundary;
- The wells along the northern boundary of site were classed as water wells and were installed in 2015 for investigation purposes. Their current status was recorded as being backfilled;

- One registered bore was located offsite adjacent to the eastern boundary. It was classed as a water well for stock purposes;
- The wells' drilled depths ranged from 20 m below ground level (mBGL) to 54 mBGL. Depth to groundwater was only recorded in one well (drilled to 54 mBGL) and was listed as 5 mBGL.
- Measured total dissolved solids (TDS) concentrations recorded from the water well for stock purposes offsite to the east was 11,192 mg/L on 5 January 1996. According to the *Environment Protection (Water Quality) Policy* (2015), groundwater with TDS concentrations exceeding 1,200 mg/L is deemed unsuitable for drinking water purposes.

4.5 Sensitive Receiving Environments

The closest sensitive receiving environments were Smith Creek, located between 20 and 100 m west of the site and Smith Bay, located 10 m to the north of the site boundary.

4.6 Site Inspection

On 11 October 2016, an experienced Environmental Consultant from LBW | ep conducted a walkover of the site. Important features pertaining to the potential for site contamination were noted and a photographic record was made.

Selected photographs taken of the on-site features are presented in Appendix D.

At the time of the inspection the following onsite key observations were made:

- The site had a moderate to steep slope north towards the foreshore of Smith Bay;
- The site included a house, in the approximate center, with:
  - Septic system north of the house
  - A shed to the south of the house
  - Immediately south of the shed a 100 mm PVC pipe and concrete plinth were noted at the surface and appeared to be a potential disused septic.
  - Approximately 5 aboveground rainwater tanks.
- Remnant infrastructure from a former onshore abalone farm was evident towards the eastern half of site. It included:
  - Cut and levelled platforms into the hillside
  - Rows of circular, potential abalone tank footprints that graded to an underground drain in the center
  - Decommissioned underground power
  - A steep earthen slope north of each cut level. At the base of the steep slope was a concrete drain with large pipes draining into the underground drain. The pipes appeared to be coming from the center of the former circular abalone tanks
  - Underground and surface drainage infrastructure that appeared associated with abalone tanks/farming
- No evidence of fuel storage, significant chemical storage or surficial staining or odours;
- No asbestos containing materials (ACM) observed on the site's surface;
- Two dams on the approximate western side of the site. The dam towards the north western corner of site had large pipes entering/exiting from the south-east and north-west corners and 'gate' at the western side;

- Some potential agricultural cropping to the south and west of site;
- A dirt access road to the house along the southern half of the western boundary and north-east to the house. An access road from the house to the foreshore

At the time of the inspection the following offsite key observations were made:

- The cut and levelled platforms with footprints of former abalone tanks and associated drainage/water infrastructure continued to the immediate east of the site boundary.
- Possibly three large sheds and a potential generator
- An active abalone farm was located to the east of site
- Farmland and a creek running into Smith Bay were located to the west of site
- Farmland was located to the south of site. Crop dusting further to the south was observed during the site inspection
- The sea (Investigator Strait) was located to the north of site. Water was observed to be discharging from the active abalone farm, east of site, into the ocean

4.7 Site Interview

Mr John Sergeant, Managing Director of KIPT, contacted the previous owners of the site who confirmed the 100mm pvc riser and concrete plinth were part of a disused septic system.

4.8 Adjacent Land Uses

Based upon the site inspection and review of current aerial photography, the land immediately surrounding the site is described below:

- North: Smith Bay and Investigator Strait ;
- East: continuation of cut and levelled platforms with former circular abalone tank footprints with associated drainage/water infrastructure, approximately three sheds and an active abalone farm;
- South: agricultural land;
- West: agricultural land, Smith creek running into Smith Bay.

5 Site History

5.1 Certificate of Title

On 31 August 2016, LBW|ep conducted a search on the Property Assist website of the current and historical certificates of title (CTs) for the site.

Available records date back to 1906 with the land originally granted to John Turner, a farmer. The site was owned by farmers until at least 1995.

Two easements were granted to ETSA Corporation (now SA Power Networks) in 1997 and 1998.

The site was purchased by K.I Seafood Marketing Pty Ltd in 2001 and transferred to Kangaroo Island Abalone Pty Ltd in 2002. The current site owner, Cinera Pty Ltd, purchased the site in 2014.

For a more detailed site ownership history, refer to the summary of current and historical information presented as a title tree in Appendix B.

5.2 Aerial Photographs

Selected aerial photographs of the site and surrounding area, covering a period from 1983 to 1999 inclusive, were acquired from DEWNR. Satellite images taken in 2002 and 2015 were obtained from Google Earth. Copies of the images are provided in Appendix E.

A summary of the features and apparent land use(s) observed in the historical aerial photography is provided in Table 2.

Table 2 Aerial Photography Review

Year	Description
1983	On-site: • The site was vacant farmland with some trees scattered along the northern boundary Off-site: • The surrounding land was generally farmland, with some small farmhouses to the south and south east of the site; • A dam was located to the east of the site; • Investigator Strait was located along the northern site boundary; and • A creek was located to the west of the site.
1989	On-site: Largely unchanged from the previous image. Off-site: Largely unchanged from the previous image.
1993	On-site: Largely unchanged from the previous image. Off-site: Largely unchanged from the previous image.
1999	On-site: • A potential house and shed had been built in the approximate centre of site with access road running down the western boundary before turning north-east towards the buildings; • A water dam had been built near the eastern boundary; • The southern portion of the site remained unchanged. Offsite: • A commercial development was present to the east of the site and appeared to be the on-shore abalone farm.

Year	Description
2002	On-site: • Significant development of the site was apparent. On the approximate eastern half of site there appeared to have occurred significant earthworks to create approximately five levelled platforms; • Circular structures, potentially on-shore above ground water tanks for abalone farming, were evident with other associated infrastructure; • The dam on the eastern boundary was no longer visible; • A dam was located towards the north-western corner of site. A pipeline appeared to run from the dam to the east of site; • Additional access tracks were evident. Offsite: • A large shed or shade structure was located to the east of the site boundary; and • Significant natural vegetation was noted beyond the creek to the west of the site.
2015	On-site: • Commercial operations, potentially on-shore abalone farming, appeared to have increased between 2002 and sometime before 2015 (evident from the many additional potential above ground abalone tank footprints onsite) but appeared to have stopped sometime before 2015 and potential above ground tanks for site operations had been removed; • Former commercial footprint appeared overgrown and disused; • Trees were present alongside the track along the western boundary. Offsite: Largely unchanged from the previous image.

5.3 EPA Public Register Searches

5.3.1 Section 7

A Section 7 Search under the Land and Business (Sales and Conveyancing) Act 1994 was conducted by the Environmental Protection Authority for the site. A copy of the search results is provided in Appendix F. The search results indicated the following, as of 29 June 2016:

- There were no mortgages, charges or prescribed encumbrances affecting the site under the relevant sections of the *Environment Protection Act 1993.*
- No licence or environmental authorisation was ever issued to operate a waste depot on the land under the *South Australia Waste Management Commission Act 1979*, the *Waste Management Act 1987* or the *Environment Protection Act 1993;*
  - The EPA held details of a license no longer in force issued under Part 6 of the Environment Protection Act 1993 to conduct at the land any other prescribed activity of environmental significance under Schedule 1 of Part A of that Act.
  - LBW | ep contacted the EPA Public Register on 28 September 2016 for any information regarding the cancelled license. LBW | ep were provided with a copy of the License provided to KI Seafood Marketing granting permission to undertake activities of environmental significance. These activities were listed as aquaculture or fish farming.
- In relation to the subject site, the EPA Register did not hold any information relating to:
  - Material or serious environmental harm cause or threatened in the course of an activity;
  - Notifications to SA EPA for contamination of underground water under section 83A or serious or material environmental harm under section 83 of the *Environment Protection Act 1993;* and
  - Environmental assessment report(s) or site contamination audit report(s).

5.3.2 Site Contamination Index

The EPA maintains a searchable database on its website of key notifications made to the EPA in regard to site contamination. The database is called the Site Contamination Index (http://www.epa.sa.gov.au/data_and_publications/site_contamination_index/). On 31 August 2016, LBW | ep conducted a search of the database for the suburbs within 1 km of the subject site including Wisanger (see Appendix F). No notifications were returned for the search.

5.4 Dangerous Substances Register

A request for a search of the site on the Dangerous Substances Register was lodged with SafeWork SA on 31 August 2016. A response from SafeWork SA dated 6 September 2016 indicated no records relating to the site. A copy of the response is provided in Appendix G.

5.5 Kangaroo Island Council

On 31 August 2016, LBW | ep contacted a representative from the Kangaroo Island Council. Council indicated that they held records relating to the following development applications:

- A shed;
- A new dwelling;
- Land division of 1 allotment into 2 allotments;
- 40 x 20 metre live feed shed; and
- An Abalone farm.

The council did not provide application dates for the listed developments.

5.6 Historical Overview

Based on the desktop site history research conducted by LBW | ep, it was likely that the site was used as farmland until 2001 when it was purchased by K.I Seafood Marketing, before being transferred to Kangaroo Island Abalone Pty Ltd in 2002. It was then used for onshore abalone farming until sometime before 2015, after which the site has been disused.

Surrounding areas were predominantly used for farmland purposes with the exception of a commercial onshore abalone farm to the immediate east of site.

Of the likely and suspected historic on and off-site uses, the most relevant with respect to potential contamination migrating to or being found on the subject site included:

- Fill or soil importation;
- Agricultural activities; and
- Aquaculture or Fish processing.

6 Preliminary Conceptual Site Model

A preliminary conceptual site model (CSM) has been formulated, utilising the site history information reported herein and LBW | ep's professional judgement, to assess the presence of PCAs (possible sources), exposure pathways and subsequent risk to receptors for the proposed commercial use. Relevant receptors include site construction workers, wharf workers, ecosystems and the built environment.

A desktop assessment of PCAs and other activities that were likely to have been undertaken at or near the site and their likely significance with respect to site contamination for the proposed land use is presented in Tables 3 and 4.

Table 3 Preliminary CSM - Desktop Assessment of Risk from PCAs

Potentially contaminating activity	Contaminants of potential concern	Likely location (See Figures 2 and 3 in Appendix A)	Relevant Media			Potential Receptors			Potential risk and/or liability for future commercial land use
			Soil	Soil Vapour	Groundwater	Humans	Ecosystems	Built	
On Site									
Fill or soil importation	Various, typically including: Heavy metals, polycyclic aromatic hydrocarbons, and petroleum hydrocarbons.	In soils across the site particularly in former tank base areas	Y	Y	Y	Y	Y	Y	**Moderate** Uncontrolled fill is expected to be present in the vicinity of the vehicle track and commercial areas associated with onshore abalone farming facilities. In the event that contamination is present in uncontrolled fill, there may be a risk to future site users as well as to site workers through dermal contact and contaminated dust inhalation. Potential for volatile chemical contamination in the fill is considered to be low. In the event that contaminated waste soils are generated during redevelopment works, higher costs for off-site disposal are likely to be incurred.
Off-site									
Fill or soil importation	Various, typically including: Heavy metals, polycyclic aromatic hydrocarbons, and petroleum hydrocarbons	East, south and west of the site	Y	-	-	Y	Y	-	**Negligible** Contaminated fill on adjacent sites was unlikely to present a risk to the proposed land use as contaminants commonly encountered in fill including metals and polycyclic aromatic hydrocarbons, posed minimal migration risk and very low vapour risk.

Table 4 Preliminary CSM - Desktop Assessment of Risk from Other Activities of Environmental Significance

Potentially contaminating activity	Contaminants of potential concern	Likely location (See Figure 2 in Appendix A)	Relevant Media			Potential Receptors			Potential risk and/or liability for future sensitive land use
			Soil	Soil Vapour	Groundwater	Humans	Ecosystems	Built	
On Site									
Food production and animal and plant product processing – fish processing	Nutrients, heavy metals, polycyclic aromatic hydrocarbons, petroleum hydrocarbons	Northern portion of the site	Y	-	-	Y	Y	-	**Moderate** The northern portion of the site was historically used as a seafood/abalone farm. There is a potential for site contamination to exist as a result of this commercial use. In the event that contamination is present in soils, risks for future users are likely to be low. Waste soils generated by redevelopment works may be contaminated and pose higher cost for off-site disposal. Leaks from onsite storage containers or poor waste disposal practices could contaminate soils and groundwater. Groundwater contamination may pose a risk to site users via vapour intrusion and groundwater extraction, as well as to site workers through dermal contact and contaminated dust inhalation. Contaminated groundwater also poses a minor risk to the nearby marine environment of Gulf St Vincent.
Agricultural activities	Various, typically including: Agricultural chemicals such as herbicides and OCPs		Y	-	-	Y	Y	-	**Low** The site has been used for agricultural activities which may have introduced agricultural chemicals to surface soils. The intensity of historical chemical applications onsite is unknown. Pesticides and termiticides could have been applied around buildings in the northern portion of the site, as well as pesticides and herbicides across the wider site for weed control. Arsenic, OCPs and OPPs may be present in soils, but would be likely to be limited to shallow fill on site. In the event that pesticide contamination was present in soils, risks for future site users are likely to be low. Waste soils generated by redevelopment works may be contaminated and pose higher cost for disposal offsite.
Off-site									
Food production and animal and plant product processing – fish processing	Nutrients, heavy metals, polycyclic aromatic hydrocarbons, petroleum hydrocarbons	Northern portion of the site	Y	-	-	Y	Y	-	**Low** The seafood/abalone farm was also present to the east of the site. There is a potential for site contamination to exist as a result of this commercial use, however contaminant migration via soils was considered highly unlikely.

Potentially contaminating activity	Contaminants of potential concern	Likely location (See Figure 2 in Appendix A)	Relevant Media			Potential Receptors			Potential risk and/or liability for future sensitive land use
			Soil	Soil Vapour	Groundwater	Humans	Ecosystems	Built	
									As the majority of works appeared to be above ground, and the likely northerly groundwater hydraulic gradient, it was considered unlikely groundwater contamination posed an unacceptable risk to the site.
Agricultural activities	Various, typically including: Agricultural chemicals such as herbicides and OCPs		Y	-	Y	Y	Y	-	**Negligible** Historical photographs suggest the surrounding land was also used for agricultural purposes. Specific information relating to the offsite application of chemicals was not identified during the site history investigation. There is a potential for spray drift to have impacted site soils during periods of unfavourable wind conditions, however contaminant migration by soils was considered highly unlikely.

7 Scope of Work and Methodology - Intrusive Assessment

7.1 Intrusive Assessment Guidance

The intrusive investigations were undertaken with reference to the guidance provided in the following documents:

- Environment Protection Authority, 2009, Guidelines for the Assessment and Remediation of Groundwater Contamination.
- National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013 (ASC NEPM);
- Friebel E and Nadebaum P (2011) Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater: Part 2 Application Document, Technical Report No 10, CRC CARE Adelaide;
- Standards Australia AS 4482.1-2005 Guide to the investigation and sampling of sites with potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds; and
- Standards Australia AS 4482.2-1999 Guide to the investigation of potentially contaminated soil – Part 2: Volatile substances.

7.2 Soil Sampling and Analysis Rationale

Prior to the commencement of intrusive investigations onsite, a sampling plan was prepared based on initial findings of LBW | ep's PSI desktop site history research. LBW | ep considered an investigation programme that included a combination of systematic (grid-based) and judgemental (targeted) sampling and testing was needed. A sampling grid of 20 soil bore locations across an approximate 80 metre grid and six targeted boreholes was adopted.

The reduced sampling density, compared to the recommended density in AS 4482.1-2005, was considered appropriate for initial baseline assessment. The sampling density provided for a relatively high resolution and representative characterisation to assess for any contamination of fill and natural soils across the site.

Recovery of soil samples from cores and selection of samples for testing was undertaken using a judgemental approach. Field observation of physical evidence of contamination was used to guide selection of representative samples for laboratory analysis. Chemical testing generally focused on near surface soils, where contamination residues were most likely to be present, within any potential uncontrolled fill materials or from pesticide application and/or other residues. In addition to the analysis of samples from upper soil layers, a range of deeper samples were tested from across the site to characterise underlying natural soils.

Selected soil samples recovered from the sampling locations were tested for a broad range of chemicals associated with the identified PCAs and activities, summarised in Table 5.

Table 5 Summary of Grid Based and Targeted Laboratory Analysis

Analyte	Grid Based Soil Bores	Targeted Soil Bores
	Number of Samples Analysed at the Laboratory	
Heavy Metals (12)[1]	20	5
pH Value	15	-
Organochlorine pesticides (OCPs) & organophosphorus pesticides (OPPs)	9	5

Total recoverable hydrocarbons (TRH) and benzene, toluene, ethylbenzene and xylenes (BTEX)	9	5
Polycyclic aromatic hydrocarbons (PAHs)	9	5
Nitrate, nitrite, ammonia, phosphorus	12	3
Herbicides	6	-
Sulphate and chloride	6	-
NEPM HIL Screen[1]	4	1
NEPM EIL Screen[2]	2	-
SPOCAS/acid sulphate soil	3	-
Termiticides	-	2

[1] NEPM Screen Health Investigation Levels (HILs) for Soil Contaminants – TRH, BTEX, PAHs, phenols, OCPs including mirex and toxophene, OPPs including chlorpyrifos, PCBs, atrazine, bifenthrin, acid herbicides, metals (arsenic, beryllium, boron, cadmium, cobalt, chromium, copper, lead, mercury, manganese, nickel, selenium, zinc), hexavalent chromium and cyanide (free)
[2] NEPM Ecological Investigation Levels (EILs) Screen for Soil Classification (percent iron, cation exchange capacity, pH(CaCl2), total organic carbon and percent clay content)

Analytical testing was undertaken by Envirolab and Eurofins | mgt, both NATA accredited for the testing undertaken.

A plan displaying the soil sampling locations is provided as Figure 2 in Appendix A.

7.2.1 Targeted Sampling

The areas LBW | ep identified for targeted sampling and the rationale for testing are summarised in Table 6. A plan displaying the targeted soil sampling locations is provided as Figure 2 in Appendix A.

Table 6 Targeted Sampling Plan

Area	Rationale	Chemical Testing
T1	Location of shed and garage. Soil bore location, sampling and chemical testing was to investigate the potential for uncontrolled fill, application of mixing/spills of chemicals and sub-slab treatment with termiticides	12 metals OCP and OPP TRH and BTEX PAH Termiticides
T2, T4 & T5	Location of former onshore abalone farm infrastructure and operation. Soil bore locations, sampling and chemical testing was to investigate the potential for uncontrolled fill, nutrients from any feed and supplements for abalone, application of mixing/spills of chemicals, treatment of infrastructure footprint with pesticides, fungicides and termiticides	NEPM HIL Nitrate, nitrite, ammonia and phosphorus 12 metals OCP and OPP TRH and BTEX PAH Termiticides
T3	Location of current septic system. Soil bore location, sampling and chemical testing was to investigate the potential for soil contamination from the septic system	12 metals TRH and BTEX PAH Nitrate, nitrite, ammonia and phosphorus
T6	Location of soil adjacent former abalone tank area drainage discharge point. Soil grab	12 metals OCP and OPP

	sample was to investigate the potential for uncontrolled fill, spills of drainage water and potential additives to water	TRH and BTEX PAH Nitrate, nitrite, ammonia and phosphorus

7.3 Fieldwork Methodology

The intrusive soil and groundwater fieldwork methodology, including field quality assurance/quality control (QA/QC) measures implemented during the investigation are summarised in Table 7.

Table 7 Field investigation methodology

Activity	Details
Environment, Health and Safety	Prior to the commencement of field activities a site specific environmental health and safety (EHS) plan was prepared and a site sampling plan developed. Dial Before You Dig details were obtained by LBW | ep to identify potential underground services at the site. A suitably qualified service locator was engaged by LBW | ep to locate underground services at the proposed drilling locations to provide a high level of confidence that the sampling locations were free of underground services. Locations were adjusted as required based on the presence of services.
Soil sampling	On 11, 12 and 13 October 2016, 20 grid based soil sampling locations (BH01-BH20) and six targeted soil sampling locations (T1-T6) were completed onsite. Grid based soil bores were drilled to depths of at least 1 mBGL. Soil bores BH01 to BH 12 were drilled to an approximate total depth of 5 mBGL using push tube methods. The targeted soil bores were drilled using hand auger methodology to depths ranging from 0.35 mBGL (T5) to 0.8 mBGL (T3). Soil cores recovered by the drilling contractor were discharged into a clean core tray. Soil samples were obtained by LBW | ep's consultant from depth intervals considered relevant for sampling and potential testing, based on field observations, with consideration of potential for contamination. During sampling, individual identification numbers were assigned to each sample collected, based on the borehole ID, and the depth sequence of the sample from the top of the borehole.
Groundwater grab sampling	On 11 October 2016, one groundwater sample was retrieved by In-Depth Drilling using groundwater grab sampling methodology from soil bore location BH13 after the recovery of the soil core. The groundwater grab sample, identified as GW01, was retrieved as follows: • Drilling was completed to approximately 2.25 mBGL using push tube methodology to intersect the saturated zone; • Upon intersecting the groundwater, the outer tube sheath was retracted to expose a metal screen, allowing groundwater to enter the tube; • Groundwater was then recovered from the tube interior using a disposable bailer. On 13 October 2016 a liquid grab sample was collected from a 100 mm PVC inspection point, possibly part of a disused septic tank system. The liquid grab sample, identified as GW02, was collected as follows: • An electronic interface probe (IP) was used to gauge the depth of any liquid in the PVC casing and the total depth. A continuous tone from the IP indicated light non-aqueous phase liquid (LNAPL) was present atop water • Using a dedicated disposal bailer a grab sample of the LNAPL and water was collected.
Sample handling	Soil samples were handled exclusively by an experienced LBW | ep consultant, and samples were stored in glass jars supplied by the primary contract laboratory. The groundwater and water / LNAPL grab samples were stored in appropriate bottles supplied by the contract laboratory. Disposable nitrile gloves were worn by the field representative whilst handling samples and were replaced prior to the collection of each sample.
Decontamination of sampling equipment	Drilling equipment and all reusable sampling equipment (including core trays) were cleaned and scrubbed in Decon-90 solution followed by a potable water rinse prior to drilling and in between sampling locations.

Activity	Details
Quality control duplicate and blank sampling	Two equipment rinsate blank samples were collected. Quality control duplicate and blank samples collected and tested during the intrusive investigation are provided in the chemical summary tables in Appendix H **Soil:** Ten quality control field duplicate samples were collected during the assessment. Field duplicates were blind-coded in the field, so the duplicate sample pairs could not be identified by the laboratory. The following soil duplicate pairs were selected for analysis at the laboratories: • Intra-laboratory Duplicates o Primary sample BH8-1/duplicate BH8-2 o Primary sample T1-1/duplicate T1-2 • Inter-laboratory Duplicates o Primary sample BH18-1/duplicate BH18-5 **Groundwater:** No groundwater grab sample duplicate was collected.
Soil logging	Soil logging was based on field interpretation per the guidance in Standards Australia AS1726-1993 as recommended in the ASC NEPM. Soil bore logs are presented in Appendix J.
Sample preservation	Soil and groundwater / water samples were stored under chilled conditions in a portable cooler immediately following sampling and during delivery to the laboratory. Sample transport was performed in accordance with LBW | ep's chain of custody procedures.
Soil bore and groundwater grab sample bore abandonment	Soil and groundwater grab sample bores were backfilled using soil cuttings.
Laboratory Analysis	**Soil:** Soil samples were dispatched to National Association of Testing Authorities (NATA) accredited laboratories Envirolab (primary laboratory) and Eurofins | MGT (secondary laboratory) for chemical testing of a broad range of analytes. Soils indicating physical evidence of contamination (e.g. ash/cinders) were specifically targeted for analysis. **Groundwater:** Groundwater samples were dispatched to NATA accredited laboratory Envirolab for chemical testing of a broad range of analytes. The groundwater grab sample, *GW01*, was analysed for the following: • NEPM groundwater investigation level (GIL) Screen (TRH, phenols, PAH, OCP, PCB, phthalates, VOC, cyanide, fluoride, metals (aluminium, tin, arsenic, barium, beryllium, boron, cadmium, chromium, hexavalent chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, tin, vanadium and zinc) • Major ions (calcium, potassium, magnesium, sodium, chloride, sulfate and alkalinity) • Nutrients (total nitrogen, nitrite, nitrate, ammonia, TKN and total phosphorus) Sample GW01was submitted for silica gel clean-up following detection of hydrocarbons in groundwater. Wastewater The liquid waste sample collected from the disused septic tank, *GW02*, was analysed for the following: • TPH identification (LNAPL sample) • Nutrients (total nitrogen, nitrite, nitrate, ammonia, TKN and total phosphorus) • Metals (aluminium, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, tin, vanadium and zinc).

8 Beneficial Use Assessment

This Beneficial Use Assessment (BUA) has been prepared to assess the realistic current and potential future beneficial uses of groundwater at the site in the context of background groundwater quality and its impact on potential Protected Environmental Values (PEV) under the Environment Protection (Water Quality) Policy 2015 (EPP-WQ). PEVs are equivalent to beneficial uses. A summary of the assessment of beneficial uses of groundwater at the site is presented in Table 8.

This BUA considers data from the WaterConnect database search carried out during the site history assessment (see section 4.4) and results of LBW | ep's groundwater investigations, as presented in Section 11 of this report.

The BUA informs the selection of appropriate investigation criteria for the protection of identified realistic PEVs.

Table 8 Beneficial Use Assessment

Beneficial Use	Onsite Use	Offsite Use
Aquatic Ecosystems Marine ecosystems	**Likely** The foreshore of Smith Bay borders the northern boundary of site. The shallow groundwater onsite, particularly at the lower elevations towards the foreshore of Smith Bay, is likely to have connection with the marine ecosystem, though the current environment and site have been highly modified/influenced by settlement, agriculture and aquaculture.	**Likely** The foreshore of Smith Bay borders the northern boundary of site. Groundwater flow onsite is inferred to be north towards Smith Bay. It is likely that there is hydraulic connection between groundwater onsite and off-site and the marine ecosystem (Smith Bay) bordering the northern boundary.
Aquatic Ecosystems Freshwater aquatic ecosystems	**Unrealistic** The proposed development plan does not include such uses. The groundwater grab sample had a TDS concentration of 18,000 mg/L and the water well east of site had a recorded TDS concentration of 11,192 mg/L, the concentrations indicating saline groundwater. With the exception of two man made dams, there was no freshwater ecosystem on the site. From observations made onsite, at least one of the dams appeared to be associated with aquaculture, potentially holding seawater from or for above ground tank operations.	**Unrealistic** The nearest water course was Smith Creek located between 20m and 100m west of site which drains into Smith Bay. The water quality of Smith Creek is unknown as are the effects of interconnection with the marine environment (tidal, groundwater, etc.) on Smith Creek. Although unlikely, It is possible that site groundwater is hydraulically connected with Smith Creek to the west of site. The inferred site groundwater flow is assumed to be north towards Smith Bay. The onsite groundwater grab sample and surrounding licensed bores had TDS concentrations ranging from approximately 11,000 mg/L to 18,000 mg/L indicating saline conditions.
Recreation (health) Primary Contact	**Unrealistic** The proposed development plan does not include such uses.	**Likely** Groundwater is not likely to be extracted for primary contact recreation use within the predominantly commercial land use area. However site groundwater is likely to drain into Smith Bay. A wharf capable of accommodating bulk carrier ships is proposed primarily for export of timber, however the frequency of bulk carriers docking at the wharf is proposed for only a small number of days per year. It is therefore possible people could engage in recreational activities in this

Beneficial Use	Onsite Use	Offsite Use
		area, coming into frequent direct contact with seawater (swimming, surfing etc).
Recreation (heath) Secondary Contact	**Unrealistic** The proposed development plan does not include such uses.	**Likely** Groundwater is not likely to be extracted for secondary contact recreation use within the predominantly commercial land use area. However site groundwater is likely to drain into Smith Bay. A wharf capable of accommodating bulk carrier ships is proposed primarily for export of timber, however the frequency of bulk carriers docking at the wharf is proposed for only a small number of days per year. It is therefore possible people could engage in recreational activities in this area, coming into less-frequent contact with seawater (boating, kayaking, fishing etc.),
Recreation (aesthetic) No Contact	**Unrealistic** The proposed development plan does not include such uses.	**Likely** Groundwater is not likely to be extracted offsite for passive recreation value. However groundwater is likely to drain into Smith Bay which does have passive recreational value, in that it is aesthetically pleasant.
Primary Industries Aquaculture & human consumption	**Unrealistic** The proposed development plan does not include such uses.	**Possible but unlikely** Groundwater is not likely to be extracted for aquaculture and human consumption, although it is possible. It is more likely, depending on the type of aquaculture, that water would be extracted from Smith Bay. It is understood the neighbouring onshore abalone farm east of site extracts seawater from Smith Bay for its operation.
Primary Industries Livestock drinking water	**Unrealistic** The proposed development plan does not include such uses.	**Possible** The concentrations identified onsite and from the Water Connect database search had TDS concentrations ranging from approximately 11,000 mg/L to 18,000 mg/L indicating saline conditions. It is unlikely groundwater of this quality would be extracted for livestock drinking water. ANZECC 2000 Table 4.3.1 Tolerances of livestock to total dissolved solids (salinity) in drinking water provides concentrations for beef cattle, dairy cattle, sheep, horses, pigs and poultry. The highest concentration range, before loss of production and a decline in animal condition and health would be expected was 10,000 mg/L to 13, 000 mg/L for sheep (only on lush green feed may tolerate up to 13,000 mg/L).
Primary Industries Irrigation & general water use	**Unrealistic** The proposed development plan does not include such uses. The groundwater grab sample had a TDS concentration of 18,000 mg/L. The water well east of site had a recorded TDS concentration of 11,192 mg/L. The concentrations in both groundwater samples indicate saline groundwater.	**Unrealistic** None of the bores identified in the Water Connect database search were listed as irrigation bores. The onsite groundwater grab sample had a TDS concentration of 18,000 mg/L. The water well east of site had a recorded TDS concentration of 11,192 mg/L. The concentrations in both groundwater samples indicate saline groundwater. It is unlikely groundwater of this quality would be extracted for irrigation and general water use.
Industrial	**Unrealistic**	**Unrealistic**

Beneficial Use	Onsite Use	Offsite Use
	Although unlikely, it is possible that groundwater could be extracted for use onsite.	Industrial use of the groundwater in surrounding areas is possible however is unlikely due the surrounding land use (agriculture) and the quality of the groundwater.
Potable	**Unrealistic** The shallow groundwater is not suitable for potable use. It is more likely that rainwater would be harvested for potable water. As recorded during field investigations, the groundwater grab sample had a TDS concentration of 18,000 mg/L, suggesting shallow groundwater beneath the site exceeded the acceptable TDS range for potable use according to the Australian Drinking Water Guidelines (2011).	**Unrealistic** As detailed in the site history assessment, where recorded on the Water Connect database, TDS concentration in the offsite bore was approximately 11,000 mg/L. These measurements suggest regional shallow groundwater TDS concentrations exceed the palatability range for potable use according to the Australian Drinking Water Guidelines (2011).
Maintenance of Ecosystems Vegetation dependence	**Unrealistic** There are some trees, large shrubs and smaller vegetation growing towards the northern boundary of site along the foreshore The proposed development plan does not include such uses.	**Unrealistic** A small number of mature trees are present near the site and are likely to have root systems potentially accessing the shallow groundwater. The majority of the vegetation onsite and immediately surrounding the site has been highly modified and/or cleared from agricultural activities. Vegetation is likely to have adapted to high salinity in groundwater.

Other factors may apply to the potential for beneficial use of groundwater, for which data was not available or LBW | ep was not aware of, at the time preparing the BUA above. These factors alone, or in combination with other factors, may lead to a different outcome. Based on the above BUA, the following PEVs were considered to be current or realistic potential future uses for groundwater in the vicinity of the site:

- Aquatic ecosystems – Marine Ecosystems
- Recreation – Primary and Secondary Contact
- Recreation – Aesthetic
- Primary Industries – Aquaculture and human consumption
- Primary Industries – Livestock drinking water

See Section 9.3 for rationale for adopted groundwater chemical screening criteria.

9 Screening Criteria

The proposed redevelopment of the site will include the construction of a deep water wharf with associated on-shore levelled tiers over an approximate 8 ha area for storage of logs, access roads and other associated amenities.

9.1 Framework

LBW | ep assessed for the presence or absence of site contamination in soils and a groundwater grab sample in consideration of criteria relevant to commercial/industrial land uses.

The ASC NEPM provides a nationally consistent framework for assessing the presence and significance of site contamination in soil and groundwater. The ASC NEPM methodology is based on assessing the potential for an unacceptable risk to human health or the environment by comparing concentrations of chemical substances to conservative, generic investigation levels for various environmental settings and land use scenarios.

Investigation levels are defined in the ASC NEPM as… *concentrations of a contaminant above which further appropriate investigation and evaluation will be required. They are not clean up or response levels*. A response level is defined as… *the concentration of a contaminant at a specific site based on a site assessment for which some form of response is required to provide an adequate margin of safety to protect public health and/or the environment*.

The ASC NEPM health investigation levels (HILs) (or health screening levels (HSLs) for petroleum hydrocarbon) are based on conservative assumptions around providing protection to a young child living or playing on the site and subjected to exposure to contaminated soils. The most stringent HILs are assigned to sensitive land uses such as residential, child care centres and primary schools. Where the land use provides for reduced access to soils, or reduced time in the setting for a child (e.g. high density residential apartments or an industrial site), higher HILs are set respectively in the ASC NEPM.

In the event that an investigation level is exceeded at a site, the nature of the appropriate response is typically determined by site-specific environmental or human health risk assessment.

9.2 Soil Assessment Criteria

9.2.1 Human Health and Environmental Screening Guidelines

For the purposes of this assessment LBW | ep has referenced the following:

- ASC NEPM HILs for a Commercial/Industrial exposure setting (HIL – D);
- ASC NEPM HSL D for Vapour Intrusion from a soil source between 0-1 mBGL (coarse grained soils), and
- ASC NEPM Management Limits for TPH fractions F1-F4 in soil – commercial and industrial

The adopted HILs and HSLs are shown on chemical summary tables in Appendix H.

9.2.2 Ecological Screening Criteria

Chemical contaminants may adversely affect the ecological values of a site and the levels considered suitable based on human health considerations may not afford protection to the local ecology. In order to consider the potential for toxicity to sensitive plants and animals, contaminant concentrations have also been compared to ecological investigation levels (EILs) and ecological screening levels (ESLs) presented in the ASC NEPM. These values are typically only applicable to the top 2 metres of the soil profile where plants (and to a lesser degree animals) are likely to interact with the soil.

Several EILs were derived from site specific conditions as recommended in the ASC NEPM. The methodology for the derivation of site specific EILs assumes that an ecosystem is adapted to the ambient background concentration (ABC) for the locality and that only adding contaminants over and above the ABC have an adverse effect.

Added contaminant limits (ACLs) are calculated based on the soil characteristics of pH, cation exchange capacity (CEC) and clay content. Empirical relationships that can model the effects of these soil properties on toxicity are used to develop soil-specific values relating to biological availability.

Sample BH11-03 was collected from 0.6 – 0.75 mBGL, BH20-04 was collected from 1.1 – 1.3 mBGL. Sample BH11-03 was described as pale orange brown silty clay of medium plasticity. Sample BH20-04 was described as green grey clay with high plasticity. These samples were considered representative of background site soils.

To determine the appropriate ACL, soils from location BH11-03 and BH20-04 were selected for testing of percent iron, clay percentage, cation exchange capacity (CEC), total organic carbon (TOC) and pH. Using these soil parameters, the ACL was derived for chromium, copper, lead, nickel and zinc using the ASC NEPM toolbox EILs calculation spreadsheet.

The completed calculation spreadsheets and output tables, along with adopted EILs and ESLs, are shown with the chemical data summary tables in Appendix H.

9.2.3 ASC NEPM Management Limits for Soils

Section 2.5 in ASC NEPM Schedule B (1) – Guideline on Investigation Levels for Soil and Groundwater, includes physical and aesthetic 'management limits' for petroleum hydrocarbon compounds. These limits reflect potential for adverse effects to exist beyond typical health and ecological concerns, including free phase formation, fire and explosive hazards, effects on buried infrastructure and aesthetic considerations. These values provide interim screening levels as Tier 1 guidance for residual petroleum hydrocarbon contamination and their application requires consideration of site specific factors such as the depth of building basements and services or for residual contamination to be re-excavated in the use of the land, in order to determine the maximum depth of application of these limits.

An exceedance means there is a potential for acute hazards to exist that may warrant remediation, even if chronic exposure risks are determined to be acceptable.

9.2.4 Soil Disposal Criteria

In the event that in-situ soils, stockpiled soils or fill materials need to be disposed offsite, chemical concentrations in the soils need to be assessed against applicable soil disposal criteria.

The criteria used to assess the suitability of soils for off-site disposal were those set in EPA information sheet *Current Criteria for the Classification of Waste including Commercial and Industrial Waste (Listed) and Waste Soil*, dated March 2010.

The soil classifications, listed by severity of contamination from lowest to highest, are:

- Waste Fill (WF);
- Intermediate Waste Soil (IWS); and
- Low-Level Contaminated Waste (LLCW).

Maximum permissible chemical concentrations for these soil classifications are collectively referred to as the soil criteria, and are presented in soil chemical data tables in Appendix J.

In addition to chemical content, consideration was given to the physical requirements of WF as defined in the Environment Protection Regulations 2009. "Waste Fill" is defined as waste containing clay, concrete, rock, sand, soil or other inert mineralogical matter in pieces not

exceeding 100 mm in length (but does not include waste consisting of or containing asbestos or bitumen).

The SA EPA accepts use of the 95% Upper Confidence Level (UCL) about the mean for establishing statistical contaminant concentration average for comparison to disposal criteria. However, for the 95% UCL to apply the data set must be reviewed for potential hotspots of contamination via the following additional criteria:

- maximum concentration less than 250% of the chemical criterion; and
- standard deviation less than 50% of the chemical criterion.

Deviation from these cut-off criteria may indicate the presence of anomalous or isolated hot spot concentrations, which may require segregation for appropriate risk mitigation.

9.3 Groundwater Assessment Criteria

9.3.1 Human Health and Environmental Screening Guidelines

While the ASC NEPM provides the framework for assessing groundwater contamination, protection of groundwater in South Australia is regulated by the EP Act, and the EPP-WQ, which came into operation on 1 January 2016.

The purpose of the EPP-WQ is to protect and maintain beneficial uses of water resources in South Australia by regulating discharges to those water sources. The EPP-WQ assigns Protected Environmental Values (PEVs) for all inland, surface waters and groundwater.

The EPP-WQ refers to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000) as part of the guidance regarding the General Environmental Duty. These "trigger values" indicate where the receiving environment is potentially at risk of being harmed and where a site-specific investigation may be required to assess the risk and/or evaluate options for environmental performance improvement. As such, the exceedance of a trigger value does not mean that harm has occurred or that remediation or management is required, rather that further site specific assessment may be required.

The default PEVs, or environmental values of waters as set out in the WQP include the following:

- Aquatic ecosystems;
- Recreation and aesthetic (primary and secondary contact and aesthetics);
- Drinking Water;
- Primary Industries
  - Irrigation and general water uses
  - Livestock drinking water
  - Aquaculture and human consumption of aquatic foods

For the purpose of this assessment, and as a result of the BUA (see section 8), Table 9 sets out the screening criteria that were applied to make an initial assessment of the potential realistic beneficial uses of the shallow groundwater at and in the immediate vicinity of the site.

Table 9 Summary of Groundwater Assessment Criteria

PEV		Assessment Criteria
Aquatic Ecosystems – marine ecosystems	Primary Criteria:	Australian and New Zealand Environment and Conservation Council (ANZECC) (2000) – Marine trigger values for 95% protection of marine water species
Recreation & Aesthetics (Health)	Primary Criteria:	National Health and Medical Research Council (NHMRC) (2008) Guidelines for Managing Risks in Recreational Water[1]
Recreation & Aesthetics (Aesthetics)	Primary Criteria:	NHMRC (2008) Guidelines for Managing Risk in Recreational Water
Primary Industries – Aquaculture and human consumption of aquatic foods	Primary Criteria	Australian and New Zealand Environment and Conservation Council (ANZECC) (2000)
Primary Industries – Livestock drinking water quality	Primary Criteria	Australian and New Zealand Environment and Conservation Council (ANZECC) (2000)

In addition to the above groundwater assessment criteria for the protection of Environmental Values, the following assessment criteria were also applied for the assessment of onsite vapour intrusion risks:

- ASC NEPM Groundwater HSLs for vapour intrusion (TRH and BTEX)

The adopted assessment criteria are shown on water chemical summary tables in Appendix I.

10 Soil Results

The following section summarises the field observations and results of the laboratory soil testing.

Grid based and targeted soil sampling locations are presented on Figure 2 in Appendix A. Tabulated laboratory soil testing results are presented in Appendix H.

Detailed descriptions of the in-situ materials encountered and depth intervals identified are summarised in the soil borehole logs presented in Appendix J (grid and targeted soil bores). Photographs of the site are presented in Appendix D.

10.1 Soil Lithology

The site surface generally consisted of a shallow reworked natural layer including various sand or clay mixtures. Approximately half of the grid based soil bore locations intersected natural soils, generally consisting of various clay and silt mixtures, from the surface.

The underlying natural soils were generally described as medium to high plasticity clays with various calcareous, silt and sand inclusions. Sandstone gravels and sandstone was generally encountered with depth.

Field observations indicated that the site soils were free from any physical evidence of contamination.

10.2 Soil Analytical Results

An overview of the soil chemical testing results is provided below. Tabulated chemical summary tables are presented against human health and ecological screening criteria and soil disposal criteria in Appendix H. Laboratory certificates of analysis are presented in Appendix K.

A total of 26 grid based and six targeted soil samples were selected for chemical testing at NATA certified laboratories. A broad range of chemicals were selected for testing per Table 5 and Table 6 in Section 7.

Concentrations of all analytes in samples tested were below the laboratory limit of reporting (LOR) and/or the adopted HIL/HSLs and ESL/EILs and were compliant with the physical and chemical requirements of Waste Fill.

One sample collected at soil bore BH13 from observed potential acid sulfate soil (PASS) at a depth of 1.65-1.8 mBGL (black organic material having been noted) was analysed for Suspension Peroxide Oxidisable Combined Acidity and Sulfur (SPOCAS) suite.

The results of analysis suggest that the soil is not acid sulfate soil. Stronger evidence of PASS was not noted elsewhere during soil bore drilling.

11 Groundwater Results

11.1 Groundwater and Liquid Waste Sample Summary

Groundwater Grab Sample

On 12 October 2016 a groundwater grab sample was collected from borehole BH13, located towards the northern boundary of site. The depth to water intersected during drilling was measured at 1.65 mBGL. The total depth of the soil borehole was 2.25 mBGL. Groundwater recharge into the borehole was slow.

Water quality parameters could not be measured due to the sampling method adopted.

Liquid Waste - Septic

A 100mm PVC riser and concrete plinth was identified uphill south of the site shed. The structure was determined to be part of a disused septic tank. The SWL inside the casing was gauged using an interface probe (IP) and LNAPL was recorded atop water at a depth of 6.165 metres below top of casing (mBTOC). The total depth measured to the presumed base of the septic tank was 6.8 mBTOC. The thickness of LNAPL could not be recorded with the IP due to malfunction of the probe (unable to correctly identify the top of water level beneath the LNAPL). A grab sample using a transparent disposable bailer indicated that the LNAPL was approximately 3 cm to 5 cm thick. A sample of LNAPL and underlying wastewater was collected for laboratory testing.

No contouring of groundwater elevation and interpreted groundwater flow direction at the site could be completed from one groundwater grab sample. The expected groundwater flow beneath site was north towards Smith Bay.

11.2 Analytical Results

Chemical data summary tables are presented in Appendix I and include comparison of results against the adopted screening criteria identified in Section 8 (BUA) and Section 9.3 (Groundwater Assessment Criteria).

Concentrations exceeding a relevant guideline trigger value have been highlighted in the data tables. Where concentrations exceed more than one of the trigger values, the concentration has been highlighted with the value with the highest investigation level.

Laboratory certificates and chain of custody documentation are presented in Appendix L.

The following section summarises the results of analysis of the groundwater grab sample, *GW1*. The water sample, *GW2*, was confirmed to be liquid waste in a disused septic tank (south of the current shed onsite). Given the liquid is stored in a septic tank comparison to groundwater investigation criteria is not appropriate, however, the results for *GW2* sample analysis have been tabulated against the groundwater investigation criteria to assess potential impact should the septic tank be found to have leaked or overflowed.

11.2.1 Heavy Metals

Groundwater Grab Sample GW1

Exceedances were as follows:

- Iron and lead concentrations exceeded the ANZECC aquaculture and human consumption for saltwater production criteria.

For the purpose of potential site groundwater disposal into the marine (Smith Bay) environment, the following exceedances were as follows:

- Cobalt and copper concentrations exceeded the ANZECC aquatic marine ecosystems criteria.

Liquid Waste – Septic water sample GW2

If the septic tank was found to leak/overflow and impact groundwater, the following exceedances might be applicable:

- Arsenic, iron, lead and manganese concentrations exceeded the ANZECC aquaculture and human consumption for saltwater production criteria;
- Cobalt and copper concentrations exceeded the ANZECC aquatic marine ecosystems criteria;
- Iron concentrations exceeded the NHMRC recreation aesthetic criterion;
- Arsenic concentrations exceeded the NHMRC recreation heath criterion.

11.2.2 TRH

Groundwater Grab Sample GW1

Concentrations of TRH were reported in *GW1*. Retesting of these samples following a silica gel clean-up was carried out. This resulted in the concentrations reducing to below the laboratory's LOR. Silica gel clean-up removes the polar hydrocarbons present naturally in the environment such as humic acids, leaving behind petroleum hydrocarbons if present. This silica gel clean-up showed that no petroleum hydrocarbons were present.

Liquid Waste – Septic GW2

Elevated concentrations of TPH were reported in *GW2* which was expected given LNAPL was present in contact with the water.

The sample was submitted for TPH identification. Results were compared to Envirolabs reference library and matched to diesel.

11.2.3 Nutrients

Groundwater Grab Sample GW1

Nitrite concentrations exceeded the ANZECC aquaculture and human consumption for saltwater production criterion.

Liquid Waste – Septic GW2

If the septic tank was found to leak/overflow, the following exceedances would be applicable:

- Ammonia concentrations exceeded the ANZECC aquatic marine ecosystems criterion.

11.2.4 Sulphate

GW1 had concentrations of sulphate exceeding the NHMRC recreational aesthetic criterion.

11.2.5 TDS

GW1 had TDS concentration of 18,000 mg/L and was indicative of saline conditions. It exceeded the ANZECC livestock drinking water tolerances for beef, dairy, sheep, horses, pigs and poultry for loss of production and decline in animal condition and health.

11.2.6 Non-detectable Contaminants

The remaining constituents of the extensive analytical suite for the groundwater grab sample, *GW1,* had concentrations below the laboratory LOR. These included:

- PAH
- OCPs
- PCBs
- VOCs
- Phenols

12 Soil Data Validation

The relative percentage difference (RPD) for a pair of duplicate concentrations was calculated using the formula:

$$RPD\ (\%) = \quad 100(x1 - x2) / X$$

where x1, x2 = duplicate results and X = mean of duplicate results.

According to the ASC NEPM,

- typical RPD values for soils range from ±30;
- a soil RPD within the range of -30% to 30% is considered to show acceptable agreement and, conversely, data is considered to have relatively poor agreement where a RPD is outside this range.

Generally higher RPD values occur for organic compounds than for metals and where low concentrations of an analyte are recorded.

The results of internal laboratory quality control procedures are provided within the laboratory certificates in Appendix K. The acceptance criterion for internal laboratory replicates is set at an RPD of -50% to 50%. Laboratory recoveries should be in the range 70% to 130%.

Table 10 indicates conformance to specific QA/QC requirements for soil data. Duplicate sample, and equipment blank results are presented in Appendix H.

Table 10 Soil Data Validation

QC Aspect	Outcome	Comment
Chain of custody documentation completed	Yes	All samples were transported under strict LBW	ep chain of custody procedures and signed chain of custody documentation is included in Appendix J.
Samples delivered to laboratory within sample holding times and with correct preservative	Yes	All samples were delivered to the laboratories in laboratory supplied containers and within recommended laboratory holding times with the exception of the following hold time exceedances: • pH • SPOCAS
All analyses NATA accredited	Yes	Envirolab and ALS were NATA accredited for all the analyses performed.
Required number of sample duplicates and blanks collected	Mostly	A total of 32 primary samples, 1 inter-laboratory duplicate sample and 2 intra-laboratory duplicate samples were analysed throughout the site works. This generally complied with the minimum duplicate ratio of 1 duplicate for 20 primary samples recommended in AS 4482.1 2005. Two rinsate blank samples were also collected. Both samples recorded parameter concentrations below the LOR.
Soil QA/QC samples reported RPDs within limits recommended by the ASC NEPM	Most	Many of the RPD values could not be calculated due to both the primary and secondary concentrations being below the laboratory PQL. **Intra-laboratory RPDs** The intra-laboratory RPDs for zinc (111%), moisture (42%) and ammonia (31%) exceeded the recommended limit of 30%. **Inter-laboratory RPDs** The inter-laboratory RPDs for lead (40%), carcinogenic PAHs (82%) and sulphate (147%) exceeded the recommended RPD limit of 30%. Many RPDs were unable to be calculated due to one or both samples being below laboratory limits. RPDs not within +/-30% were likely to be due to the heterogeneous distribution and low concentrations of analytes in soil as there was no evidence in the data of a systematic laboratory or sampling error. Overall the analyte pair RPD results indicated good data correlation between the primary results and duplicate results.
Acceptable laboratory QC results	Mostly	The majority of the laboratory RPD values for were within the appropriate limits except: • spike % recovery in three samples for iron, phosphorus, nitrate, iron and molybdenum. ALS did not report any laboratory RPD exceedances.

12.1 Groundwater Data Validation

The relative percentage difference (RPD) for a pair of duplicate concentrations was calculated using the formula:

RPD (%) = $100(x1 - x2) / X$

where x1, x2 = duplicate results and X = mean of duplicate results.

According to the SA EPA,

- typical RPD values for groundwater samples should range from ±20;
- a groundwater RPD within the range of -20% to 20% is considered to show acceptable agreement and, conversely, data is considered to have relatively poor agreement where a RPD is outside this range.

Generally higher RPD values occur for organic compounds than for metals and where low concentrations of an analyte are recorded.

The results of internal laboratory quality control procedures are provided within the laboratory certificates in Appendix D. The acceptance criterion for internal laboratory replicates is set at an RPD of -50% to 50%. Laboratory recoveries should be in the range 70% to 130%.

Table 11 indicates conformance to specific QA/QC requirements for groundwater data.

Table 11 Groundwater Data Validation

QC Aspect	Outcome	Comment
Chain of custody documentation completed	Yes	All samples were transported under strict LBW	ep chain of custody procedures and signed chain of custody documentation is included in Appendix J.
Samples delivered to laboratory within sample holding times and with correct preservative	Yes	All samples were delivered to the laboratories within the sample holding times.
All analyses NATA accredited	Yes	Envirolab were NATA accredited for all the analyses performed.
Required number of sample duplicates and blanks collected	No	No duplicate sample was collected of the groundwater grab sample.
Acceptable laboratory QC results	Mostly	The majority of the laboratory RPD values for were within the appropriate limits except: • spike % recovery for OCPs, PCBs and TRH

In summary, LBW | ep considered the results for the QA/QC processes and testing information provided appropriate confidence the soil and groundwater data could be relied upon for the purpose of this assessment.

13 Discussion

13.1 Soil Contamination

As there were no exceedances of the selected HILs and EIL/ESLs, site soils were considered to pose no unacceptable risk to the proposed commercial/industrial land use and are suitable for retention on site without further management.

Soils within the assessment area were compliant with the physical and chemical requirements of Waste Fill should disposal of excess spoil be required during development.

13.2 Groundwater

13.2.1 Groundwater Grab Sample

- Several analytes including metals (cobalt, copper, iron and manganese), sulphate, nitrite and TDS exceeded one or more of the adopted screening criteria. None of the exceedances were applicable to the proposed industrial use of the site. The BUA identified the sea (Smith Bay), immediately adjacent to site, as a possible receptor via discharge of site groundwater. For this reason the following offsite environmental values were considered possible, (though unlikely): Aquatic ecosystems – Marine Ecosystems
- Recreation – Primary and Secondary Contact
- Recreation – Aesthetic
- Primary Industries – Aquaculture and human consumption

It is unlikely groundwater would be extracted and used for aquaculture and human consumption for marine production at and/or near the site. Source water is likely to be sought directly from the ocean bordering the northern boundary of site.

The use of site groundwater for livestock drinking water was considered unlikely given the TDS concentrations. Given the high TDS concentrations in groundwater, livestock (sheep) could potentially tolerate the levels for short periods if introduced gradually (ANZECC 2000), given this any extraction of groundwater would be minimal and would not be expected to influence hydraulic flow of groundwater under the site.

There was no evidence from the site soil assessment that significant or unacceptable soil contamination was present in soils to be a potential onsite source of groundwater contamination.

The groundwater grab sample provided a snapshot in time of the water quality at *GW1*, located towards the foreshore of Smith Bay and did not take into consideration any local and regional naturally occurring background concentrations.

Concentrations of metals, sulphate and TDS that exceeded one or more of the environmental values, aquaculture and human consumption, aquatic marine ecosystems and/or livestock drinking water criteria, would require additional assessment specific to the environmental value and the specific area to determine if the water quality, represented by a grab sample towards the foreshore, was suitable for these uses or not. Assessment would need to take into account the numerous uncertainties associated with the derivation and application of the guidelines.

13.2.2 Septic

The liquid waste septic sample, *GW2*, was compared to the adopted groundwater screening criteria to assess for impact that might occur if the septic tank was found to be leaking or overflow. At the time of this site investigation there was no reason to believe this was the case,

and the exceedances highlighted in Section 11 and summarised on the chemical summary tables in Appendix I are for comparison only and not applicable to the BUA (Section 8).

LNAPL was identified in the septic tank and laboratory testing confirmed it to be diesel. KIPT confirmed this was a disused septic tank and therefore it was determined that site contamination did not exist that threatened or had caused harm to groundwater and it was deemed not necessary to notify SA EPA under section 83A of the Environment Protection Act 1993.

13.3 Conceptual Site Model

For an unacceptable risk to human health or the environment to exist relative to site contamination, the following must be satisfied:

- a **SOURCE** of contamination of sufficient toxicity to cause harm must be present;

  AND

- a complete **PATHWAY** must exist between the source of contamination and a receptor;

  AND

- a **RECEPTOR** must be present with potential to be exposed.

It follows that where the source is of insufficient toxicity OR there is no complete exposure pathway OR there is no receptor, that unacceptable risk is not evident.

Toxicity

Chemical results suggest the site soils are suitable to be retained on site for commercial/industrial land use and do not pose an unacceptable human health or ecological risk to future site users.

Exposure Pathways

Potential sources identified in LBW | ep's site history are included in table 12 below to evidence they have been considered. Following the DSI results, LBW | ep have updated the risk of exposure/complete pathway to receptor rating.

Toxicity to a receptor may be realised via acute (short-term) or chronic (long-term) exposure.

Based on the proposed industrial land use onsite and the existing and likely offsite beneficial uses of groundwater, potential onsite and offsite receptors include:

- Future industrial workers;
- Future maintenance workers undertaking subsurface excavation works; and
- Construction workers undertaking subsurface excavation works during site development;
- Offsite users of extracted groundwater
- The marine environment (human use and ecological) potentially receiving site groundwater.

Identified potential sources of onsite contamination may include:

- uncontrolled fill material across the majority of the site
- soil, groundwater and vapour impacts relating to LNAPL within the disused septic tank
- groundwater impacts relating to wastewater within the disused septic tank

- soil impacts relating to historical application of agricultural chemicals to surface soils
- soil impacts and groundwater impacts relating to impacts from food production and animal and plant product processing – fish processing

The proposed industrial development land use may generally include:

- several level tiers / terraces across the site
- access roads
- associated amenities

Table 12 provides a summary of exposure risks to onsite and offsite receptors relative to the PCA or environmentally significant activity identified at the site during the site history update and based on results of the DSI.

Table 12 Conceptual Site Model Development

PCA or Significant Activity	Media contaminated and extent - Source	Receptor	Pathway	Risk of Exposure / Complete Pathway to Receptor
Fill or Soil Importation	**Soil** No/negligible fill was identified during the soil assessment. Reworked natural soils identified at nearly half of the grid based soil borehole locations. No volatile contaminants noted to date.	Future industrial workers children	Dermal contact, ingestion, inhalation of dust	Negligible Concentrations in all samples analysed for metals, pH, OCPs, OPPs, TRH, BTEX, PAHs, herbicides, nitrate, nitrite, ammonia, phosphorus, sulphate, chloride, termiticides, phenols and PCBs, were below the adopted health and ecological investigation/screening assessment levels.
		Future maintenance workers	Dermal contact, ingestion , inhalation of dust	Negligible Concentrations in all samples analysed for metals, pH, OCPs, OPPs, TRH, BTEX, PAHs, herbicides, nitrate, nitrite, ammonia, phosphorus, sulphate, chloride, termiticides, phenols and PCBs, were below the adopted health and ecological investigation/screening assessment levels.
		Construction workers (during development works)	Dermal contact, ingestion, inhalation of dust	Negligible Concentrations in all samples analysed for metals, pH, OCPs, OPPs, TRH, BTEX, PAHs, herbicides, nitrate, nitrite, ammonia, phosphorus, sulphate, chloride, termiticides, phenols and PCBs, were below the adopted health and ecological investigation/screening assessment levels.
		Ecological (plants on developed site)	Plant uptake	Negligible No contaminant concentrations identified above EILs/ESLs.
	Groundwater There was no evidence from the site soil assessment that significant or unacceptable soil contamination was present in soils to be a potential onsite source of groundwater contamination.	Environmental values identified in the BUA, Section 8.	Groundwater extraction for potential livestock drinking water and aquaculture and human consumption of aquatic foods and marine ecosystems and recreational through potential	Negligible Unlikely contaminant source for groundwater contamination. Proposed industrial use may potentially seal majority of area

PCA or Significant Activity	Media contaminated and extent - Source	Receptor	Pathway	Risk of Exposure / Complete Pathway to Receptor
			groundwater discharge into the ocean (Smith Bay).	
Impacts relating to possible release of diesel from disused septic tank	**Soil** No soil contamination detected in T1, located approximately ten metres to the north of the septic tank.	Future industrial workers	Dermal contact	Negligible Soil samples analysed approximately 10 to the north had concentrations of TRH and BTEXN below the adopted health and ecological investigation/screening assessment levels. There is potential for TRH impacts closer to the source, however these are likely to be at depth and easily managed during site development (removal of septic).
		Future maintenance workers	Dermal contact	Low Soil samples analysed approximately 10 to the north had concentrations of TRH and BTEXN below the adopted health and ecological investigation/screening assessment levels. There is potential for TRH impacts closer to the source.
		Construction workers (during development works)	Dermal contact	Low Soil samples analysed approximately 10 to the north had concentrations of TRH and BTEXN below the adopted health and ecological investigation/screening assessment levels. There is potential for TRH impacts closer to the source.
	Groundwater In the event that soil contamination had occurred, contaminants may have impacted shallow groundwater.	Human health on and off site	Contaminant solute migration and groundwater extraction for use.	Negligible LNAPL volume likely to be low and appeared contained. Use of groundwater is unlikely due to high salinity of groundwater in this area. The distance from the source to offsite receiving environments would likely allow for natural attenuation of TRH, at least to some degree.

PCA or Significant Activity	Media contaminated and extent - Source	Receptor	Pathway	Risk of Exposure / Complete Pathway to Receptor
				The groundwater grab sample *GW1*, inferred to be down hydraulic gradient had TRH concentrations less than the laboratory LOR.
		Ecological (deep rooted plants)	Contaminant solute migration.	Negligible No to minor deep rooted plants proposed for the industrial land use.
	Vapour Soil contamination has not been detected and impacted liquid is retained in a septic tank.	Human health on and off site	Vapour emission from hydrocarbon migrating with groundwater transmitting through soil.	Negligible Migration potential is low as no suggestion of loss of LNAPL.
Application of agricultural chemicals / agricultural activities and fertiliser application for lawns and gardens (including former primary school use)	**Soil** Land was thought to be generally vacant or used for grazing and broad acre farming prior to development. In the event that chemicals were used during this time, chemicals were likely to have been applied in low rates over large areas, and as such would likely to be contained to surficial soils. Contaminant type and likely concentration did not suggest significant potential for groundwater contamination or vapour generation. **Groundwater** Potential for some minor nutrient leaching to groundwater, particularly nitrate, through application of fertilisers.	Human health and ecological on site	Dermal contact, ingestion, plant uptake	Negligible Contaminant type, likely extent and concentration were unlikely to pose significant risk to any receptor. No soil or groundwater contaminant concentrations identified above the applicable assessment criteria
Food production and animal and plan product processing – fish processing	**Soil** Land was thought to be used for on-shore abalone farming. It is understood the process was in above ground tanks.	Human health on site	Contaminant solute migration and groundwater extraction for use.	Negligible Concentrations in all samples analysed for metals, pH, OCPs, OPPs, TRH, BTEX, PAHs, herbicides, nitrate, nitrite, ammonia, phosphorus, sulphate, chloride, termiticides, phenols and PCBs, were below the adopted

PCA or Significant Activity	Media contaminated and extent - Source	Receptor	Pathway	Risk of Exposure / Complete Pathway to Receptor
	The soil assessment did not identify any contamination from potential impacts associated with maintenance of infrastructure and aquaculture operations. **Groundwater** Potential impacts from source water, additives, effluent water and drainage from aquaculture activities.			health and ecological investigation/screening assessment levels.
		Ecological (deep rooted plants)	Contaminant migration	Negligible Concentrations in all samples analysed for metals, pH, OCPs, OPPs, TRH, BTEX, PAHs, herbicides, nitrate, nitrite, ammonia, phosphorus, sulphate, chloride, termiticides, phenols and PCBs, were below the adopted health and ecological investigation/screening assessment levels.

14 Conclusions and Recommendations

LBW Environmental Projects (LBW | ep) was commissioned by Kangaroo Island Plantation Timbers Pty Ltd (KIPT) to undertake a Preliminary Site Investigation (PSI) for the site located at Allotments 51 and 52 North Coast Road, Wisanger, South Australia (the site). The PSI comprised a desktop site history and a preliminary assessment of site soils and groundwater.

The objectives of the site history were to:

The objectives of the PSI – Site History were to:

- Research current and historical land uses and associated activities undertaken at or adjacent to the site to identify whether Potentially Contaminating Activities (PCAs) may have occurred on or near the subject site; and
- Provide a current desktop assessment of risk with respect to the likelihood that PCAs could have caused site contamination, with regards to the proposed commercial land use.

Based on the desktop research and a site inspection, LBW | ep prepared a preliminary CSM for PCAs that were undertaken or inferred to have occurred at and near the subject site. The conclusions of the site history were as follows:

- One PCA was identified or inferred to have occurred on-site with the corresponding risk level assigned:
  - Fill or soil importation –MODERATE
- One off-site PCAs was identified or inferred to have occurred in the area surrounding the site, including:
  - Fill or soil importation –Negligible

The objectives of the intrusive assessment were to:

- Characterise the contamination status of site soils in consideration of the PCAs and areas of interest identified in the Site History Review;
- Assess whether site soils were suitable for the proposed commercial land use, or whether remediation or management might be needed to achieve the desired outcome;
- Develop preliminary advice on waste classification for soils which may become surplus to needs during future redevelopment of the site, and
- Assess the groundwater contamination status with respect to the proposed commercial land use.

Soils

Based on the qualitative risk assessment for the redevelopment project, there is negligible potential for unacceptable risk to human health and ecological receptors to occur. Soils are suitable to be retained on site for commercial/industrial land use.

No specific remediation or management is required to make the site suitable for the proposed development.

Groundwater

There is no unacceptable risk to future site users from known conditions of the shallow groundwater as there is no confirmed site contamination present and no realistic pathways of exposure to the groundwater for the proposed land use.

Disused Septic Tank

LBW | ep recommends that before removal of the disused septic tank the contents be pumped out by a licensed waste contractor. There is potential for environmental harm to occur if the tank removal process is not carefully managed. Once the tank is removed it should be inspected for any evidence of leakage and the underlying soil be inspected for visual and olfactory signs of contamination. Validation samples should collected from the tank pit soils and tested for chemicals of potential concern.

15 Limitations

Scope of Services

This environmental site assessment report ("the report") has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between KIPT and LBW Environmental Projects (LBW | ep) ("scope of services"). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

Reliance on Data

In preparing the report, LBW | ep has relied upon data, surveys, analyses, designs, plans and other information provided by KIPT and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise stated in the report, LBW | ep has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. LBW | ep will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to LBW | ep.

Desktop Environmental Conclusions

In accordance with the scope of services, LBW | ep has relied upon the data and has conducted desktop site history research in the preparation of the report. The nature and extent investigation conducted is described in the report.

No desktop investigation, no matter how thorough, can eliminate the possibility that not all potentially contaminating activities were identified or provide sufficient confidence to determine the suitability of a site for a given use. The conclusions are based only upon the data and information available to LBW | ep at the time of preparing this report.

Environmental Conclusions

In accordance with the scope of services, LBW | ep has relied upon the data and has conducted environmental field monitoring and/or testing in the preparation of the report. The nature and extent of monitoring and/or testing conducted is described in the report.

On all sites, varying degrees of non-uniformity of the vertical and horizontal soil or groundwater conditions are encountered. Hence no monitoring, common testing or sampling technique can eliminate the possibility that monitoring or testing results/samples are not totally representative of soil and/or groundwater conditions encountered. The conclusions are based upon the data and the environmental field monitoring and/or testing and are therefore merely indicative of the environmental condition of the site at the time of preparing the report, including the presence or otherwise of contaminants or emissions.

Also, it should be recognised that site conditions, including the extent and concentration of contaminants, can change with time.

Within the limitations imposed by the scope of services, the monitoring, testing, sampling and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

Report for Benefit of KIPT

The report has been prepared for the benefit of the stated party only. LBW | ep assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of LBW | ep or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

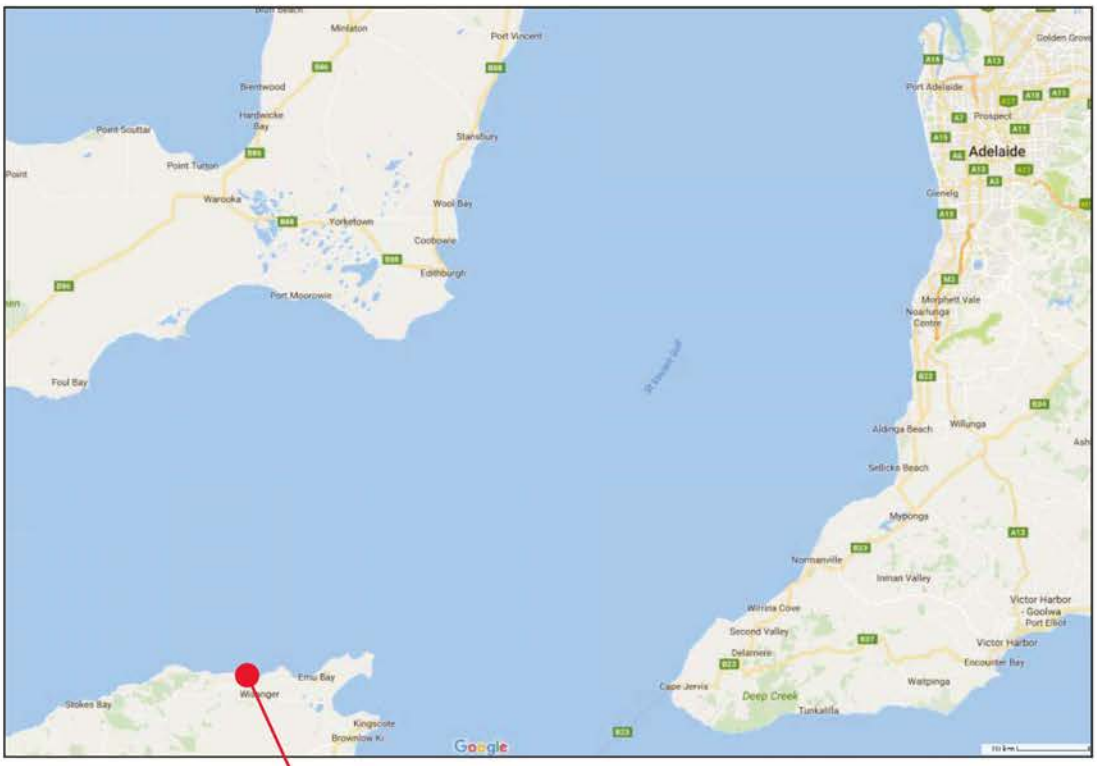
Other Limitations

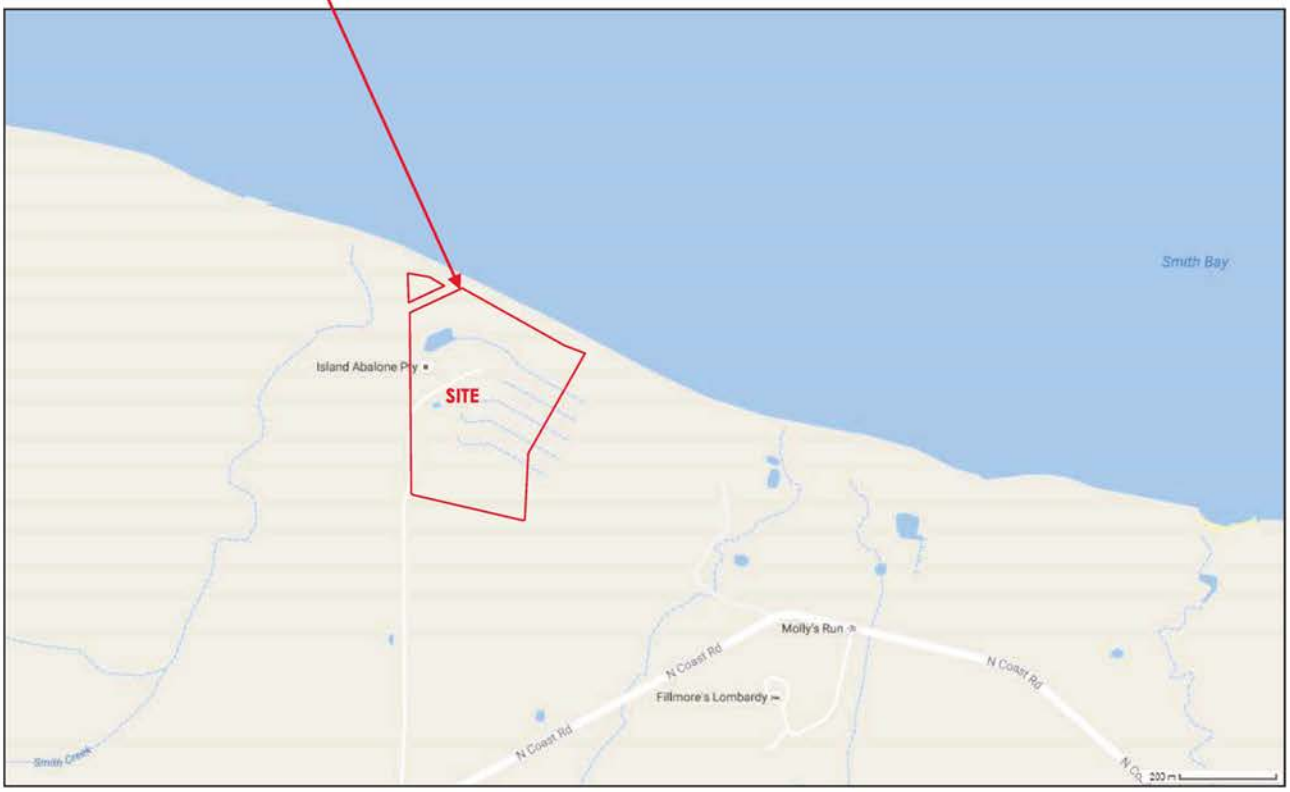
LBW | ep will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

LBW|ep

Appendix A

Figures





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LBW | environmental projects

Job No: 150738-01
Drawn: H Custance
Checked: B Fitzgerald

Smith Bay, Kangaroo Island

Preliminary Site Investigation

For

KIPT

Figure 1
Site Location Plan

FIGURE 2

Soil Borehole Sample Location Plan

Smith Bay, Kangaroo Island

Preliminary Site Investigation

For

KIPT

LEGEND

- Approximate site boundary
- Geotechnical and environmental soil bore locations
- Environmental soil bore locations
- Targeted soil bore locations

SCALE

0 100 200 m

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LBW environmental projects

FIGURE 3

Water Sample Location Plan

Smith Bay, Kangaroo Island

Preliminary Site Investigation

For

KIPT

LEGEND

- Approximate site boundary
- Groundwater grab sample location
- Approximate location of current septic
- **GW2** Location of disused septic tank

SCALE

0 100 200 m

Job Number: 150738-01

Drawn: H Custance

Checked: B Fitzgerald

LBW environmental projects

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Appendix B

Certificate of Title and Site History

Government of South Australia
Department of Planning, Transport and Infrastructure

Product	Register Search
Date/Time	31/08/2016 02:34PM
Customer Reference	150738-01
Order ID	20160831009163
Cost	$27.75

The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.

Registrar-General

Certificate of Title - Volume 6127 Folio 273

REAL PROPERTY ACT, 1886
South Australia

Parent Title(s)	CT 5870/746
Dealing(s) Creating Title	RTC 12040789
Title Issued	17/12/2013
Edition	2
Edition Issued	24/04/2014

Estate Type

FEE SIMPLE

Registered Proprietor

CINEREA PTY. LTD. (ACN: 167 774 058)
OF SUITE 9/75A ANGAS STREET ADELAIDE SA 5000

Description of Land

ALLOTMENT COMPRISING PIECES 51 AND 52 DEPOSITED PLAN 92343
IN THE AREA NAMED WISANGER
HUNDRED OF MENZIES

Easements

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED A ON DP 92343 TO DISTRIBUTION LESSOR CORPORATION (SUBJECT TO LEASE 8890000) (TG 8363477)

SUBJECT TO EASEMENT(S) OVER THE LAND MARKED B ON DP 92343 (RTC 12040789)

TOGETHER WITH EASEMENT(S) OVER THE LAND MARKED J ON DP 92343 (RTC 9234708)

TOGETHER WITH EASEMENT(S) OVER THE LAND MARKED C ON DP 92343 FOR THE TRANSMISSION OF ELECTRICITY BY UNDERGROUND CABLE (RTC 12040789)

Schedule of Dealings

NIL

Notations

Dealings Affecting Title

NIL

Priority Notices

NIL

Notations on Plan

NIL

Registrar-General's Notes

NIL

Administrative Interests

NIL

* Denotes the dealing has been re-lodged.

Land Ownership History

KIPT Smith Bay

PSI—Baseline Site Assessment

150738-01

CT 6127/273

Allotment Pieces 51 and 52, Deposited Plan 92343 in the area named Wisanger, Hundred of Menzies

17.12.2013 New title to Quentin John Anderson

02.04.2014 Transfer to Cinera Pty Ltd

CT 5870/746

Portion of Section 338 in the Hundred of Menzies, County of Carnarvon

18.04.2002 New title to Kangaroo Island Abalone Pty Ltd

17.01.2012 Transfer to Quentin John Anderson

21.11.2013 Application for Deposit of Land Division

Cancelled to CT 6127/272 and 6127/273 (site)

CT 5584/238

Section 338 in the Hundred of Menzies, County of Carnarvon

09.10.1993 New title to Willie Dirk Smith

26.09.2001 Transfer to K.I Seafood Marketing Pty Ltd

19.04.2002 Application for Deposit of Land Division

Transfer to Kangaroo Island Abalone Pty Ltd

Cancelled to CT 5870/746 (site) and CT 5890/747

CT 5486/765

Section 338 in the Hundred of Menzies, County of Carnarvon

30.12.1997 New title to Willie Dirk Smith

13.10.1998 Grant of easement to ETSA Corporation (now SA Power Networks)

Cancelled to CT 5584/237 (current easement)

Cancelled to CT 5584/238

CT 5248/901

Section 338 in the Hundred of Menzies, County of Carnarvon

17.02.1995 New title to Malcolm John Turner (farmer) and Josephine Dorothy Turner (his wife)

23.02.1995 Transfer to Willie Dirk Smith

17.09.1997 Grant of easement to ETSA Corporation (now SA Power Networks)

Cancelled to CT 5486/746(current easement)

Cancelled to CT 5486/765

CT 755/69

Section 338 in the Hundred of Menzies, County of Carnarvon

08.11.1906 Land Grant to John Turner (farmer)

31.03.1920 Lease to George Turner and William Richard Boxer

17.04.1923 Transfer to George Alfred Turner (farmer)

31.01.1944 Transfer to Elsie Verna Turner (widow)

21.05.1955 Transfer to Elsie Verna Turner, Malcolm John Turner (farmer) and Josephine Dorothy Turner (his wife)

11.10.1961 Transfer to Malcolm John Turner (farmer) and Josephine Dorothy Turner (his wife)

Cancelled to CT 5248/901

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Appendix C

WaterConnect Groundwater Database Search

WaterConnect Groundwater Database Records

LBW environmental projects

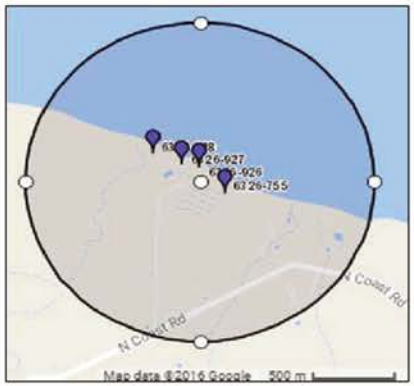
Job: KIPT Smith Bay Baseline Assessment
LBW Job Number: 150738-01
Search Date: 01-Sep-16
Search Radius: 1km

Headings
EC: Electrical conductivity
TDS: Total dissolved solids
SWL: Standing water level
RSWL: Relative standing water level

Class
WW: Water wells
WP: Waterpoint well
ENG: Engineering well

Purpose
DOM: Domestic
DRN: Drainage
ENV: Environmental
INV: Investigation
IRR: Irrigation
OBS: Observation
SPR: Spring
STK: Stock
MON: Monitoring

Status
ABD: Abandoned
BKF: Backfilled
CFL: Controlled flowing
NL: Not located
OPR: Operational
UFL: Uncontrolled flowing
UKN: Unknown
RHB: Rehabilitated
FL: Flowing



Unit No.	Class	Purpose	Status	Status Date	Permit Number	DHNO	Original drill date	Original drill depth (m)	Max drill date	Max drill depth (m)	RSWL (mAHD)	SWL (mBGL)	SWL date	TDS (mg/L)	EC (mS/cm)	Salinity date	pH	pH_date	yield (L/min)	yield date	mga easting	mga northing	mga zone
6326-755	WW	STK			153385	34882	5/01/1996	54	54	5/01/1996		5	5/01/1996	11192	19000	5/01/1996	7.2	5/01/1996	1.4	5/01/1996	720189.1	6058370.54	53
6326-926	WW	INV	BKF	23/11/2015	288193	254029	23/11/2015	20	20	23/11/2015											720049.82	6058532.27	53
6326-927	WW	INV	BKF	24/11/2015	288194	254030	24/11/2015	20	20	24/11/2015											719950.11	6058555.49	53
6326-928	WW	INV	BKF	25/11/2015	288195	254031	25/11/2015	20	20	25/11/2015											719782.12	6058626.35	53

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Appendix D

Site Inspection Photographs

Photograph 1: View looking north from the south of site down the approximate western half of site

Photograph 2: Looking west along a cut and levelled platform, circular potential abalone tank footprints with potential drainage

Photograph 3: View looking west along cut and levelled platform with house and shed in the background

Photograph 3: View looking south of the driveway along the western boundary

Photograph 5: View looking south west drilling bore hole BH6

Photograph 6: View looking north north-west along the western boundary. Smith Creek is offsite in the background

LBW environmental projects

Job No: 150738-01
Drawn: T Martin
Checked: B Fitzgerald

Smith Bay, Kangaroo Island

Preliminary Site Investigation

For

KIPT

Site Photographs

Photograph 7: View looking east showing the steep slope towards the foreshore towards the north of site

Photograph 8: View looking west at the steep slope towards the foreshore

Photograph 9: View looking east at potential former drainage/ pumping pipes and a dam

Photograph 10: View looking west at potential former drainage/ pumping pipes and a dam

Photograph 11: View looking north from the house at the active septic system

Photograph 12: Disused septic south of the shed

Photograph 13: Showing a grab sample from the disused septic with LNAPL sitting above liquid waste

Photograph 14: View looking east at cut and levelled platforms. Drains with pipes discharging into them can be seen

Photograph 15: View looking west at a hardstand drainage channel with pipes discharging into the drain

Photograph 16: Pipe and drain infrastructure

Photograph 17: View looking west at potential re-vegetation of a former onshore abalone tank footprint. The house and shed are in the background

Photograph 18: Soil bore hole drilling

Photograph 19: Soil core of BH2

Photograph 20: Soil core of BH7

Photograph 21: Soil core of BH9

Photograph 22: Soil core of BH12

Photograph 23: Soil core of BH17

Photograph 24: Soil core of BH13

LBW environmental projects

Job No: 160878
Drawn: T Martin
Checked: B Fitzgerald

Smith Bay, Kangaroo Island

Preliminary Site Investigation

For

KIPT

Site Photographs

LBW|ep

Appendix E

Historical Aerial Photographs

1983 Aerial Photograph

Smith Bay Approvals

Baseline Site Assessment

For

Kangaroo Island Plantation Timbers

LEGEND

Approximate site boundary

DATE 18.04.1983

SURVEY 2979

PHOTO 193

SCALE

0 10 20

Image source:
Mapland, Dept for Environment and Natural Resources

Job No: 150738-01
Drawn: T Martin
Checked: B Fitzgerald

N

LBW environmental projects

1989 Aerial Photograph

Smith Bay Approvals

Baseline Site Assessment

For

Kangaroo Island Plantation Timbers

LEGEND

Approximate site boundary

DATE 23.01.1989

SURVEY 4006

PHOTO 122

SCALE

0 10 20

Image source:
Mapland, Dept for Environment and Natural Resources

Job No: 150738-01
Drawn: T Martin
Checked: B Fitzgerald

N

LBW environmental projects

N

1993 Aerial Photograph

Smith Bay Approvals

Baseline Site Assessment

For

Kangaroo Island Plantation Timbers

LEGEND

Approximate site boundary

DATE 07.12.1993

SURVEY 4740

PHOTO 20

SCALE

0 10 20

Image source:
Mapland, Dept for Environment and Natural Resources

Job No: 150738-01
Drawn: T Martin
Checked: B Fitzgerald

LBW environmental projects

1999 Aerial Photograph

Smith Bay Approvals

Baseline Site Assessment

For

Kangaroo Island Plantation Timbers

LEGEND

Approximate site boundary

DATE 20.09.1999

SURVEY 5711

PHOTO 53

SCALE

0 10 20

Image source:
Mapland, Dept for Environment and Natural Resources

Job No: 150738-01
Drawn: T Martin
Checked: B Fitzgerald

N

LBW environmental projects

N

2002 Aerial Photograph

Smith Bay Approvals

Baseline Site Assessment

For

Kangaroo Island Plantation Timbers

LEGEND

Approximate site boundary

DATE 15.03.2002

SURVEY 6050

PHOTO 25

SCALE

0 10 20

Image source:
Mapland, Dept for Environment and Natural Resources

Job No: 150738-01
Drawn: T Martin
Checked: B Fitzgerald

LBW environmental projects

N

2015 Aerial Photograph

Smith Bay Approvals

Baseline Site Assessment

For

Kangaroo Island Plantation Timbers

LEGEND

Approximate site boundary

DATE 14.10.2015

SURVEY -

PHOTO -

SCALE

0 10 20

Image source:
Google Earth

Job No: 150738-01
Drawn: T Martin
Checked: B Fitzgerald

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Appendix F

EPA Public Register Searches

Receipt No :
Admin No : 61147 (40813)

LBW Environmental Projects
PO BOX 225
STEPNEY SA 5069

Contact: Section 7
Telephone: (08) 8204 2026
Email: epasection7@sa.gov.au

Contact: Public Register
Telephone: (08) 8204 9128
Email: epa.publicregister@sa.gov.au

08 September, 2016

EPA STATEMENT TO FORM 1 - CONTRACTS FOR SALE OF LAND OR BUSINESS

The EPA provides this statement to assist the vendor meet its obligations under section 7(1)(b) of the *Land and Business (Sale and Conveyancing) Act 1994*. A response to the questions prescribed in Schedule 1-Contracts for sale of land or business-forms (Divisions 1 and 2) of the *Land and Business (Sale and Conveyancing) Act 1994* is provided in relation to the land.

I refer to your enquiry concerning the parcel of land comprised in

Title Reference	CT Volume 6127 Folio 273
Address	Pieces 51-52, 1970B North Coast Road, WISANGER SA 5223

Schedule – Division 1 – *Land and Business (Sale and Conveyancing) Regulations 2010*

PARTICULARS OF MORTGAGES, CHARGES AND PRESCRIBED ENCUMBRANCES AFFECTING THE LAND

7. Environment Protection Act 1993

Does the EPA hold any of the following details relating to the *Environment Protection Act 1993*:

7.1	Section 59 - Environment performance agreement that is registered in relation to the land.	NO
7.2	Section 93 - Environment protection order that is registered in relation to the land.	NO
7.3	Section 93A - Environment protection order relating to cessation of activity that is registered in relation to the land.	NO
7.4	Section 99 - Clean-up order that is registered in relation to the land.	NO
7.5	Section 100 - Clean-up authorisation that is registered in relation to the land.	NO
7.6	Section 103H - Site contamination assessment order that is registered in relation to the land.	NO
7.7	Section 103J - Site remediation order that is registered in relation to the land.	NO

7.8	Section 103N - Notice of declaration of special management area in relation to the land (due to possible existence of site contamination).	NO
7.9	Section 103P - Notation of site contamination audit report in relation to the land.	NO
7.10	Section 103S - Notice of prohibition or restriction on taking water affected by site contamination in relation to the land.	NO

Schedule – Division 2 – *Land and Business (Sale and Conveyancing) Regulations 2010*

PARTICULARS RELATING TO ENVIRONMENT PROTECTION

3-Licences and exemptions recorded by EPA in public register

Does the EPA hold any of the following details in the public register:

a)	details of a current licence issued under Part 6 of the *Environment Protection Act 1993* to conduct, at the land-	
i)	a waste or recycling depot (as referred to in clause 3(3) of Schedule 1 Part A of that Act); or	NO
ii)	activities producing listed wastes (as referred to in clause 3(4) of Schedule 1 Part A of that Act); or	NO
iii)	any other prescribed activity of environmental significance under Schedule 1 of that Act?	NO
b)	details of a licence no longer in force issued under Part 6 of the *Environment Protection Act 1993* to conduct, at the land-	
i)	a waste or recycling depot (as referred to in clause 3(3) of Schedule 1 Part A of that Act); or	NO
ii)	activities producing listed wastes (as referred to in clause 3(4) of Schedule 1 Part A of that Act); or	NO
iii)	any other prescribed activity of environmental significance under Schedule 1 of that Act?	**YES**
c)	details of a current exemption issued under Part 6 of the *Environment Protection Act 1993* from the application of a specified provision of that Act in relation to an activity carried on at the land?	NO
d)	details of an exemption no longer in force issued under Part 6 of the *Environment Protection Act 1993* from the application of a specified provision of that Act in relation to an activity carried on at the land?	NO
e)	details of a licence issued under the repealed *South Australian Waste Management Commission Act 1979* to operate a waste depot at the land?	NO
f)	details of a licence issued under the repealed *Waste Management Act 1987* to operate a waste depot at the land?	NO
g)	details of a licence issued under the repealed *South Australian Waste Management Commission Act 1979* to produce waste of a prescribed kind (within the meaning of that Act) at the land?	NO

h)	details of a licence issued under the repealed *Waste Management Act 1987* to produce prescribed waste (within the meaning of that Act) at the land?	NO

4-Pollution and site contamination on the land - details recorded by the EPA in public register

Does the EPA hold any of the following details in the public register in relation to the land or part of the land:

a)	details of serious or material environmental harm caused or threatened in the course of an activity (whether or not notified under section 83 of the *Environment Protection Act 1993*)?	NO
b)	details of site contamination notified to the EPA under section 83A of the *Environment Protection Act 1993*?	NO
c)	a copy of a report of an environmental assessment (whether prepared by the EPA or some other person or body and whether or not required under legislation) that forms part of the information required to be recorded in the public register?	NO
d)	a copy of a site contamination audit report?	NO
e)	details of an agreement for the exclusion or limitation of liability for site contamination to which section 103E of the *Environment Protection Act 1993* applies?	NO
f)	details of an agreement entered into with the EPA relating to an approved voluntary site contamination assessment proposal under section 103I of the *Environment Protection Act 1993?*	NO
g)	details of an agreement entered into with the EPA relating to an approved voluntary site remediation proposal under section 103K of the *Environment Protection Act 1993?*	NO
h)	details of a notification under section 103Z(1) of the *Environment Protection Act 1993* relating to the commencement of a site contamination audit?	NO
i)	details of a notification under section 103Z(2) of the *Environment Protection Act 1993* relating to the termination before completion of a site contamination audit?	NO
j)	details of records, held by the former *South Australian Waste Management Commission* under the repealed *Waste Management Act 1987*, of waste (within the meaning of that Act) having been deposited on the land between 1 January 1983 and 30 April 1995?	NO

5-Pollution and site contamination on the land - other details held by EPA

Does the EPA hold any of the following details in relation to the land or part of the land:

a)	a copy of a report known as a "Health Commission Report" prepared by or on behalf of the *South Australian Health Commission* (under the repealed *South Australian Health Commission Act 1976*)?	NO
b)	details (which may include a report of an environmental assessment) relevant to an agreement entered into with the EPA relating to an approved voluntary site contamination assessment proposal under section 103I of the *Environment Protection Act 1993?*	NO
c)	details (which may include a report of an environmental assessment) relevant to an agreement entered into with the EPA relating to an approved voluntary site remediation proposal under section 103K of the *Environment Protection Act 1993*?	NO

d)	a copy of a pre-1 July 2009 site audit report?	NO
e)	details relating to the termination before completion of a pre-1 July 2009 site audit?	NO

A summary of the activities relating to wastes may be appended. Should you require any further information regarding this land (outside the Public Register details) please contact the Environment Protection Authority to make necessary arrangements.

Details and/or copies of environmental assessments, licences and records on the Public Register may be obtained from the Environment Protection Authority on payment of the prescribed fee.

Prior to arranging an examination and/or copies of the required above information please telephone (08) 8204 9128 to contact the Public Register Administrator to ensure the required details are available upon arrival.

All care and diligence has been taken to access the above information from available records. Historical records provided to the EPA concerning matters arising prior to 1 May 1995 are limited and may not be accurate or complete and therefore the EPA cannot confirm the accuracy of the historical information provided.

File Reference: EPA/12701

LBW environmental projects

EPA Site Contamination Index Search

150738-01

31/08/16

Within 1 km of subject site =

Search contamination site index

This index was last updated 22 August 2016

Search	
Suburb/Town:	Kangaroo Island « required
Type	All Type definitions
	Search

No contamination sites were found which match the specified search terms.

This index was last updated 22 August 2016

Search	
Suburb/Town:	Wisanger « required
Type	All Type definitions
	Search

No contamination sites were found which match the specified search terms.

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Appendix G

SafeWork SA Dangerous Substances Search

Government of South Australia
SafeWork SA

Attorney-General's Department

Licensing, Customer Services Team

Level 4 World Park A
33 Richmond Road
Keswick SA 5035

GPO Box 465
Adelaide SA 5001

DX 715 Adelaide

Phone 1300 365 255
Fax 08 8303 9903
Email licensing.safework@sa.gov.au

ABN 50-560-588-327

www.safework.sa.gov.au

6 September 2016

Tahlia Martin
LBW Environmental Projects Pty Ltd
184 Magill Road
NORWOOD SA 5067

Dear Ms Martin

DANGEROUS SUBSTANCES LICENCE SEARCH

PROPERTY DETAILS: 1970B North Coast Road, Wisanger

Further to your Application for a Dangerous Substance Search dated **31/8/2016** for the abovementioned site, I advise that there are no current or historical records for this site.

Yours sincerely

MANAGER
LICENSING, CUSTOMER SERVICES TEAM
SAFEWORK SA

LBW|ep

Appendix H

Soil Chemical Summary Tables

Chemical Summary Table

LBW|ep

	Metals																		
	Arsenic	Beryllium	Boron	Cadmium	Chromium (hexavalent)	Chromium (III+VI)	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Tin	Zinc
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	4	1	3	0.4	1	1	1	1	1	1	1	0.1	1	1	2	1	1	1
NEPM 1999 Soil HIL D - Commercial/Industrial	3000	500	300000	900	3600		4000	240000		1500	60000	730		6000	10000			400000
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)	160							330		1800				730				1400
NEPM 1999 EIL - Commercial/Industrial (CLAY)	160							340		1800				810				1400
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																		
NEPM 1999 Management Limits - Commercial/Industrial (fine)																		
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)																		
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**																
Grid Based Soil Bores																			
BH1-01	BH1	0-0.2	13/10/2016	<4	-	-	<0.4	-	8	-	2	-	4	-	<0.1	<1	2	<2	<1	<1	3
BH2-01	BH2	0-0.05	13/10/2016	<4	-	-	<0.4	-	19	-	5	-	6	-	<0.1	<1	5	<2	<1	<1	8
BH3-02	BH3	0.5-0.6	13/10/2016	<4	-	-	<0.4	-	5	-	3	-	1	-	<0.1	<1	5	<2	<1	<1	4
BH4-01	BH4	0-0.1	13/10/2016	5	-	-	<0.4	-	41	-	<1	-	14	-	<0.1	<1	3	<2	<1	<1	3
BH4-03	BH4	0.5-0.6	13/10/2016	<4	<1	8	<0.4	<1	17	2	3	-	6	110	<0.1	-	4	<2	-	-	6
BH5-01	BH5	0-0.1	13/10/2016	<4	-	-	<0.4	-	30	-	2	-	8	-	<0.1	<1	7	<2	<1	<1	8
BH6-01	BH6	0-0.1	13/10/2016	<4	<1	9	<0.4	<1	14	4	2	-	4	86	<0.1	-	4	<2	-	-	5
BH7-01	BH7	0-0.1	13/10/2016	<4	-	-	<0.4	-	21	-	2	-	7	-	<0.1	<1	5	<2	<1	<1	5
BH8-01	BH8	0-0.15	13/10/2016	<4	<1	5	<0.4	<1	9	1	3	-	4	41	<0.1	-	2	<2	-	-	8
BH9-01	BH9	0-0.1	12/10/2016	<4	-	-	<0.4	-	8	-	2	-	3	-	<0.1	<1	2	<2	<1	<1	4
BH9-03	BH9	0.35-0.45	12/10/2016	6	-	-	<0.4	-	9	-	<1	-	4	-	<0.1	<1	3	<2	<1	<1	3
BH10-01	BH10	0-0.15	12/10/2016	<4	-	-	<0.4	-	16	-	2	-	5	-	<0.1	<1	5	<2	<1	<1	5
BH11-01	BH11	0-0.1	13/10/2016	<4	-	-	<0.4	-	15	-	3	-	5	-	<0.1	<1	4	<2	<1	<1	6
BH11-03*	BH11	0.6-0.75	13/10/2016	<4	-	-	<0.4	-	4	-	<1	2300	1	-	<0.1	<1	4	<2	<1	<1	2
BH12-01	BH12	0-0.1	13/10/2016	<4	-	-	<0.4	-	11	-	2	-	4	-	<0.1	<1	2	<2	<1	<1	5
BH13-01	BH13	0-0.35	13/10/2016	<4	-	-	<0.4	-	6	-	<1	-	1	-	<0.1	<1	2	<2	<1	<1	4
BH13-04	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Chemical Summary Table

LBW|ep

	Metals																		
	Arsenic	Beryllium	Boron	Cadmium	Chromium (hexavalent)	Chromium (III+VI)	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Tin	Zinc
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	4	1	3	0.4	1	1	1	1	1	1	1	0.1	1	1	2	1	1	1
NEPM 1999 Soil HIL D - Commercial/Industrial	3000	500	300000	900	3600		4000	240000		1500	60000	730		6000	10000			400000
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)	160							330		1800				730				1400
NEPM 1999 EIL - Commercial/Industrial (CLAY)	160							340		1800				810				1400
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																		
NEPM 1999 Management Limits - Commercial/Industrial (fine)																		
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)																		

Sample ID	Sample Location	Sample Depth Range (mBGL)	Sample Date																
Grid Based Soil Bores																			
BH13-05	BH13	1.65-1.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14-01	BH14	0-0.15	12/10/2016	<4	-	-	<0.4	-	13	-	6	-	5	-	<0.1	<1	4	<2	<1	<1	12
BH15-01	BH15	0-0.15	12/10/2016	4	-	-	<0.4	-	14	-	5	-	6	-	<0.1	<1	5	<2	<1	<1	8
BH16-01	BH16	0-0.2	12/10/2016	<4	-	-	<0.4	-	9	-	2	-	3	-	<0.1	<1	4	<2	<1	<1	4
BH17-01	BH17	0-0.15	13/10/2016	<4	<1	8	<0.4	<1	16	2	3	-	6	77	<0.1	-	5	<2	-	-	6
BH18-01	BH18	0-0.1	13/10/2016	<4	-	-	<0.4	-	12	-	2	-	4	-	<0.1	<1	3	<2	<1	<1	6
BH19-01	BH19	0-0.15	13/10/2016	<4	-	-	<0.4	-	18	-	3	-	7	-	<0.1	<1	4	<2	<1	<1	7
BH20-01	BH20	0-0.1	12/10/2016	<4	-	-	<0.4	-	10	-	2	-	5	-	<0.1	<1	2	<2	<1	<1	6
BH20-04*	BH20	1.1-1.3	12/10/2016	<4	-	-	<0.4	-	27	-	1	20,000	8	-	<0.1	<1	4	<2	<1	<1	8
Targeted Soil Bores																			
T1-01	T1	0-0.1	13/10/2016	<4	-	-	<0.4	-	16	-	14	-	5	-	<0.1	<1	9	<2	<1	1	200
T2-01	T2	0-0.1	13/10/2016	<4	<1	31	<0.4	<1	12	4	2	-	5	32	<0.1	-	3	<2	-	-	6
T3-04	T3	0.7-0.8	13/10/2016	<4	-	-	<0.4	-	10	-	2	-	2	-	<0.1	<1	6	<2	<1	<1	3
T4-01	T4	0-0.05	13/10/2016	<4	-	-	<0.4	-	23	-	3	-	7	-	<0.1	<1	7	<2	<1	<1	18
T5-01	T5	0-0.05	13/10/2016	<4	-	-	<0.4	-	17	-	1	-	6	-	<0.1	<1	4	<2	<1	<1	5
T6-01	T6	0-0.05	13/10/2016	<4	-	-	<0.4	-	16	-	3	-	5	-	<0.1	<1	5	<2	<1	<1	6

*sample selected as ambient background concentration (ABC) for calculation of the EIL . Selected EILS are derived based on the added contaminant limit (ACL) + background concentrations. EIL/ESLs are applicable to samples collected within top 2m of soil profile.

Chemical Summary Table

LBW ep

				PAH																		PAH other	PAH/Phenols other	
				Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH	Benzo(a)pyrene TEQ	Carcinogenic PAH (BaP TEQ Half LOR)	Carcinogenic PAH (BaP TEQ LOR)	Benzo(b)&(k)fluoranthene	Cresol Total	Picloram
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.5	0.5	0.5	0.2	0.2	0.5
NEPM 1999 Soil HIL D - Commercial/Industrial																		4000		40	40		25000	35000
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)															370									
NEPM 1999 EIL - Commercial/Industrial (CLAY)															370									
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																								
NEPM 1999 Management Limits - Commercial/Industrial (fine)																								
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)								1.4																
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**																					
Grid Based Soil Bores																								
BH1-01	BH1	0-0.2	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	<0.5
BH2-01	BH2	0-0.05	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-
BH3-02	BH3	0.5-0.6	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-
BH4-01	BH4	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
BH4-03	BH4	0.5-0.6	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	<0.2	<0.5
BH5-01	BH5	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-
BH6-01	BH6	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	<0.2	<0.5
BH7-01	BH7	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-
BH8-01	BH8	0-0.15	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	<0.2	<0.5
BH9-01	BH9	0-0.1	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
BH9-03	BH9	0.35-0.45	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10-01	BH10	0-0.15	12/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-
BH11-01	BH11	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11-03*	BH11	0.6-0.75	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12-01	BH12	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
BH13-01	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13-04	BH13	0-0.35	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-

Chemical Summary Table

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				PAH																		PAH other	PAH/Phenols other	
				Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH	Benzo(a)pyrene TEQ	Carcinogenic PAH (BaP TEQ Half LOR)	Carcinogenic PAH (BaP TEQ LOR)	Benzo(b&k)fluoranthene	Cresol Total	Picloram
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.5	0.5	0.5	0.2	0.2	0.5
NEPM 1999 Soil HIL D - Commercial/Industrial																		4000		40	40		25000	35000
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)															370									
NEPM 1999 EIL - Commercial/Industrial (CLAY)															370									
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																								
NEPM 1999 Management Limits - Commercial/Industrial (fine)																								
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)								1.4																
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**																					
Grid Based Soil Bores																								
BH13-05	BH13	1.65-1.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14-01	BH14	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15-01	BH15	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH16-01	BH16	0-0.2	12/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-
BH17-01	BH17	0-0.15	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	<0.2	<0.5
BH18-01	BH18	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-
BH19-01	BH19	0-0.15	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
BH20-01	BH20	0-0.1	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
BH20-04*	BH20	1.1-1.3	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Targeted Soil Bores																								
T1-01	T1	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-
T2-01	T2	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	<0.2	<0.5
T3-04	T3	0.7-0.8	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-
T4-01	T4	0-0.05	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-
T5-01	T5	0-0.05	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-
T6-01	T6	0-0.05	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	<0.5	<0.5	<0.2	-	-

Chemical Summary Table

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				TRH											BTEX						
				TRH C6-C9	TRH >C10-C14	TRH >C15-C28	TRH >C29 - C36	TRH >C10 - C36 (sum of fractions)	TRH C6-C10	TRH C6-C10 less BTEX (F1)	TRH >C10-C16	TRH >C10-C16 less Napthalene (F2)	TRH >C16-C34	TRH >C34-C40	TRH >C10-C40 (sum of fractions)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				25	50	100	100	50	25	25	50	50	100	100	50	0.2	0.5	1	1	2	1
NEPM 1999 Soil HIL D - Commercial/Industrial																					
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)																					
NEPM 1999 EIL - Commercial/Industrial (CLAY)																					
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)										310						4					
NEPM 1999 Management Limits - Commercial/Industrial (fine)									800		1000		5000	10,000							
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)										215	170		2500	6600		95	135	185			95
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**																		
Grid Based Soil Bores																					
BH1-01	BH1	0-0.2	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
BH2-01	BH2	0-0.05	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
BH3-02	BH3	0.5-0.6	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
BH4-01	BH4	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4-03	BH4	0.5-0.6	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
BH5-01	BH5	0-0.1	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
BH6-01	BH6	0-0.1	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
BH7-01	BH7	0-0.1	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
BH8-01	BH8	0-0.15	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
BH9-01	BH9	0-0.1	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH9-03	BH9	0.35-0.45	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10-01	BH10	0-0.15	12/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
BH11-01	BH11	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11-03*	BH11	0.6-0.75	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12-01	BH12	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13-01	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13-04	BH13	0-0.35	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1

Chemical Summary Table

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				TRH												BTEX					
				TRH C6-C9	TRH >C10-C14	TRH >C15-C28	TRH >C29 - C36	TRH >C10 - C36 (sum of fractions)	TRH C6-C10	TRH C6-C10 less BTEX (F1)	TRH >C10-C16	TRH >C10-C16 less Napthalene (F2)	TRH >C16-C34	TRH >C34-C40	TRH >C10-C40 (sum of fractions)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				25	50	100	100	50	25	25	50	50	100	100	50	0.2	0.5	1	1	2	1
NEPM 1999 Soil HIL D - Commercial/Industrial																					
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)																					
NEPM 1999 EIL - Commercial/Industrial (CLAY)																					
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)										310						4					
NEPM 1999 Management Limits - Commercial/Industrial (fine)									800		1000		5000	10,000							
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)										215	170		2500	6600		95	135	185			95
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**																		
Grid Based Soil Bores																					
BH13-05	BH13	1.65-1.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14-01	BH14	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15-01	BH15	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH16-01	BH16	0-0.2	12/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
BH17-01	BH17	0-0.15	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
BH18-01	BH18	0-0.1	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
BH19-01	BH19	0-0.15	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20-01	BH20	0-0.1	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20-04*	BH20	1.1-1.3	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Targeted Soil Bores																					
T1-01	T1	0-0.1	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
T2-01	T2	0-0.1	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
T3-04	T3	0.7-0.8	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
T4-01	T4	0-0.05	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
T5-01	T5	0-0.05	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1
T6-01	T6	0-0.05	13/10/2016	<25	<50	<100	<100	<50	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<1	<2	<1

Chemical Summary Table

LBW ep

				Organochlorine Pesticides																				
				4,4-DDD	4,4-DDE	4,4-DDT	DDT+DDE+DDD	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)	Aldrin	Dieldrin	Chlordane (cis)	Chlordane (trans)	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				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	0.1	0.1	0.1	0.1	0.1	0.1	2
NEPM 1999 Soil HIL D - Commercial/Industrial							3600												100		50		2500	160
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)						640																		
NEPM 1999 EIL - Commercial/Industrial (CLAY)						640																		
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																								
NEPM 1999 Management Limits - Commercial/Industrial (fine)																								
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)																								
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**																					
Grid Based Soil Bores																								
BH1-01	BH1	0-0.2	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2-01	BH2	0-0.05	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
BH3-02	BH3	0.5-0.6	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
BH4-01	BH4	0-0.1	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
BH4-03	BH4	0.5-0.6	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2
BH5-01	BH5	0-0.1	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
BH6-01	BH6	0-0.1	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2
BH7-01	BH7	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH8-01	BH8	0-0.15	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2
BH9-01	BH9	0-0.1	12/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
BH9-03	BH9	0.35-0.45	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10-01	BH10	0-0.15	12/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
BH11-01	BH11	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11-03*	BH11	0.6-0.75	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12-01	BH12	0-0.1	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
BH13-01	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13-04	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Chemical Summary Table

LBW|ep

				Organochlorine Pesticides																			
				4,4-DDD	4,4-DDE	4,4-DDT	DDT+DDE+DDD	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)	Aldrin	Dieldrin	Chlordane (cis)	Chlordane (trans)	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				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	0.1	0.1	0.1	0.1	0.1	0.1	2
NEPM 1999 Soil HIL D - Commercial/Industrial							3600												100		50		2500	160
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)						640																		
NEPM 1999 EIL - Commercial/Industrial (CLAY)						640																		
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																								
NEPM 1999 Management Limits - Commercial/Industrial (fine)																								
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)																								
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**																					
Grid Based Soil Bores																								
BH13-05	BH13	1.65-1.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14-01	BH14	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15-01	BH15	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH16-01	BH16	0-0.2	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17-01	BH17	0-0.15	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2
BH18-01	BH18	0-0.1	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
BH19-01	BH19	0-0.15	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20-01	BH20	0-0.1	12/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
BH20-04*	BH20	1.1-1.3	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Targeted Soil Bores																								
T1-01	T1	0-0.1	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
T2-01	T2	0-0.1	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2
T3-04	T3	0.7-0.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T4-01	T4	0-0.05	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
T5-01	T5	0-0.05	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-
T6-01	T6	0-0.05	13/10/2016	<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	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-

				Organophosphorous Pesticides											Pesticides		Synthetic Pyrethroids
				Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Ronnel	Mirex	Parathion	Bifenthrin
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.1	0.5
NEPM 1999 Soil HIL D - Commercial/Industrial						2000									100		4500
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)																	
NEPM 1999 EIL - Commercial/Industrial (CLAY)																	
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																	
NEPM 1999 Management Limits - Commercial/Industrial (fine)																	
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)																	
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**														
Grid Based Soil Bores																	
BH1-01	BH1	0-0.2	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2-01	BH2	0-0.05	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
BH3-02	BH3	0.5-0.6	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
BH4-01	BH4	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
BH4-03	BH4	0.5-0.6	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.5
BH5-01	BH5	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
BH6-01	BH6	0-0.1	13/10/2016	-	-	<0.1	-	-	-	-	-	-	-	-	<0.5	-	<0.5
BH7-01	BH7	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH8-01	BH8	0-0.15	13/10/2016	-	-	<0.1	-	-	-	-	-	-	-	-	<0.5	-	<0.5
BH9-01	BH9	0-0.1	12/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
BH9-03	BH9	0.35-0.45	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10-01	BH10	0-0.15	12/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
BH11-01	BH11	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11-03*	BH11	0.6-0.75	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12-01	BH12	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
BH13-01	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13-04	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Chemical Summary Table

LBW|ep

				Organophosphorous Pesticides											Pesticides		Synthetic Pyrethroids
				Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Ronnel	Mirex	Parathion	Bifenthrin
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.1	0.5
NEPM 1999 Soil HIL D - Commercial/Industrial						2000									100		4500
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)																	
NEPM 1999 EIL - Commercial/Industrial (CLAY)																	
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																	
NEPM 1999 Management Limits - Commercial/Industrial (fine)																	
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)																	
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**														
Grid Based Soil Bores																	
BH13-05	BH13	1.65-1.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14-01	BH14	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15-01	BH15	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH16-01	BH16	0-0.2	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17-01	BH17	0-0.15	13/10/2016	-	-	<0.1	-	-	-	-	-	-	-	-	<0.5	-	<0.5
BH18-01	BH18	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
BH19-01	BH19	0-0.15	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20-01	BH20	0-0.1	12/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
BH20-04*	BH20	1.1-1.3	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Targeted Soil Bores																	
T1-01	T1	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.5
T2-01	T2	0-0.1	13/10/2016	-	-	<0.1	-	-	-	-	-	-	-	-	<0.5	-	<0.5
T3-04	T3	0.7-0.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T4-01	T4	0-0.05	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.5
T5-01	T5	0-0.05	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
T6-01	T6	0-0.05	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-

				Herbicides																	
				2,4,5-Trichlorophenoxy Acetic Acid	2,4,5-TP (Silvex)	Hedonal	2,4-dichlorophenoxybutanoic acid	2,4-Dichlorprop	2,4,6-Trichlorophenoxy-acetic acid	2-Chlorophenoxyacetic acid	4-Chlorophenoxy acetic acid	Acifluorfen	Atrazine	Bromoxynil	Clopyralid	Dicamba	Dinoseb	2-Methyl-4-chlorophenoxyacetic acid	2-Methyl-4-Chlorophenoxy Butanoic Acid	Mecoprop	Triclopyr
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5
NEPM 1999 Soil HIL D - Commercial/Industrial				5000		9000							2500					5000	5000	5000	
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)																					
NEPM 1999 EIL - Commercial/Industrial (CLAY)																					
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																					
NEPM 1999 Management Limits - Commercial/Industrial (fine)																					
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)																					
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**																		
Grid Based Soil Bores																					
BH1-01	BH1	0-0.2	13/10/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	-	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
BH2-01	BH2	0-0.05	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3-02	BH3	0.5-0.6	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4-01	BH4	0-0.1	13/10/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	-	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
BH4-03	BH4	0.5-0.6	13/10/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
BH5-01	BH5	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH6-01	BH6	0-0.1	13/10/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
BH7-01	BH7	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH8-01	BH8	0-0.15	13/10/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
BH9-01	BH9	0-0.1	12/10/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	-	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
BH9-03	BH9	0.35-0.45	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10-01	BH10	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11-01	BH11	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11-03*	BH11	0.6-0.75	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12-01	BH12	0-0.1	13/10/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	-	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
BH13-01	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13-04	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Chemical Summary Table

LBW|ep

	Herbicides																		
	2,4,5-Trichlorophenoxy Acetic Acid	2,4,5-TP (Silvex)	Hedonal	2,4-dichlorophenoxybutanoic acid	2,4-Dichlorprop	2,4,6-Trichlorophenoxy-acetic acid	2-Chlorophenoxyacetic acid	4-Chlorophenoxy acetic acid	Acifluorfen	Atrazine	Bromoxynil	Clopyralid	Dicamba	Dinoseb	2-Methyl-4-chlorophenoxyacetic acid	2-Methyl-4-Chlorophenoxy Butanoic Acid	Mecoprop	Triclopyr
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	
NEPM 1999 Soil HIL D - Commercial/Industrial	5000		9000							2500					5000	5000	5000		
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)																			
NEPM 1999 EIL - Commercial/Industrial (CLAY)																			
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																			
NEPM 1999 Management Limits - Commercial/Industrial (fine)																			
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)																			

Sample ID	Sample Location	Sample Depth Range (mBGL)	Sample Date																
Grid Based Soil Bores																			
BH13-05	BH13	1.65-1.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14-01	BH14	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15-01	BH15	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH16-01	BH16	0-0.2	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17-01	BH17	0-0.15	13/10/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
BH18-01	BH18	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19-01	BH19	0-0.15	13/10/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	-	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
BH20-01	BH20	0-0.1	12/10/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	-	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
BH20-04*	BH20	1.1-1.3	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Targeted Soil Bores																			
T1-01	T1	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T2-01	T2	0-0.1	13/10/2016	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5
T3-04	T3	0.7-0.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T4-01	T4	0-0.05	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T5-01	T5	0-0.05	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T6-01	T6	0-0.05	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

				Polychlorinated Biphenyls							Phenols								
				Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	2,4-dimethylphenol	2-methylphenol	2-nitrophenol	4-chloro-3-methylphenol	2,4-dinitrophenol	4-methylphenol	4-nitrophenol	Total Phenols	Phenolics Total
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	2	2	0.4	4	0.2	0.2
NEPM 1999 Soil HIL D - Commercial/Industrial											7								240000	
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)																				
NEPM 1999 EIL - Commercial/Industrial (CLAY)																				
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																				
NEPM 1999 Management Limits - Commercial/Industrial (fine)																				
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)																				
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**																	
Grid Based Soil Bores																				
BH1-01	BH1	0-0.2	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH2-01	BH2	0-0.05	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3-02	BH3	0.5-0.6	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4-01	BH4	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4-03	BH4	0.5-0.6	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<2	<2	<0.4	<4	<0.2	<0.2
BH5-01	BH5	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH6-01	BH6	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<2	<2	<0.4	<4	<0.2	<0.2
BH7-01	BH7	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH8-01	BH8	0-0.15	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<2	<2	<0.4	<4	<0.2	<0.2
BH9-01	BH9	0-0.1	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH9-03	BH9	0.35-0.45	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10-01	BH10	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11-01	BH11	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11-03*	BH11	0.6-0.75	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12-01	BH12	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13-01	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13-04	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Chemical Summary Table

LBW|ep

	Polychlorinated Biphenyls								Phenols								
	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	2,4-dimethylphenol	2-methylphenol	2-nitrophenol	4-chloro-3-methylphenol	2,4-dinitrophenol	4-methylphenol	4-nitrophenol	Total Phenols	Phenolics Total
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	2	2	0.4	4	0.2	0.2
NEPM 1999 Soil HIL D - Commercial/Industrial								7								240000	
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)																	
NEPM 1999 EIL - Commercial/Industrial (CLAY)																	
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																	
NEPM 1999 Management Limits - Commercial/Industrial (fine)																	
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)																	

Sample ID	Sample Location	Sample Depth Range (mBGL)	Sample Date																
Grid Based Soil Bores																			
BH13-05	BH13	1.65-1.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14-01	BH14	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15-01	BH15	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH16-01	BH16	0-0.2	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17-01	BH17	0-0.15	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<2	<2	<0.4	<4	<0.2	<0.2
BH18-01	BH18	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19-01	BH19	0-0.15	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20-01	BH20	0-0.1	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20-04*	BH20	1.1-1.3	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Targeted Soil Bores																			
T1-01	T1	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T2-01	T2	0-0.1	13/10/2016	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<2	<2	<0.4	<4	<0.2	<0.2
T3-04	T3	0.7-0.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T4-01	T4	0-0.05	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T5-01	T5	0-0.05	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T6-01	T6	0-0.05	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	Halogenated Benzenes	Halogenated Phenols							Inorganics										
	Hexachlorobenzene	2,3,4,6-tetrachlorophenol	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,6-dichlorophenol	2-chlorophenol	Pentachlorophenol	Exchangeable Sodium	Cation Exchange Capacity (CEC)	Exchangeable Magnesium	Exchangeable Calcium	Exchangeable Potassium	Cyanide (Free)	Moisture	pH (aqueous extract)	Clay in soils <2um	DCPA (Chlorthal) Diacid	pH kcl
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	mg/kg	%	pH_Unit	% (w/w)	mg/kg	pH units
EQL	0.1	0.2	0.2	0.2	0.2	0.2	0.2	1	0.1	1	0.1	0.1	0.1	0.5	0.1			0.5	
NEPM 1999 Soil HIL D - Commercial/Industrial	80							660						1500					
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)																			
NEPM 1999 EIL - Commercial/Industrial (CLAY)																			
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																			
NEPM 1999 Management Limits - Commercial/Industrial (fine)																			
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)																			

Sample ID	Sample Location	Sample Depth Range (mBGL)	Sample Date																	
Grid Based Soil Bores																				
BH1-01	BH1	0-0.2	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.1	-	-	<0.5	-
BH2-01	BH2	0-0.05	13/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	13	7.5	-	-	-
BH3-02	BH3	0.5-0.6	13/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	4.7	9.1	-	-	-
BH4-01	BH4	0-0.1	13/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	3.7	8.2	-	<0.5	-
BH4-03	BH4	0.5-0.6	13/10/2016	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	-	-	-	-	-	<0.5	8.4	8.8	-	<0.5	-
BH5-01	BH5	0-0.1	13/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	3.7	7.4	-	-	-
BH6-01	BH6	0-0.1	13/10/2016	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	-	-	-	-	-	<0.5	3.9	7.7	-	<0.5	-
BH7-01	BH7	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-	-
BH8-01	BH8	0-0.15	13/10/2016	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	-	-	-	-	-	<0.5	3.4	6.9	-	<0.5	-
BH9-01	BH9	0-0.1	12/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	12	6.6	-	<0.5	-
BH9-03	BH9	0.35-0.45	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	8.7	-	-	-
BH10-01	BH10	0-0.15	12/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	17	-	-	-	-
BH11-01	BH11	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	8.1	-	-	-
BH11-03*	BH11	0.6-0.75	13/10/2016	-	-	-	-	-	-	-	-	1.1	40	7.8	31	0.6	-	26	-	25	-	-
BH12-01	BH12	0-0.1	13/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	<0.5	-
BH13-01	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.3	9	-	-	-
BH13-04	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.4	-	-	-	-

Chemical Summary Table

LBW|ep

				Halogenated Benzenes	Halogenated Phenols							Inorganics										
				Hexachlorobenzene	2,3,4,6-tetrachlorophenol	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,6-dichlorophenol	2-chlorophenol	Pentachlorophenol	Exchangeable Sodium	Cation Exchange Capacity (CEC)	Exchangeable Magnesium	Exchangeable Calcium	Exchangeable Potassium	Cyanide (Free)	Moisture	pH (aqueous extract)	Clay in soils <2um	DCPA (Chlorthal) Diacid	pH kcl
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	cmol/kg	mg/kg	%	pH_Unit	% (w/w)	mg/kg	pH units
EQL				0.1	0.2	0.2	0.2	0.2	0.2	0.2	1	0.1	1	0.1	0.1	0.1	0.5	0.1			0.5	
NEPM 1999 Soil HIL D - Commercial/Industrial				80							660						1500					
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)																						
NEPM 1999 EIL - Commercial/Industrial (CLAY)																						
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)																						
NEPM 1999 Management Limits - Commercial/Industrial (fine)																						
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)																						
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**																			
Grid Based Soil Bores																						
BH13-05	BH13	1.65-1.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.8
BH14-01	BH14	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	8	-	-	-
BH15-01	BH15	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18	7.4	-	-	-
BH16-01	BH16	0-0.2	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	8.7	-	-	-
BH17-01	BH17	0-0.15	13/10/2016	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	-	-	-	-	-	<0.5	21	-	-	<0.5	-
BH18-01	BH18	0-0.1	13/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-
BH19-01	BH19	0-0.15	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	-	-	<0.5	-
BH20-01	BH20	0-0.1	12/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	11	6.9	-	<0.5	-
BH20-04*	BH20	1.1-1.3	12/10/2016	-	-	-	-	-	-	-	-	6.6	47	9.3	29	2.1	-	22	-	61	-	-
Targeted Soil Bores																						
T1-01	T1	0-0.1	13/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	21	-	-	-	-
T2-01	T2	0-0.1	13/10/2016	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	-	-	-	-	-	<0.5	18	-	-	<0.5	-
T3-04	T3	0.7-0.8	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	-	-	-	-
T4-01	T4	0-0.05	13/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	-	-	-
T5-01	T5	0-0.05	13/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	20	-	-	-	-
T6-01	T6	0-0.05	13/10/2016	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	19	-	-	-	-

Chemical Summary Table

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	Anions	Nutrients				Other		SPOCAS						
	Sulphate	Ammonia	Nitrate (as N)	Nitrite (as N)	TOC	3,5-Dichlorobenzoic acid	Actril (loxynil)	Peroxide Oxidisable Sulfur	Acid Reacted Calcium	Calcium in Peroxide	KCl Extractable Calcium	KCl Extractable Magnesium	Magnesium in Peroxide	Sulfur in Peroxide
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%
EQL	10	0.5	0.5	0.1	1000	0.5	1	0.005	0.005	0.005	0.005	0.005	0.005	0.005
NEPM 1999 Soil HIL D - Commercial/Industrial														
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)														
NEPM 1999 EIL - Commercial/Industrial (CLAY)														
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)														
NEPM 1999 Management Limits - Commercial/Industrial (fine)														
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)														
Sample ID	**Sample Location**	**Sample Depth Range (mBGL)**	**Sample Date**											
Grid Based Soil Bores														
BH1-01	BH1	0-0.2	13/10/2016	-	2.4	2.1	<0.1	-	<0.5	<1	-	-	-	-	-	-
BH2-01	BH2	0-0.05	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3-02	BH3	0.5-0.6	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4-01	BH4	0-0.1	13/10/2016	-	2	<0.5	<0.1	-	<0.5	<1	-	-	-	-	-	-
BH4-03	BH4	0.5-0.6	13/10/2016	68	7.1	<0.5	0.3	-	<0.5	<1	-	-	-	-	-	-
BH5-01	BH5	0-0.1	13/10/2016	-	1.5	0.5	0.5	-	-	-	-	-	-	-	-	-
BH6-01	BH6	0-0.1	13/10/2016	-	4.9	<0.5	2.7	-	<0.5	<1	-	-	-	-	-	-
BH7-01	BH7	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-
BH8-01	BH8	0-0.15	13/10/2016	-	150	13	<0.1	-	<0.5	<1	-	-	-	-	-	-
BH9-01	BH9	0-0.1	12/10/2016	-	1.5	1	<0.1	-	<0.5	<1	-	-	-	-	-	-
BH9-03	BH9	0.35-0.45	12/10/2016	<10	-	-	-	-	-	-	-	-	-	-	-	-
BH10-01	BH10	0-0.15	12/10/2016	<10	-	-	-	-	-	-	-	-	-	-	-	-
BH11-01	BH11	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11-03*	BH11	0.6-0.75	13/10/2016	110	-	-	-	12,000	-	-	-	-	-	-	-	-
BH12-01	BH12	0-0.1	13/10/2016	-	2.3	<0.5	0.1	-	<0.5	<1	-	-	-	-	-	-
BH13-01	BH13	0-0.35	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13-04	BH13	0-0.35	13/10/2016	<10	-	-	-	-	-	-	-	-	-	-	-	-

Chemical Summary Table

LBW|ep

	Anions	Nutrients				Other		SPOCAS						
	Sulphate	Ammonia	Nitrate (as N)	Nitrite (as N)	TOC	3,5-Dichlorobenzoic acid	Actril (loxynil)	Peroxide Oxidisable Sulfur	Acid Reacted Calcium	Calcium in Peroxide	KCl Extractable Calcium	KCl Extractable Magnesium	Magnesium in Peroxide	Sulfur in Peroxide
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%	%	%	%
EQL	10	0.5	0.5	0.1	1000	0.5	1	0.005	0.005	0.005	0.005	0.005	0.005	0.005
NEPM 1999 Soil HIL D - Commercial/Industrial														
NEPM 1999 EIL - Commercial/Industrial (Silty CLAY)														
NEPM 1999 EIL - Commercial/Industrial (CLAY)														
NEPM 1999 Soil HSL D for Vapour Intrusion - Comm./Indust. (Clay, 0-1mBGL)														
NEPM 1999 Management Limits - Commercial/Industrial (fine)														
NEPM 1999 Soil ESLs - Commercial/Industrial (fine)														

Sample ID	Sample Location	Sample Depth Range (mBGL)	Sample Date													
Grid Based Soil Bores																
BH13-05	BH13	1.65-1.8	13/10/2016	-	-	-	-	-	-	-	0.03	7.3	7.5	0.21	0.034	0.3	0.05
BH14-01	BH14	0-0.15	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15-01	BH15	0-0.15	12/10/2016	-	3.5	<0.5	<0.1	-	-	-	-	-	-	-	-	-	-
BH16-01	BH16	0-0.2	12/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17-01	BH17	0-0.15	13/10/2016	-	2	<0.5	0.8	-	<0.5	<1	-	-	-	-	-	-	-
BH18-01	BH18	0-0.1	13/10/2016	330	1.5	<0.5	0.1	-	-	-	-	-	-	-	-	-	-
BH19-01	BH19	0-0.15	13/10/2016	-	3.6	15	6	-	<0.5	<1	-	-	-	-	-	-	-
BH20-01	BH20	0-0.1	12/10/2016	-	-	-	-	-	<0.5	<1	-	-	-	-	-	-	-
BH20-04*	BH20	1.1-1.3	12/10/2016	-	-	-	-	<1000	-	-	-	-	-	-	-	-	-
Targeted Soil Bores																
T1-01	T1	0-0.1	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T2-01	T2	0-0.1	13/10/2016	-	<0.5	7.7	<0.1	-	<0.5	<1	-	-	-	-	-	-	-
T3-04	T3	0.7-0.8	13/10/2016	-	<0.5	<0.5	<0.1	-	-	-	-	-	-	-	-	-	-
T4-01	T4	0-0.05	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T5-01	T5	0-0.05	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T6-01	T6	0-0.05	13/10/2016	-	2.1	0.8	<0.1	-	-	-	-	-	-	-	-	-	-

EIL Calculator Output

Inputs
Select contaminant from list below
Cu
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
40
Enter soil pH (calcium chloride method) (values from 1 to 14)
7
Enter organic carbon content (%OC) (values from 0 to 50%)
1
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
1
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
2.5
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
high

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	55	75
Urban residential and open public spaces	120	220
Commercial and industria	170	330

Inputs
Select contaminant from list below
Cu
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
47
Enter soil pH (calcium chloride method) (values from 1 to 14)
7
Enter organic carbon content (%OC) (values from 0 to 50%)
1
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
1
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
2.5
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
high

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	60	75
Urban residential and open public spaces	120	230
Commercial and industria	180	330

Inputs
Select contaminant from list below
Ni
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
40
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
4
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
2.5
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
high

Outputs		
Land use	Ni soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	20	75
Urban residential and open public spaces	140	430
Commercial and industria	270	730

Inputs
Select contaminant from list below
Ni
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
47
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
4
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
2.5
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
high

Outputs		
Land use	Ni soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	25	85
Urban residential and open public spaces	150	480
Commercial and industria	300	810

Inputs
Select contaminant from list below
Zn
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
40
Enter soil pH (calcium chloride method) (values from 1 to 14)
7
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
2
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
2.5
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
high

Outputs		
Land use	Zn soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	90	190
Urban residential and open public spaces	340	880
Commercial and industria	540	1400

Inputs
Select contaminant from list below
Zn
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
47
Enter soil pH (calcium chloride method) (values from 1 to 14)
7
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
8
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
2.5
or for aged ABCs only
Enter State (or closest State)
SA
Enter traffic volume (high or low)
high

Outputs		
Land use	Zn soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	95	200
Urban residential and open public spaces	350	890
Commercial and industria	550	1400

Inputs
Select contaminant from list below
Pb
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Lead generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	110	470
Urban residential and open public spaces	270	1100
Commercial and industria	440	1800

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Appendix I

Water Chemical Summary Tables

	Metals																						
	Aluminium (Filtered)	Antimony (Filtered)	Arsenic (Filtered)	Barium (Filtered)	Beryllium (Filtered)	Boron (Filtered)	Cadmium (Filtered)	Chromium (hexavalent)	Chromium (III+VI) (Filtered)	Cobalt (Filtered)	Copper (Filtered)	Iron (Filtered)	Lead (Filtered)	Manganese (Filtered)	Mercury (Filtered)	Molybdenum (Filtered)	Nickel (Filtered)	Selenium (Filtered)	Silver (Filtered)	Thallium (Filtered)	Tin (Filtered)	Vanadium (Filtered)	Zinc (Filtered)
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
PQL	0.01	0.001	0.001	0.001	0.0005	0.005	0.0001	0.005	0.001	0.001	0.001	0.01	0.001	0.005	0.00005	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
NEPM 1999 GW HSL D for Vapour Intrusion - Commercial/Industrial (Sand, 2-4mBGL)																							
ANZECC 2000 Aquatic Ecosystems - Marine Ecosystems (95%)							0.0055		0.0274	0.001	0.0013		0.0044		0.0004		0.07		0.0014			0.1	0.015
NHMRC 2008 Recreation Health		0.03	0.07	7		40	0.02	0.5			20		0.1	5	0.01	0.5	0.2	0.1					
NHMRC 2008 Recreation Aesthetic											1	0.3		0.1									3
ANZECC 2000 Primary Industries, Aquaculture and human consumption - saltwater production	0.01		0.03				0.0005		0.02		0.005	0.01	0.001	0.01	0.001		0.1	0.01	0.003			0.1	0.005
ANZECC 2000 Primary Industries - Livestock Drinking Water	5		0.5			5	0.01		1	1	0.4#		0.1		0.002	0.15	1	0.02					20
Sample ID	**Sample Date**																						
Groundwater Grab Sample																							
GW1	12/10/2016	<0.01	<0.001	0.007	0.14	<0.0005	3	<0.0001	<0.005	<0.001	0.004	0.004	0.012	<0.001	0.036	<0.00005	0.007	0.002	0.01	<0.001	<0.001	<0.001	0.004	0.017
GW1 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liquid Waste - Disused Septic																							
GW2	13/10/2016	0.018	<0.001	0.03	0.041	<0.0005	0.29	<0.0001	-	<0.001	0.001	0.003	2.8	0.003	0.046	<0.00005	<0.001	0.002	0.002	<0.001	<0.001	0.005	<0.001	0.031
GW2 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

A*: recommended concentrations of TDS in drinking water for livstock are given in ANZECC 2000 Table 4.3.1

most conservative value for sheep

	PAH																PAH other
	Acenaphthene	Acenaphthylene	Anthracene	Benz[a]anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH	Benzo(a)pyrene TEQ	Benzo(b)&(k)fluoranthene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PQL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	2
NEPM 1999 GW HSL D for Vapour Intrusion - Commercial/Industrial (Sand, 2-4mBGL)																	
ANZECC 2000 Aquatic Ecosystems - Marine Ecosystems (95%)												70					
NHMRC 2008 Recreation Health					0.01										0.01		
NHMRC 2008 Recreation Aesthetic																	
ANZECC 2000 Primary Industries, Aquaculture and human consumption - saltwater production																	
ANZECC 2000 Primary Industries - Livestock Drinking Water																	
Sample ID	**Sample Date**																
Groundwater Grab Sample																	
GW1	12/10/2016	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<5	<2
GW1 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liquid Waste - Disused Septic																	
GW2	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW2 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

A*: recommended concentrations of TDS in drinking water for livstock are given in ANZECC 2000 Table 4.3.1
most conservative value for sheep

		TRH										BTEX				
		TRH C6-C9	TRH >C10-C14	TRH >C15-C28	TRH >C29 - C36	TRH C6-C10	TRH C6-C10 less BTEX (F1)	TRH >C10-C16	TRH >C10-C16 less Napthalene (F2)	TRH >C16-C34	TRH >C34-C40	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PQL		10	50	100	100	10	10	50	50	100	100	1	1	1	1	2
NEPM 1999 GW HSL D for Vapour Intrusion - Commercial/Industrial (Sand, 2-4mBGL)							*6000*					*5000*				
ANZECC 2000 Aquatic Ecosystems - Marine Ecosystems (95%)												700				
NHMRC 2008 Recreation Health												1	800	300		
NHMRC 2008 Recreation Aesthetic													250	3		
ANZECC 2000 Primary Industries, Aquaculture and human consumption - saltwater production																
ANZECC 2000 Primary Industries - Livestock Drinking Water																
Sample ID	**Sample Date**															
Groundwater Grab Sample																
GW1	12/10/2016	<50	<50	210	120	<50	<50	81	81	250	<100	<5	<5	<5	<5	<10
GW1 (Silica Gel Cleanup)			<50	<100	<100	-	-	<50	<50	<100	<100	-	-	-	-	-
Liquid Waste - Disused Septic																
GW2	13/10/2016	-	330,000	1,200,000	28,000	-	-	710,000	-	830,000	13,000	-	-	-	-	-
GW2 (Silica Gel Cleanup)		-	230,000	940,000	17,000	-	-	530,000	-	650,000	7,100	-	-	-	-	-

A*: recommended concentrations of TDS in drinking water for livstock are given in ANZECC 2000 Table 4.3.1

most conservative value for sheep

	Chlorinated Hydrocarbons															
	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Bromodichloromethane	Bromoform
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PQL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
NEPM 1999 GW HSL D for Vapour Intrusion - Commercial/Industrial (Sand, 2-4mBGL)																
ANZECC 2000 Aquatic Ecosystems - Marine Ecosystems (95%)				1900												
NHMRC 2008 Recreation Health						30				3						
NHMRC 2008 Recreation Aesthetic																
ANZECC 2000 Primary Industries, Aquaculture and human consumption - saltwater production																
ANZECC 2000 Primary Industries - Livestock Drinking Water																
Sample ID	**Sample Date**															
Groundwater Grab Sample																
GW1	12/10/2016	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
GW1 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liquid Waste - Disused Septic																	
GW2	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW2 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

A*: recommended concentrations of TDS in drinking water for livstock are given in ANZECC 2000 Table 4.3.1

most conservative value for sheep

		Chlorinated Hydrocarbons													
		Carbon tetrachloride	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Hexachlorobutadiene	Trichloroethene (TCE)	Tetrachloroethene (PCE)	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Vinyl chloride
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PQL		1	1	10	1	10	1	1	1	1	1	1	1	1	10
NEPM 1999 GW HSL D for Vapour Intrusion - Commercial/Industrial (Sand, 2-4mBGL)															
ANZECC 2000 Aquatic Ecosystems - Marine Ecosystems (95%)															
NHMRC 2008 Recreation Health										0.7		50			0.3
NHMRC 2008 Recreation Aesthetic															
ANZECC 2000 Primary Industries, Aquaculture and human consumption - saltwater production															
ANZECC 2000 Primary Industries - Livestock Drinking Water															
Sample ID	**Sample Date**														
Groundwater Grab Sample															
GW1	12/10/2016	<5	<5	<50	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<50
GW1 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liquid Waste - Disused Septic															
GW2	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW2 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-

A*: recommended concentrations of TDS in drinking water for livstock are given in ANZECC 2000 Table 4.3.1
most conservative value for sheep

	Organochlorine Pesticides																		
	4,4-DDD	4,4-DDE	4,4-DDT	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)	Aldrin	Dieldrin	Chlordane (cis)	Chlordane (trans)	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Heptachlor	Heptachlor epoxide	Methoxychlor
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PQL	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
NEPM 1999 GW HSL D for Vapour Intrusion - Commercial/Industrial (Sand, 2-4mBGL)																			
ANZECC 2000 Aquatic Ecosystems - Marine Ecosystems (95%)															0.008				
NHMRC 2008 Recreation Health			20				20										0.3		300
NHMRC 2008 Recreation Aesthetic																			
ANZECC 2000 Primary Industries, Aquaculture and human consumption - saltwater production							0.004			<--0.004-->		0.001							
ANZECC 2000 Primary Industries - Livestock Drinking Water																			
Sample ID	**Sample Date**																		
Groundwater Grab Sample																			
GW1	12/10/2016	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
GW1 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liquid Waste - Disused Septic																			
GW2	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW2 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

A*: recommended concentrations of TDS in drinking water for livstock are given in ANZECC 2000 Table 4.3.1

most conservative value for sheep

		Polychlorinated Biphenyls							Phenols								
		Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	2,4-dimethylphenol	2-methylphenol	2-nitrophenol	4,6-Dinitro-2-methylphenol	4-chloro-3-methylphenol	2,4-dinitrophenol	4-methylphenol	4-nitrophenol	Total Phenols
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L
PQL		2	2	2	2	2	2	2	1	1	1	10	1	0.01	0.002	20	1
NEPM 1999 GW HSL D for Vapour Intrusion - Commercial/Industrial (Sand, 2-4mBGL)																	
ANZECC 2000 Aquatic Ecosystems - Marine Ecosystems (95%)																	400
NHMRC 2008 Recreation Health																	
NHMRC 2008 Recreation Aesthetic																	
ANZECC 2000 Primary Industries, Aquaculture and human consumption - saltwater production																	
ANZECC 2000 Primary Industries - Livestock Drinking Water																	
Sample ID	**Sample Date**																
Groundwater Grab Sample																	
GW1	12/10/2016	<2	<2	<2	<2	<2	<2	<2	<1	<1	<1	<10	<1	<0.01	<0.002	<20	<1
GW1 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liquid Waste - Disused Septic																	
GW2	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW2 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

A*: recommended concentrations of TDS in drinking water for livstock are given in ANZECC 2000 Table 4.3.1
most conservative value for sheep

	Halogenated Benzenes										Halogenated Hydrocarbons				Halogenated Phenols						
	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Chlorobenzene	Hexachlorobenzene	1,2-dibromoethane	Bromomethane	Dichlorodifluoromethane	Trichlorofluoromethane	2,3,4,6-tetrachlorophenol	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2,6-dichlorophenol	2-chlorophenol	Pentachlorophenol
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
PQL	1	1	1	1	1	1	1	1	1	0.2	1	10	10	10	1	1	1	1	1	1	5
NEPM 1999 GW HSL D for Vapour Intrusion - Commercial/Industrial (Sand, 2-4mBGL)																					
ANZECC 2000 Aquatic Ecosystems - Marine Ecosystems (95%)		80																			22
NHMRC 2008 Recreation Health			1500		40				300								20	200		300	10
NHMRC 2008 Recreation Aesthetic			1	20	0.3												2	0.3		0.1	
ANZECC 2000 Primary Industries, Aquaculture and human consumption - saltwater production																					
ANZECC 2000 Primary Industries - Livestock Drinking Water																					

Sample ID	Sample Date																				
Groundwater Grab Sample																					
GW1	12/10/2016	<5	<5	<5	<5	<5	<5	<5	<5	<5	<0.2	<5	<50	<50	<50	<1	<1	<1	<1	<1	<1	<5
GW1 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liquid Waste - Disused Septic																					
GW2	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW2 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

A*: recommended concentrations of TDS in drinking water for livstock are given in ANZECC 2000 Table 4.3.1
most conservative value for sheep

	Inorganics			Cations				Anions			Ionic Balance	Alkalinity			
	Cyanide Total	TDS	Salinity as NaCl	Calcium	Magnesium	Potassium	Sodium	Chloride	Fluoride	Sulphate	Ionic Balance	Bicarbonate as CaCO3	Carbonate as CaCO3	Hydroxide	Alkalinity (total)
	mg/L	mg/L	g/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	mg/L	mg/L	µg/L	mg/L
PQL	0.004	5	1	0.5	0.5	0.5	0.5	1	0.1	1		5	5	5000	5
NEPM 1999 GW HSL D for Vapour Intrusion - Commercial/Industrial (Sand, 2-4mBGL)															
ANZECC 2000 Aquatic Ecosystems - Marine Ecosystems (95%)	0.004														
NHMRC 2008 Recreation Health									15	5000					
NHMRC 2008 Recreation Aesthetic										250					
ANZECC 2000 Primary Industries, Aquaculture and human consumption - saltwater production	0.005	3000-33000													>20
ANZECC 2000 Primary Industries - Livestock Drinking Water		A*		1000					2	1000					

Sample ID	Sample Date														
Groundwater Grab Sample															
GW1	12/10/2016	<0.004	18000*	15	380	580	140	5300	8500	0.5	620	-0.34	2500	<5	<5000	2500
GW1 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liquid Waste - Disused Septic															
GW2	13/10/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW2 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

A*: recommended concentrations of TDS in drinking water for livstock are given in ANZECC 2000 Table 4.3.1
most conservative value for sheep

	Nutrients							MAH									Phthalates						Solvents
	Ammonia	Nitrate (as N)	Nitrate (by calculation: 1 mg/L nitrate-N = 4.43 mg/L nitrate)	Nitrite (as N)	Nitrite (by calculation: 1 mg/L nitrite-N = 3.29 mg/L nitrite)	Kjeldahl Nitrogen Total	Phosphorus	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	Isopropylbenzene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene	Bis(2-ethylhexyl) phthalate	Butyl benzyl phthalate	Diethylphthalate	Dimethyl phthalate	Di-n-butyl phthalate	Di-n-octyl phthalate	Cyclohexane
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L
PQL	0.005	0.005		0.005		0.1	0.05	1	1	1	1	1	1	1	1	1	50	10	10	10	50	10	0.001
NEPM 1999 GW HSL D for Vapour Intrusion - Commercial/Industrial (Sand, 2-4mBGL)																							
ANZECC 2000 Aquatic Ecosystems - Marine Ecosystems (95%)	0.91																						
NHMRC 2008 Recreation Health		500		30											30								
NHMRC 2008 Recreation Aesthetic	0.5														4								
ANZECC 2000 Primary Industries, Aquaculture and human consumption - saltwater production			100		0.1																		
ANZECC 2000 Primary Industries - Livestock Drinking Water			1500		30																		
Sample ID	**Sample Date**																						
Groundwater Grab Sample																							
GW1	12/10/2016	0.16	0.79	3.4997	0.045	0.1481	42	0.1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<10	<50	<10	<0.005
GW1 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liquid Waste - Disused Septic																							
GW2	13/10/2016	480	<0.005	-	0.024	0.079	740	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GW2 (Silica Gel Cleanup)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

A*: recommended concentrations of TDS in drinking water for livstock are given in ANZECC 2000 Table 4.3.1

most conservative value for sheep

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Appendix J

Soil Borehole Logs

SOIL LOG

Sampling Location ID:BH1

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069
Phone: 08 8331 2417 Fax: 08 8331 2415

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: JP

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Ground Surface					
					REWORKED NATURAL Clayey SAND: Fine to coarse grained, grey-brown, with organics.	M		BH1-1		Duplicate: BH1-2
					Sandy Silty CLAY High plasticity, orange-brown, fine to coarse sand, with calcareous gravels.	M		BH1-3		
		0.5			**Calcareous Silty Sandy CLAY** High plasticity, grey-brown, with fine to coarse sand and fine to medium calcareous gravels.	M		BH1-4		
		1.0								
		1.5			**Silty Calcareous CLAY** High plasticity, light grey-brown, with fine to medium gravels.	M				
		2.0								
		2.5			**Sandy CLAY** High plasticity, mottled orange-brown, fine to coarse sand, with fine to medium gravels.	M				
		3.0			**Silty CLAY** High plasticity, pale brown, with fine to coarse sand lenses.	M				
		3.5								
		4.0								
		4.5			**Sandy CLAY** High plasticity, pale orange-brown, fine to coarse sand.	M				
					SANDSTONE					
		5.0			Refusal					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH2

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: JP

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface					
					REWORKED NATURAL Clayey SAND: Fine to coarse grained, grey-brown, with organics.	M M		BH2-1 BH2-2		
		0.5			**Sandy Silty CLAY** High plasticity, orange-brown, with fine to coarse sand.	M		BH2-3		
					Calcareous Silty Sandy CLAY High plasticity, grey-brown, with fine to coarse sand.			BH2-4		
		1.0			**Calcareous Silty CLAY** High plasticity, light grey-brown, with fine to medium gravels.					
		1.5			**Sandy CLAY** High plasticity, grey-brown, fine to coarse sand, with fine to medium sandstone gravels.	M				
		2.0								
		2.5								
		3.0								
		3.5			**Clayey SAND** Fine to coarse grained, light orange-brown, low plasticity fines, with fine to medium gravels.	M				
		4.0								
		4.5			**Sandy CLAY** High plasticity, pale orange-brown, fine to coarse sand, with fine to medium gravels.	SM				
		5.0			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH3

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069
Phone: 08 8331 2417 Fax: 08 8331 2415

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: JP

Subsurface Lithology

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture
Push Tube		0.0			Ground Surface	
					REWORKED NATURAL Clayey SAND: Fine to coarse grained, grey-brown, with organics.	M
		0.5			**Calcareous Silty CLAY** Low to medium plasticity, light orange-brown.	M
		1.0				
		1.5				
					Calcareous Silty CLAY High plasticity, light grey-brown, with fine to medium gravels.	M
		2.0				
		2.5			**Clayey SAND** Fine to coarse grained, light orange-brown, with fine to medium gravels.	M
		3.0				
		3.5			**SANDSTONE** Light orange-brown.	
					Refusal	
		4.0				
		4.5				
		5.0				

Sampling Details

Recovery	Sample ID	PID (ppm)	Additional Comments
	BH3-1		
	BH3-2		
	BH3-3		
	BH3-4		
	BH3-5		

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH4

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069
Phone: 08 8331 2417 Fax: 08 8331 2415

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: JP

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Ground Surface					
					REWORKED NATURAL Gravelly SAND: Fine to coarse grained, orange-brown, with fine to medium gravels.	M		BH4-1		
						M		BH4-2		
		0.5			**REWORKED NATURAL** Silty Sandy CLAY: Medium plasticity, pale brown, with fine to coarse sand and fine to medium gravels.	M		BH4-3		Trace organic/fish odour.
		1.0			**Sandy Silty CLAY** High plasticity, dark brown, with fine to coarse sand and fine to medium gravels.			BH4-4		
		1.5			**Calcareous Clayey SILT** Light orange-brown, with fine to medium gravels and fine to coarse sand.					
		2.0			**Calcareous Sandy Clayey SILT** Low plasticity, fine to coarse sand, with fine to medium gravels.	D				
		2.5								
		3.0								
		3.5								
		4.0								
		4.5			**SANDSTONE** Pale brown.					
					Refusal					
		5.0								

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH5

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069
Phone: 08 8331 2417 Fax: 08 8331 2415

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: JP

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Ground Surface					
					REWORKED NATURAL Silty CLAY: High plasticity, orange-brown mottled.	M		BH5-1		
						M		BH5-2		
		0.5			**Silty CLAY** High plasticity, dark brown with cream calcareous mottling.	M		BH5-3		
					Silty CLAY High plasticity, red-brown.					
		1.0			**Silty Sandy CLAY** Medium plasticity, light-brown, calcareous, with fine to coarse sand.	M		BH5-4		
		1.5								
		2.0			**Sandy CLAY** Medium to high plasticity, pale grey with orange mottling, fine to coarse sand, with fine to medium gravels.	SM				
		2.5								
		3.0								
		3.5			**Clayey SAND** Fine to coarse grained, light grey, low plasticity fines.	D				
		4.0								
		4.5								
		5.0			**SILTSTONE GRAVEL** Fine to coarse grained, light grey. Refusal					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH6

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: JP

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface					
					REWORKED NATURAL Silty CLAY: High plasticity, orange-brown mottled.	M		BH6-1		
					Silty CLAY High plasticity, dark brown with cream calcareous mottling and inclusions.	M		BH6-2		
		0.5				M		BH6-3		
					Calcareous Silty Sandy CLAY Medium plasticity, light-brown, fine to coarse sand.			BH6-4		
		1.0								
		1.5								
		2.0								
		2.5			**Silty CLAY** Low plasticity, pale grey-brown, with fine to medium sandstone gravels and trace fine to coarse sand.	M				
		3.0								
					Silty CLAY High plasticity, pale grey with orange mottling, with fine to coarse sand lenses.					
		3.5								
		4.0								
					CLAY High plasticity, red-brown mottled, with silt.					
		4.5								
					SANDSTONE GRAVELS Fine to medium grained, red-brown mottled.					
		5.0			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH7

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: JP

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface					
					REWORKED NATURAL Silty Sandy CLAY: High plasticity, orange-brown mottled, with fine to coarse sand and fine to medium gravels.	M		BH7-1		
		0.5			**Sandy Silty CLAY** Medium to high plasticity, dark brown, with fine to coarse sand.	SM		BH7-2		
		1.0			**Sandy CLAY** High plasticity, red-brown mottled, with fine to coarse sand.	M		BH7-3		
		1.5			**Silty CLAY** Medium plasticity, light grey with red mottling, with sandstone lenses.					
		2.0			**Calcareous Silty Sandy CLAY** Medium plasticity, light grey, with fine to coarse sand.					
		2.5								
		3.0			**CLAY** High plasticity, grey-brown, with trace fine to coarse sand.					
		3.5								
		4.0			**Sandy CLAY** Medium plasticity, orange-brown, fine to coarse sand, with silt lenses.					
		4.5								
		5.0			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH8

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069
Phone: 08 8331 2417 Fax: 08 8331 2415

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: JP

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Ground Surface					
					REWORKED NATURAL Sandy CLAY: Medium plasticity, grey-brown, with fine to coarse sand and trace organics.	SM		BH8-1		Duplicate: BH8-2
		0.5			**Clayey SAND** Fine to coarse grained, light grey, with less than plastic limit fines.	M		BH8-3		
					Sandy Silty CLAY High plasticity, red-brown mottled, with fine to coarse sand.	SM		BH8-4		
		1.0								
					Calcareous Silty Sandy CLAY Medium plasticity, light grey, with fine to coarse sand.	M		BH8-5		
		1.5								
		2.0						BH8-6		
		2.5								
		3.0			**Silty Sandy CLAY** High plasticity, light grey, fine to coarse sand.			BH8-7		
		3.5			**CLAY** High plasticity, grey-brown, with trace fine to coarse sand.					
		4.0								
		4.5			**Sandy CLAY** Medium plasticity, orange-brown, fine to coarse sand, with silt lenses.					
					SILTSTONE GRAVEL Fine to medium grained, light grey.					
		5.0			Refusal					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH9

LBW | environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: JP

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface					
					Silty CLAY Medium plasticity, dark brown, with organics.	M		BH9-1		
		0.5			**Silty CLAY** High plasticity, orange-brown with cream mottling.	SM M		BH9-2 BH9-3		
		1.0			**Calcareous Silty CLAY** Medium plasticity, light grey, with fine sand.					
		1.5			**GRAVEL** Weathered sandstone with cemented clay lenses, light grey with orange mottling.	D		BH9-4		
		2.0			**GRAVEL** Weathered sandstone, fine to coarse grained, light grey.	D/SM		BH9-5		
		2.5								
		3.0			**Cemented SAND** Fine to coarse grained, pale orange-brown, with fine to coarse sandstone gravels.					
		3.5								
		4.0			**SAND** Fine to coarse grained, light orange-brown, with sandstone lenses.					
		4.5								
		5.0			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH10

LBW | environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 12.10.2016
Date Completed: 12.10.2016
Logged By: BAF
Checked By: JP

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface					
					REWORKED NATURAL Silty CLAY: Medium to high plasticity, light orange-brown, with fine gravels.	M		BH10-1		
						M		BH10-2		
		0.5			**Calcareous Silty CLAY** Medium plasticity, light grey, with fine to coarse sand.			BH10-5		
		1.0			**GRAVEL** Weathered sandstone with cemented clay lenses, light grey with orange mottling.	D		BH10-3		
		1.5								
		2.0								
		2.5						BH10-4		
		3.0			**Sandy CLAY** High plasticity, pale grey-brown, with fine to coarse sand.					
		3.5			**SAND** Weathered with sandstone lenses, fine to coarse, light orange-brown.	D				
		4.0								
		4.5								
		5.0			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH11

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069
Phone: 08 8331 2417 Fax: 08 8331 2415

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 12.10.2016
Date Completed: 12.10.2016
Logged By: BAF
Checked By: JP

Subsurface Lithology							Sampling Details			
Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Ground Surface					
					Silty CLAY Medium plasticity, dark brown, with fine organics.	M		BH11-1	0	
		0.5			**Silty CLAY** Medium plasticity, pale orange-brown, highly calcareous, with fine to medium sandstone gravels.	M		BH11-2	0	
								BH11-3	0	
		1.0								
		1.5						BH11-4	0	
		2.0			**Silty CLAY** Medium plasticity, pale orange-brown, with fine to coarse sand lenses and fine to medium sandstone gravels.					
		2.5								
		3.0								
		3.5								
		4.0			**SANDSTONE** Light grey with red-orange mottling.					
		4.5			Refusal					
		5.0								

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH12

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069
Phone: 08 8331 2417 Fax: 08 8331 2415

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 12.10.2016
Date Completed: 12.10.2016
Logged By: BAF
Checked By: JP

Subsurface Lithology

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture
Push Tube		0.0			Ground Surface	
					Silty CLAY Medium plasticity, dark brown, with fine organics.	M
		0.5			**Silty CLAY** High plasticity, pale orange-red-brown.	M
					Silty CLAY Medium plasticity, pale orange-brown, with fine to coarse sand lenses and fine to medium sandstone gravels.	M
		1.0				
		1.5			**Calcareous Silty Sandy CLAY** High plasticity, light grey, fine to coarse sand.	
		2.0			**CLAY** High plasticity, green-grey mottled, trace fine to coarse sand.	
		2.5				
		3.0			**CLAY** High plasticity, grey-brown mottled, with trace fine to coarse sand.	
		3.5				
		4.0			**SANDSTONE** Light grey with red-orange mottling.	
		4.5			Refusal	
		5.0				

Sampling Details

Recovery	Sample ID	PID (ppm)	Additional Comments
	BH12-1		
	BH12-2		
	BH12-3		
	BH12-4		

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH13

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 11.10.2016
Date Completed: 11.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology							Sampling Details			
Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface	M				
					SAND Fine to coarse grained, light brown.			BH13-1	0	Duplicate: BH13-2
		0.5								
								BH13-4	0.1	Some black organics present at 0.9 to 0.95 mBGL
		1.0								
		1.5				W		BH13-5	0	
		2.0						BH13-6	0.3	Rock, cobbles.
		2.5			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH14

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 10.10.2016
Date Completed: 10.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface					
					Sandy SILT Dark brown, fine to coarse sand, with organics (roots, grass) and trace fine to medium gravels.	M		BH14-1	0	
		0.5						BH14-2	0.1	Fine roots to 0.6 mBGL.
					Sandy CLAY Medium plasticity, dark brown.	M		BH14-3	0.2	
		1.0			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH15

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 11.10.2016
Date Completed: 11.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology							Sampling Details			
Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface					
					Sandy SILT Dark brown, fine to coarse sand, with organics (roots) and trace fine gravels.	M		BH15-1	0	
		0.5			**Sandy CLAY** Medium plasticity, dark brown, with fine to coarse sand and trace fine gravels.	M		BH15-2	0	
					Cobbles.			BH15-3		
		1.0			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH16

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 11.10.2016
Date Completed: 11.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface **Silty SAND** Fine to coarse grained, dark brown, with less than plastic limit fines.	M		BH16-1		
		0.5			Trace fine gravels.	M/W		BH16-2		
		1.0			Cobbles/rock. End of Hole			BH16-3		

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH17

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 11.10.2016
Date Completed: 11.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface					
					Sandy SILT Brown, fine to coarse sand, with organics (roots).	M		BH17-1		
					Sandy CLAY High plasticity, brown with some red-brown mottling and fine to medium sand.	M		BH17-2		
		0.5			**CLAY** High plasticity, brown, trace fine to medium sand.	M		BH17-3		
		1.0			**CLAY** Medium plasticity, brown and light brown, with some fine to medium sand and fine to medium calcareous gravels.	M		BH17-4		
								BH17-5		
		1.5			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH18

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 12.10.2016
Date Completed: 12.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface					
					Sandy CLAY Medium to high plasticity, brown, with fine to coarse sand, fine to medium roots and trace fine to medium gravels.	M		BH18-1		Duplicate: BH18-5
								BH18-2		
					Silty CLAY Low to medium plasticity, pale brown/cream with calcaereous mottling and less than plastic limit fines.	M		BH18-3		Fine to medium aggregates, friable with finger pressure.
		0.5								
								BH18-4		
		1.0			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH19

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 12.10.2016
Date Completed: 12.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology							Sampling Details			
Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface					
					Sandy CLAY Medium plasticity, brown, with fine to medium sand and some organics (fine roots).	M		BH19-1		
		0.5			**Sandy CLAY** Low to medium plasticity, brown, with fine to coarse sand and calcareous gravels.	M		BH19-2		
		1.0			**Gravelly CLAY** Low plasticity, pale brown, with fine to medium calcareous gravels and fine to coarse sand.	M		BH19-3		
					Pale brown with orange-brown mottling.			BH19-4		
		1.5			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:BH20

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 12.10.2016
Date Completed: 12.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface					
					Silty CLAY Low to medium plasticity, dark brown, with less than plastic limit fines and fine to coarse sand.	M		BH20-1		
					Sandy CLAY Medium plasticity, brown with some orange-brown/red-brown mottling, fine to coarse sand and trace fine calcareous gravels.	M		BH20-2		
		0.5			**CLAY** High plasticity, green-grey, trace fine to medium sand.	M		BH20-3		
		1.0						BH20-4		
		1.5			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:T1

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology							Sampling Details			
Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Push Tube		0.0			Soil Surface					
					REWORKED NATURAL Sandy CLAY: Medium plasticity, brown/grey-brown, with fine to medium sand and fine calcareous gravels.	M		T1-1		Duplicate: T1-2
					Silty CLAY Low to medium plasticity, pale brown/cream with calcareous mottling, less than plastic limit fines and fine to medium calcareous gravels.	M		T1-3		Duplicate: T1-4
		0.5			Some calcareous cobbles.			T1-5		
					End of Hole					
		1.0								

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** 4WD

SOIL LOG

Sampling Location ID:T2

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Hand Auger		0.0			Soil Surface					
					REWORKED NATURAL Silty CLAY: Low to medium plasticity, pale brown/cream, with fine to coarse calcareous gravels and trace fine to coarse sand, shells.	M		T2-1		Duplicate: T2-2
					Sandy CLAY Medium plasticity, brown with pale brown/cream calcareous mottling, fine to coarse sand and fine to coarse calcareous gravels.	M		T2-3		
					Some red-brown mottling and sandstone gravels.					
					Silty CLAY Low to medium plasticity, dark brown, with fine to medium sand. Some sandstone.	M		T2-4		
		0.5						T2-5		
					End of Hole					
		1.0								

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** Hand Auger

SOIL LOG

Sampling Location ID:T3

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Hand Auger		0.0			Soil Surface					
					Silty Sandy CLAY Low to medium plasticity, dark brown, with fine to coarse sand and some fine to coarse calcareous gravels and organics.	M		T3-1		Duplicate: T3-2
		0.5			**Silty Sandy CLAY** Low plasticity, pale brown/cream, with fine to coarse sand and fine to coarse calcareous gravels.	M		T3-3		
								T3-4		
		1.0			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** Hand Auger

SOIL LOG

Sampling Location ID:T4

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology							Sampling Details			
Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Hand Auger		0.0			Soil Surface					
					REWORKED NATURAL Medium plasticity, brown/orange-brown/red-brown, with fine to coarse sand, fine to coarse calcareous gravels and trace organics.	D		T4-1		Duplicate: T4-2
					Silty Sandy CLAY Low plasticity, pale brown/cream, with fine to coarse sand and fine to medium calcareous gravels.	M		T4-3		
					Sandy CLAY Medium to high plasticity, brown/orange-brown with calcareous mottling, fine to coarse sand and fine to coarse calcareous gravels.	M		T4-4		
		0.5			**Calcareous Sandy CLAY** Low plasticity, pale brown/green-grey,with fine to coarse sand and fine to coarse calcareous gravels.	M		T4-5		
		1.0			End of Hole					

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** Hand Auger

SOIL LOG

Sampling Location ID:T5

LBW environmental projects

184 Magill Road Norwood SA 5067
PO Box 225 Stepney SA 5069

Site Location: Smith Bay, Kangaroo Island
Project: Preliminary Site Investigation
Client: KIPT
Job No.: 150738-01

Date Commenced: 13.10.2016
Date Completed: 13.10.2016
Logged By: BAF
Checked By: BF

Subsurface Lithology / Sampling Details

Drilling Method	Water	Depth (m)	Graphic	USCS	Description	Moisture	Recovery	Sample ID	PID (ppm)	Additional Comments
Hand Auger		0.0			Soil Surface **REWORKED NATURAL** Medium plasticity, brown/grey-brown, with fine to coarse sand, sandstone and calcareous gravels.	M		T5-1 T5-3 T5-4		Duplicate: T5-2
		0.5			End of Hole					
		1.0								

Contractor: In-Depth Drilling **Operator:** Lachlan Sandland **Drill Rig:** Hand Auger

Appendix K

Laboratory Reports and Chain of Custody Documentation - Soil

1 Dalmore Drive, Scoresby, Victoria 3179
tel: +61 3 9763 2500

email: melbourne@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Melbourne | ABN 37 112 535 645 - 002

CERTIFICATE OF ANALYSIS 9488

Client:
LBW Environmental Projects
184 Magill Road
Norwood
SA 5067

Attention: Brad Fitzgerald

Sample log in details:

Your Reference:	**150738-01 - Smith Bay Baseline Assessment**
No. of samples:	108 Soils, 2 Waters
Date samples received / completed instructions received	18/10/2016 / 18/10/2016

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: / Issue Date:	26/10/16 / 26/10/16
Date of Preliminary Report:	Not Issued

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

Pamela Adams
Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	9488-1	9488-5	9488-10	9488-16	9488-18
Your Reference	----------	BH1-01	BH2-01	BH3-02	BH4-03	BH5-01
Date Sampled	----------	13/10/2016	13/10/2016	13/10/2016	13/10/2016	13/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
vTRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	106	105	105	102	108

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	9488-22	9488-26	9488-29	9488-41	9488-55
Your Reference	----------	BH6-01	BH7-01	BH8-01	BH10-01	BH13-04
Date Sampled	----------	13/10/2016	13/10/2016	13/10/2016	12/10/2016	13/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
vTRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	108	103	105	95	104

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	9488-64	9488-67	9488-72	9488-84	9488-85
Your Reference	----------	BH16-01	BH17-01	BH18-01	T1-01	T1-02
Date Sampled	----------	12/10/2016	13/10/2016	13/10/2016	13/10/2016	13/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
vTRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	101	94	99	92	94

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	9488-89	9488-97	9488-98	9488-103	9488-107
Your Reference	----------	T2-01	T3-04	T4-01	T5-01	T6-01
Date Sampled	----------	13/10/2016	13/10/2016	13/10/2016	13/10/2016	13/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
vTRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	99	95	99	102	103

TRH Soil C10-C40 NEPM						
Our Reference:	UNITS	9488-1	9488-5	9488-10	9488-16	9488-18
Your Reference	----------	BH1-01	BH2-01	BH3-02	BH4-03	BH5-01
Date Sampled	----------	13/10/2016	13/10/2016	13/10/2016	13/10/2016	13/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	80	80	80	81	82

TRH Soil C10-C40 NEPM						
Our Reference:	UNITS	9488-22	9488-26	9488-29	9488-41	9488-55
Your Reference	----------	BH6-01	BH7-01	BH8-01	BH10-01	BH13-04
Date Sampled	----------	13/10/2016	13/10/2016	13/10/2016	12/10/2016	13/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	21/10/2016	21/10/2016	22/10/2016	22/10/2016	22/10/2016
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	83	86	86	87	83

TRH Soil C10-C40 NEPM Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-64 BH16-01 12/10/2016 Soil	9488-67 BH17-01 13/10/2016 Soil	9488-72 BH18-01 13/10/2016 Soil	9488-84 T1-01 13/10/2016 Soil	9488-85 T1-02 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
$TRHC_{10}$ - C_{14}	mg/kg	<50	<50	<50	<50	<50
$TRHC_{15}$ - C_{28}	mg/kg	<100	<100	<100	<100	<100
$TRHC_{29}$ - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
$TRH>C_{10}$-C_{16}	mg/kg	<50	<50	<50	<50	<50
$TRH>C_{10}$ - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
$TRH>C_{16}$-C_{34}	mg/kg	<100	<100	<100	<100	<100
$TRH>C_{34}$-C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	83	82	81	80	84

TRH Soil C10-C40 NEPM Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-89 T2-01 13/10/2016 Soil	9488-97 T3-04 13/10/2016 Soil	9488-98 T4-01 13/10/2016 Soil	9488-103 T5-01 13/10/2016 Soil	9488-107 T6-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
$TRHC_{10}$ - C_{14}	mg/kg	<50	<50	<50	<50	<50
$TRHC_{15}$ - C_{28}	mg/kg	<100	<100	<100	<100	<100
$TRHC_{29}$ - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
$TRH>C_{10}$-C_{16}	mg/kg	<50	<50	<50	<50	<50
$TRH>C_{10}$ - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
$TRH>C_{16}$-C_{34}	mg/kg	<100	<100	<100	<100	<100
$TRH>C_{34}$-C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	78	76	75	79	81

PAHs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-1 BH1-01 13/10/2016 Soil	9488-5 BH2-01 13/10/2016 Soil	9488-10 BH3-02 13/10/2016 Soil	9488-16 BH4-03 13/10/2016 Soil	9488-18 BH5-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
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	%	94	96	94	94	100

PAHs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-22 BH6-01 13/10/2016 Soil	9488-26 BH7-01 13/10/2016 Soil	9488-29 BH8-01 13/10/2016 Soil	9488-41 BH10-01 12/10/2016 Soil	9488-55 BH13-04 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
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	%	96	98	92	96	96

PAHs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-64 BH16-01 12/10/2016 Soil	9488-67 BH17-01 13/10/2016 Soil	9488-72 BH18-01 13/10/2016 Soil	9488-84 T1-01 13/10/2016 Soil	9488-85 T1-02 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
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	%	96	96	94	106	92

PAHs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-89 T2-01 13/10/2016 Soil	9488-97 T3-04 13/10/2016 Soil	9488-98 T4-01 13/10/2016 Soil	9488-103 T5-01 13/10/2016 Soil	9488-107 T6-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
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	%	94	94	96	102	94

Speciated Phenols in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-16 BH4-03 13/10/2016 Soil	9488-22 BH6-01 13/10/2016 Soil	9488-29 BH8-01 13/10/2016 Soil	9488-67 BH17-01 13/10/2016 Soil	9488-89 T2-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
Phenol	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
2-Chlorophenol	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
2-Methylphenol	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
3/4-Methylphenol	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
2-Nitrophenol	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
2,4-Dimethylphenol	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
2,4-Dichlorophenol	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
2,6-Dichlorophenol	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
2,4,5-Trichlorophenol	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
2,4,6-Trichlorophenol	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
2,4-Dinitrophenol	mg/kg	<2	<2	<2	<2	<2
4-Nitrophenol	mg/kg	<4	<4	<4	<4	<4
2,3,4,6-Tetrachlorophenol	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Pentachlorophenol	mg/kg	<1	<1	<1	<1	<1
4-Chloro-3-Methylphenol	mg/kg	<2	<2	<2	<2	<2
Total +ve Cresols	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Total +ve Phenols	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Surrogate Phenol-d_6	%	86	92	90	92	84

OCP in Soil - NEPM Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-5 BH2-01 13/10/2016 Soil	9488-10 BH3-02 13/10/2016 Soil	9488-14 BH4-01 13/10/2016 Soil	9488-16 BH4-03 13/10/2016 Soil	9488-18 BH5-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve reported Aldrin + Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve reported DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	[NA]	[NA]	[NA]	<0.5	[NA]
Toxaphene	mg/kg	[NA]	[NA]	[NA]	<2	[NA]
Surrogate TCMX	%	94	96	96	94	100

OCP in Soil - NEPM Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-22 BH6-01 13/10/2016 Soil	9488-29 BH8-01 13/10/2016 Soil	9488-30 BH8-02 13/10/2016 Soil	9488-36 BH9-01 12/10/2016 Soil	9488-41 BH10-01 12/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve reported Aldrin + Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve reported DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	<0.5	<0.5	[NA]	[NA]	[NA]
Toxaphene	mg/kg	<2	<2	[NA]	[NA]	[NA]
Surrogate TCMX	%	98	94	92	100	94

OCP in Soil - NEPM Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-49 BH12-01 13/10/2016 Soil	9488-67 BH17-01 13/10/2016 Soil	9488-72 BH18-01 13/10/2016 Soil	9488-80 BH20-01 12/10/2016 Soil	9488-84 T1-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve reported Aldrin + Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve reported DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	[NA]	<0.5	[NA]	[NA]	[NA]
Toxaphene	mg/kg	[NA]	<2	[NA]	[NA]	[NA]
Surrogate TCMX	%	96	96	96	94	98

OCP in Soil - NEPM Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-85 T1-02 13/10/2016 Soil	9488-89 T2-01 13/10/2016 Soil	9488-98 T4-01 13/10/2016 Soil	9488-103 T5-01 13/10/2016 Soil	9488-107 T6-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Hexachlorobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve reported Aldrin + Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve reported DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	[NA]	<0.5	[NA]	[NA]	[NA]
Toxaphene	mg/kg	[NA]	<2	[NA]	[NA]	[NA]
Surrogate TCMX	%	90	92	98	100	94

OP in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ----------	9488-5 BH2-01 13/10/2016 Soil	9488-10 BH3-02 13/10/2016 Soil	9488-14 BH4-01 13/10/2016 Soil	9488-16 BH4-03 13/10/2016 Soil	9488-18 BH5-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorovos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	94	96	96	94	100

OP in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ----------	9488-22 BH6-01 13/10/2016 Soil	9488-29 BH8-01 13/10/2016 Soil	9488-30 BH8-02 13/10/2016 Soil	9488-36 BH9-01 12/10/2016 Soil	9488-41 BH10-01 12/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl	mg/kg	[NA]	[NA]	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	[NA]	[NA]	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	[NA]	[NA]	<0.1	<0.1	<0.1
Diazinon	mg/kg	[NA]	[NA]	<0.1	<0.1	<0.1
Dichlorovos	mg/kg	[NA]	[NA]	<0.1	<0.1	<0.1
Dimethoate	mg/kg	[NA]	[NA]	<0.1	<0.1	<0.1
Ethion	mg/kg	[NA]	[NA]	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	[NA]	[NA]	<0.1	<0.1	<0.1
Malathion	mg/kg	[NA]	[NA]	<0.1	<0.1	<0.1
Parathion	mg/kg	[NA]	[NA]	<0.1	<0.1	<0.1
Ronnel	mg/kg	[NA]	[NA]	<0.1	<0.1	<0.1
Surrogate TCMX	%	98	94	92	100	94

OP in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS --- ---	9488-49 BH12-01 13/10/2016 Soil	9488-67 BH17-01 13/10/2016 Soil	9488-72 BH18-01 13/10/2016 Soil	9488-80 BH20-01 12/10/2016 Soil	9488-84 T1-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Dichlorovos	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	96	96	94	98

OP in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS --- ---	9488-85 T1-02 13/10/2016 Soil	9488-89 T2-01 13/10/2016 Soil	9488-98 T4-01 13/10/2016 Soil	9488-103 T5-01 13/10/2016 Soil	9488-107 T6-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Dichlorovos	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	[NA]	<0.1	<0.1	<0.1
Surrogate TCMX	%	90	92	98	100	94

PCBs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-16 BH4-03 13/10/2016 Soil	9488-22 BH6-01 13/10/2016 Soil	9488-29 BH8-01 13/10/2016 Soil	9488-67 BH17-01 13/10/2016 Soil	9488-89 T2-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	94	98	94	96	92

Synthetic Pyrethroids in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-16 BH4-03 13/10/2016 Soil	9488-22 BH6-01 13/10/2016 Soil	9488-29 BH8-01 13/10/2016 Soil	9488-67 BH17-01 13/10/2016 Soil	9488-84 T1-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
Bifenthrin	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Cyfluthrin	mg/Kg	[NA]	[NA]	[NA]	[NA]	<2
Cypermethrin	mg/kg	[NA]	[NA]	[NA]	[NA]	<2
Deltamethrin	mg/kg	[NA]	[NA]	[NA]	[NA]	<0.5
Esfenvalerate	mg/kg	[NA]	[NA]	[NA]	[NA]	<0.5
□-Cyhalothrin	mg/kg	[NA]	[NA]	[NA]	[NA]	<0.5
cis-Permethrin	mg/kg	[NA]	[NA]	[NA]	[NA]	<0.5
trans-Permethrin	mg/kg	[NA]	[NA]	[NA]	[NA]	<0.5

Synthetic Pyrethroids in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-85 T1-02 13/10/2016 Soil	9488-89 T2-01 13/10/2016 Soil	9488-98 T4-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016
Bifenthrin	mg/kg	<0.5	<0.5	<0.5
Cyfluthrin	mg/Kg	<2	[NA]	<2
Cypermethrin	mg/kg	<2	[NA]	<2
Deltamethrin	mg/kg	<0.5	[NA]	<0.5
Esfenvalerate	mg/kg	<0.5	[NA]	<0.5
□-Cyhalothrin	mg/kg	<0.5	[NA]	<0.5
cis-Permethrin	mg/kg	<0.5	[NA]	<0.5
trans-Permethrin	mg/kg	<0.5	[NA]	<0.5

Triazine Herbicides in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-16 BH4-03 13/10/2016 Soil	9488-22 BH6-01 13/10/2016 Soil	9488-29 BH8-01 13/10/2016 Soil	9488-67 BH17-01 13/10/2016 Soil	9488-89 T2-01 13/10/2016 Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	22/10/2016	22/10/2016	22/10/2016	22/10/2016	22/10/2016
Atrazine	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5

Phenoxy Acid Herbicides in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-1 BH1-01 13/10/2016 Soil	9488-14 BH4-01 13/10/2016 Soil	9488-16 BH4-03 13/10/2016 Soil	9488-22 BH6-01 13/10/2016 Soil	9488-29 BH8-01 13/10/2016 Soil
Date Extracted	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Date analysed	-	25/10/2016	25/10/2016	25/10/2016	25/10/2016	25/10/2016
Clopyralid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
3,5-Dichlorobenzoic acid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
o-Chlorophenoxy acetic acid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
4-CPA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dicamba	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Mecoprop	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroprop	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-D	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoxynil	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Triclopyr	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-TP (Silvex)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-T	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPB	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4-DB	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dinoseb	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Ioxynil	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Picloram	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
DCPA (Chlorthal) Diacid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acifluorfen	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
2,4,6-T	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,6-D	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate: 2,4-DCPA	%	88	81	83	75	86

Phenoxy Acid Herbicides in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-36 BH9-01 12/10/2016 Soil	9488-49 BH12-01 13/10/2016 Soil	9488-67 BH17-01 13/10/2016 Soil	9488-76 BH19-01 13/10/2016 Soil	9488-80 BH20-01 12/10/2016 Soil
Date Extracted	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Date analysed	-	25/10/2016	25/10/2016	25/10/2016	25/10/2016	25/10/2016
Clopyralid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
3,5-Dichlorobenzoic acid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
o-Chlorophenoxy acetic acid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
4-CPA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dicamba	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Mecoprop	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloroprop	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-D	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoxynil	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Triclopyr	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-TP (Silvex)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-T	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPB	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2.4-DB	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dinoseb	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Ioxynil	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Picloram	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
DCPA (Chlorthal) Diacid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acifluorfen	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
2,4,6-T	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,6-D	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate: 2,4-DCPA	%	82	88	90	81	88

Phenoxy Acid Herbicides in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ---------- 	9488-89 T2-01 13/10/2016 Soil
Date Extracted	-	24/10/2016
Date analysed	-	25/10/2016
Clopyralid	mg/kg	<0.5
3,5-Dichlorobenzoic acid	mg/kg	<0.5
o-Chlorophenoxy acetic acid	mg/kg	<0.5
4-CPA	mg/kg	<0.5
Dicamba	mg/kg	<0.5
Mecoprop	mg/kg	<0.5
MCPA	mg/kg	<0.5
Dichloroprop	mg/kg	<0.5
2,4-D	mg/kg	<0.5
Bromoxynil	mg/kg	<0.5
Triclopyr	mg/kg	<0.5
2,4,5-TP (Silvex)	mg/kg	<0.5
2,4,5-T	mg/kg	<0.5
MCPB	mg/kg	<0.5
2.4-DB	mg/kg	<0.5
Dinoseb	mg/kg	<1.0
Ioxynil	mg/kg	<1.0
Picloram	mg/kg	<0.5
DCPA (Chlorthal) Diacid	mg/kg	<0.5
Acifluorfen	mg/kg	<2.0
2,4,6-T	mg/kg	<0.5
2,6-D	mg/kg	<0.5
Surrogate: 2,4-DCPA	%	84

NEPM screen metals in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-1 BH1-01 13/10/2016 Soil	9488-5 BH2-01 13/10/2016 Soil	9488-10 BH3-02 13/10/2016 Soil	9488-14 BH4-01 13/10/2016 Soil	9488-16 BH4-03 13/10/2016 Soil
Date digested	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Arsenic	mg/kg	<4	<4	<4	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	19	5	41	17
Copper	mg/kg	2	5	3	<1	3
Lead	mg/kg	4	6	1	14	6
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	5	5	3	4
Zinc	mg/kg	3	8	4	3	6
Selenium	mg/kg	<2	<2	<2	<2	<2
Beryllium	mg/kg	[NA]	[NA]	[NA]	[NA]	<1
Boron	mg/kg	[NA]	[NA]	[NA]	[NA]	8
Cobalt	mg/kg	[NA]	[NA]	[NA]	[NA]	2
Manganese	mg/kg	[NA]	[NA]	[NA]	[NA]	110
Phosphorus	mg/kg	110	[NA]	[NA]	30	230
Silver	mg/kg	<1	<1	<1	<1	[NA]
Tin	mg/kg	<1	<1	<1	<1	[NA]
Molybdenum	mg/kg	<1	<1	<1	<1	[NA]

NEPM screen metals in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-18 BH5-01 13/10/2016 Soil	9488-22 BH6-01 13/10/2016 Soil	9488-26 BH7-01 13/10/2016 Soil	9488-29 BH8-01 13/10/2016 Soil	9488-30 BH8-02 13/10/2016 Soil
Date digested	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	30	14	21	9	9
Copper	mg/kg	2	2	2	3	3
Lead	mg/kg	8	4	7	4	5
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	7	4	5	2	2
Zinc	mg/kg	8	5	5	8	28
Selenium	mg/kg	<2	<2	<2	<2	<2
Beryllium	mg/kg	[NA]	<1	[NA]	<1	[NA]
Boron	mg/kg	[NA]	9	[NA]	5	[NA]
Cobalt	mg/kg	[NA]	4	[NA]	1	[NA]
Manganese	mg/kg	[NA]	86	[NA]	41	[NA]
Phosphorus	mg/kg	140	200	[NA]	160	160
Silver	mg/kg	<1	[NA]	<1	[NA]	<1
Tin	mg/kg	<1	[NA]	<1	[NA]	<1
Molybdenum	mg/kg	<1	[NA]	<1	[NA]	<1

NEPM screen metals in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-36 BH9-01 12/10/2016 Soil	9488-38 BH9-03 12/10/2016 Soil	9488-41 BH10-01 12/10/2016 Soil	9488-45 BH11-01 13/10/2016 Soil	9488-47 BH11-03 13/10/2016 Soil
Date digested	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Arsenic	mg/kg	<4	6	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	9	16	15	4
Copper	mg/kg	2	<1	2	3	<1
Lead	mg/kg	3	4	5	5	1
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	3	5	4	4
Zinc	mg/kg	4	3	5	6	2
Selenium	mg/kg	<2	<2	<2	<2	<2
Iron	mg/kg	[NA]	[NA]	[NA]	[NA]	2,300
Phosphorus	mg/kg	160	[NA]	[NA]	[NA]	[NA]
Silver	mg/kg	<1	<1	<1	<1	<1
Tin	mg/kg	<1	<1	<1	<1	<1
Molybdenum	mg/kg	<1	<1	<1	<1	<1

NEPM screen metals in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-49 BH12-01 13/10/2016 Soil	9488-53 BH13-01 13/10/2016 Soil	9488-58 BH14-01 12/10/2016 Soil	9488-61 BH15-01 12/10/2016 Soil	9488-64 BH16-01 12/10/2016 Soil
Date digested	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Arsenic	mg/kg	<4	<4	<4	4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	6	13	14	9
Copper	mg/kg	2	<1	6	5	2
Lead	mg/kg	4	1	5	6	3
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	2	4	5	4
Zinc	mg/kg	5	4	12	8	4
Selenium	mg/kg	<2	<2	<2	<2	<2
Phosphorus	mg/kg	210	[NA]	[NA]	280	[NA]
Silver	mg/kg	<1	<1	<1	<1	<1
Tin	mg/kg	<1	<1	<1	<1	<1
Molybdenum	mg/kg	<1	<1	<1	<1	<1

NEPM screen metals in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-67 BH17-01 13/10/2016 Soil	9488-72 BH18-01 13/10/2016 Soil	9488-76 BH19-01 13/10/2016 Soil	9488-80 BH20-01 12/10/2016 Soil	9488-83 BH20-04 12/10/2016 Soil
Date digested	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	16	12	18	10	27
Copper	mg/kg	3	2	3	2	1
Lead	mg/kg	6	4	7	5	8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	3	4	2	4
Zinc	mg/kg	6	6	7	6	8
Selenium	mg/kg	<2	<2	<2	<2	<2
Beryllium	mg/kg	<1	[NA]	[NA]	[NA]	[NA]
Boron	mg/kg	8	[NA]	[NA]	[NA]	[NA]
Cobalt	mg/kg	2	[NA]	[NA]	[NA]	[NA]
Manganese	mg/kg	77	[NA]	[NA]	[NA]	[NA]
Iron	mg/kg	[NA]	[NA]	[NA]	[NA]	20,000
Phosphorus	mg/kg	110	170	300	[NA]	[NA]
Silver	mg/kg	[NA]	<1	<1	<1	<1
Tin	mg/kg	[NA]	<1	<1	<1	<1
Molybdenum	mg/kg	[NA]	<1	<1	<1	<1

NEPM screen metals in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-84 T1-01 13/10/2016 Soil	9488-85 T1-02 13/10/2016 Soil	9488-89 T2-01 13/10/2016 Soil	9488-97 T3-04 13/10/2016 Soil	9488-98 T4-01 13/10/2016 Soil
Date digested	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	16	18	12	10	23
Copper	mg/kg	14	12	2	2	3
Lead	mg/kg	5	5	5	2	7
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	9	10	3	6	7
Zinc	mg/kg	200	190	6	3	18
Selenium	mg/kg	<2	<2	<2	<2	<2
Beryllium	mg/kg	[NA]	[NA]	<1	[NA]	[NA]
Boron	mg/kg	[NA]	[NA]	31	[NA]	[NA]
Cobalt	mg/kg	[NA]	[NA]	4	[NA]	[NA]
Manganese	mg/kg	[NA]	[NA]	32	[NA]	[NA]
Phosphorus	mg/kg	[NA]	[NA]	26	71	[NA]
Silver	mg/kg	<1	<1	[NA]	<1	<1
Tin	mg/kg	1	<1	[NA]	<1	<1
Molybdenum	mg/kg	<1	<1	[NA]	<1	<1

NEPM screen metals in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ---------- 	9488-103 T5-01 13/10/2016 Soil	9488-107 T6-01 13/10/2016 Soil
Date digested	-	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016
Arsenic	mg/kg	<4	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	17	16
Copper	mg/kg	1	3
Lead	mg/kg	6	5
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	4	5
Zinc	mg/kg	5	6
Selenium	mg/kg	<2	<2
Phosphorus	mg/kg	[NA]	56
Silver	mg/kg	<1	<1
Tin	mg/kg	<1	<1
Molybdenum	mg/kg	<1	<1

Misc Inorg - soil NEPM						
Our Reference:	UNITS	9488-1	9488-5	9488-10	9488-14	9488-16
Your Reference	----------	BH1-01	BH2-01	BH3-02	BH4-01	BH4-03
Date Sampled	----------	13/10/2016	13/10/2016	13/10/2016	13/10/2016	13/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Free Cyanide in soil	mg/kg	[NA]	[NA]	[NA]	[NA]	<0.5
Hexavalent Chromium, Cr^{6+}	mg/kg	[NA]	[NA]	[NA]	[NA]	<1
pH 1:5 soil:water	pH Units	[NA]	7.5	9.1	8.2	8.8
Nitrate as N in soil	mg/kg	2.1	[NA]	[NA]	<0.5	<0.5
Nitrite as N in soil	mg/kg	<0.1	[NA]	[NA]	<0.1	0.3
Ammonia as N in soil	mg/kg	2.4	[NA]	[NA]	2.0	7.1
Sulphate, SO4	mg/kg	[NA]	[NA]	[NA]	[NA]	68
Chloride, Cl	mg/kg	[NA]	[NA]	[NA]	[NA]	170

Misc Inorg - soil NEPM						
Our Reference:	UNITS	9488-18	9488-22	9488-29	9488-30	9488-36
Your Reference	----------	BH5-01	BH6-01	BH8-01	BH8-02	BH9-01
Date Sampled	----------	13/10/2016	13/10/2016	13/10/2016	13/10/2016	12/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Free Cyanide in soil	mg/kg	[NA]	<0.5	<0.5	[NA]	[NA]
Hexavalent Chromium, Cr^{6+}	mg/kg	[NA]	<1	<1	[NA]	[NA]
pH 1:5 soil:water	pH Units	7.4	7.7	6.9	6.7	6.6
Nitrate as N in soil	mg/kg	0.5	<0.5	13	16	1
Nitrite as N in soil	mg/kg	0.5	2.7	<0.1	<0.1	<0.1
Ammonia as N in soil	mg/kg	1.5	4.9	150	110	1.5

Misc Inorg - soil NEPM						
Our Reference:	UNITS	9488-38	9488-41	9488-45	9488-47	9488-49
Your Reference	----------	BH9-03	BH10-01	BH11-01	BH11-03	BH12-01
Date Sampled	----------	12/10/2016	12/10/2016	13/10/2016	13/10/2016	13/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
pH 1:5 soil:water	pH Units	8.7	[NA]	8.1	[NA]	[NA]
pH 1:5 soil:$CaCl_2$	pH Units	[NA]	[NA]	[NA]	8.0	[NA]
Clay in soils <2um	% (w/w)	[NA]	[NA]	[NA]	25	[NA]
Total Organic Carbon (Walkley Black)	mg/kg	[NA]	[NA]	[NA]	12,000	[NA]
Nitrate as N in soil	mg/kg	[NA]	[NA]	[NA]	[NA]	<0.5
Nitrite as N in soil	mg/kg	[NA]	[NA]	[NA]	[NA]	0.1
Ammonia as N in soil	mg/kg	[NA]	[NA]	[NA]	[NA]	2.3
Sulphate, SO4	mg/kg	<10	<10	[NA]	110	[NA]
Chloride, Cl	mg/kg	<10	<10	[NA]	450	[NA]

Misc Inorg - soil NEPM Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-53 BH13-01 13/10/2016 Soil	9488-55 BH13-04 13/10/2016 Soil	9488-58 BH14-01 12/10/2016 Soil	9488-61 BH15-01 12/10/2016 Soil	9488-64 BH16-01 12/10/2016 Soil
Date prepared	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
pH 1:5 soil:water	pH Units	9.0	[NA]	8.0	7.4	8.7
Nitrate as N in soil	mg/kg	[NA]	[NA]	[NA]	<0.5	[NA]
Nitrite as N in soil	mg/kg	[NA]	[NA]	[NA]	<0.1	[NA]
Ammonia as N in soil	mg/kg	[NA]	[NA]	[NA]	3.5	[NA]
Sulphate, SO4	mg/kg	[NA]	<10	[NA]	[NA]	[NA]
Chloride, Cl	mg/kg	[NA]	<10	[NA]	[NA]	[NA]

Misc Inorg - soil NEPM Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-67 BH17-01 13/10/2016 Soil	9488-72 BH18-01 13/10/2016 Soil	9488-76 BH19-01 13/10/2016 Soil	9488-80 BH20-01 12/10/2016 Soil	9488-83 BH20-04 12/10/2016 Soil
Date prepared	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Free Cyanide in soil	mg/kg	<0.5	[NA]	[NA]	[NA]	[NA]
Hexavalent Chromium, Cr^{6+}	mg/kg	<1	[NA]	[NA]	[NA]	[NA]
pH 1:5 soil:water	pH Units	[NA]	[NA]	[NA]	6.9	[NA]
pH 1:5 soil:$CaCl_2$	pH Units	[NA]	[NA]	[NA]	[NA]	8.1
Clay in soils <2um	% (w/w)	[NA]	[NA]	[NA]	[NA]	61
Total Organic Carbon (Walkley Black)	mg/kg	[NA]	[NA]	[NA]	[NA]	<1,000
Nitrate as N in soil	mg/kg	<0.5	<0.5	15	[NA]	[NA]
Nitrite as N in soil	mg/kg	0.8	0.1	6.0	[NA]	[NA]
Ammonia as N in soil	mg/kg	2.0	1.5	3.6	[NA]	[NA]
Sulphate, SO4	mg/kg	[NA]	330	[NA]	[NA]	[NA]
Chloride, Cl	mg/kg	[NA]	28	[NA]	[NA]	[NA]

Misc Inorg - soil NEPM Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-89 T2-01 13/10/2016 Soil	9488-97 T3-04 13/10/2016 Soil	9488-107 T6-01 13/10/2016 Soil
Date prepared	-	24/10/2016	24/10/2016	24/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016
Free Cyanide in soil	mg/kg	<0.5	[NA]	[NA]
Hexavalent Chromium, Cr^{6+}	mg/kg	<1	[NA]	[NA]
Nitrate as N in soil	mg/kg	7.7	<0.5	0.8
Nitrite as N in soil	mg/kg	<0.1	<0.1	<0.1
Ammonia as N in soil	mg/kg	<0.5	<0.5	2.1

Cation exchange capacity Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ---------- 	9488-47 BH11-03 13/10/2016 Soil	9488-83 BH20-04 12/10/2016 Soil
Exchangeable Ca	meq/100g	31	29
Exchangeable K	meq/100g	0.6	2.1
Exchangeable Mg	meq/100g	7.8	9.3
Exchangeable Na	meq/100g	1.1	6.6
Cation Exchange Capacity	meq/100g	40	47

sPOCAS		
Our Reference:	UNITS	9488-56
Your Reference	----------	BH13-05
Date Sampled	----------	13/10/2016
Type of sample		Soil
Date prepared	-	19/10/2016
Date analysed	-	25/10/2016
pH $_{kcl}$	pH units	9.8
TAA	moles H^+/t	<5
pH $_{ox}$	pH units	8.0
TPA	moles H^+/t	<5
S_{KCl}	%w/w S	0.02
Ca_{KCl}	%w/w	0.21
Mg_{KCl}	%w/w	0.034
S_P	%w/w	0.05
Ca_P	%w/w	7.5
Mg_P	%w/w	0.30
a-ANC$_E$	moles H^+/t	4,100
S_{HCl}	%w/w S	<0.005
TSA	moles H^+/t	<5
s-TAA	%w/w S	<0.01
s-TPA	%w/w S	<0.01
s-TSA	%w/w S	<0.01
S_{POS}	%w/w	0.03
a-S_{POS}	moles H^+/t	18
Ca_A	%w/w	7.3
a-Ca_A	moles H^+/t	3,600
s-Ca_A	%w/w S	5.8
Mg_A	%w/w	0.27
a-Mg_A	moles H^+/t	220
s-Mg_A	%w/w S	0.36
ANC$_E$	% $CaCO_3$	21
s-ANC$_E$	%w/w S	6.6
Fineness Factor	-	2.0
S_{NAS}	%w/w S	<0.005
a-S_{NAS}	moles H^+/t	<5
s-S_{NAS}	%w/w S	<0.01
s-Net Acidity	%w/w S	<0.01
a-Net Acidity	moles H^+/t	<5
Liming rate	kg $CaCO_3$/t	<0.75
Net Acidity (WA)	%w/w S	0.029
a-Net Acidity without ANCE	moles H^+/t	18
Liming rate without ANCE	kg $CaCO_3$/t	1.3

Moisture						
Our Reference:	UNITS	9488-1	9488-5	9488-10	9488-14	9488-16
Your Reference	----------	BH1-01	BH2-01	BH3-02	BH4-01	BH4-03
Date Sampled	----------	13/10/2016	13/10/2016	13/10/2016	13/10/2016	13/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Moisture	%	7.1	13	4.7	3.7	8.4

Moisture						
Our Reference:	UNITS	9488-18	9488-22	9488-26	9488-29	9488-30
Your Reference	----------	BH5-01	BH6-01	BH7-01	BH8-01	BH8-02
Date Sampled	----------	13/10/2016	13/10/2016	13/10/2016	13/10/2016	13/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Moisture	%	3.7	3.9	13	3.4	5.2

Moisture						
Our Reference:	UNITS	9488-36	9488-38	9488-41	9488-45	9488-47
Your Reference	----------	BH9-01	BH9-03	BH10-01	BH11-01	BH11-03
Date Sampled	----------	12/10/2016	12/10/2016	12/10/2016	13/10/2016	13/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Moisture	%	12	17	17	14	26

Moisture						
Our Reference:	UNITS	9488-49	9488-53	9488-55	9488-58	9488-61
Your Reference	----------	BH12-01	BH13-01	BH13-04	BH14-01	BH15-01
Date Sampled	----------	13/10/2016	13/10/2016	13/10/2016	12/10/2016	12/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Moisture	%	16	4.3	7.4	16	18

Moisture						
Our Reference:	UNITS	9488-64	9488-67	9488-72	9488-76	9488-80
Your Reference	----------	BH16-01	BH17-01	BH18-01	BH19-01	BH20-01
Date Sampled	----------	12/10/2016	13/10/2016	13/10/2016	13/10/2016	12/10/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Moisture	%	13	21	16	17	11

Moisture Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-83 BH20-04 12/10/2016 Soil	9488-84 T1-01 13/10/2016 Soil	9488-85 T1-02 13/10/2016 Soil	9488-89 T2-01 13/10/2016 Soil	9488-97 T3-04 13/10/2016 Soil
Date prepared	-	21/10/2016	21/10/2016	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016	24/10/2016	24/10/2016
Moisture	%	22	21	22	18	26

Moisture Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-98 T4-01 13/10/2016 Soil	9488-103 T5-01 13/10/2016 Soil	9488-107 T6-01 13/10/2016 Soil
Date prepared	-	21/10/2016	21/10/2016	21/10/2016
Date analysed	-	24/10/2016	24/10/2016	24/10/2016
Moisture	%	16	20	19

HM in water - dissolved Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9488-108 R1 13/10/2016 Water	9488-109 R2 13/10/2016 Water
Date prepared	-	19/10/2016	19/10/2016
Date analysed	-	19/10/2016	19/10/2016
Arsenic-Dissolved	µg/L	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1
Copper-Dissolved	µg/L	<1	<1
Lead-Dissolved	µg/L	<1	<1
Nickel-Dissolved	µg/L	<1	<1
Zinc-Dissolved	µg/L	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	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. 'TEQ 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. 'TEQ 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. 'TEQ 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-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Note, the Total +ve Cresols or Phenols PQL is reflective of the lowest individual PQL and is therefore" Total +ve Cresols or Phenols" is simply a sum of the positive individual Cresols or Phenols.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD or GC-MS. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-015	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
ORG-031	Acid herbicides and speciated phenols in soil by DCM:Acetone extraction with derivatisation and determination by GC-MS.

Method ID	Methodology Summary
	Haloacetic acids in waters are derivatised and analysed by GC-ECD. Acid herbicides, speciated phenols, carbamates and ureas in water by DCM extraction with derivatisation and determination by GC-MS. Analysed by MPL, NATA accrediation 2901.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-013	Cyanide - total determined colourimetrically after distillation, based on APHA latest edition, 4500-CN_C,E. Free cyanide determined colourimetrically after filtration and confirmed by diffusion. Solids are extracted in a caustic media prior to distillation and analysis.
Inorg-024	Hexavalent Chromium (Cr6+) - determined colourimetrically by discrete analyser.
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.
AS1289.3.6.3	Determination Particle Size Analysis using AS1289.3.6.3 and AS1289.3.6.1 and in house method INORG-107. Clay fraction at <2um reported.
Inorg-036	Total Organic Carbon or Matter - A titrimetric method that measures the oxidisable organic content of soils.
Inorg-055	Nitrate - determined colourimetrically. Soils are analysed following a water extraction.
Inorg-055	Nitrite - determined colourimetrically based on APHA latest edition NO2- B. Soils are analysed following a water extraction.
Inorg-057	Ammonia - determined colourimetrically based on EPA350.1 and APHA latest edition 4500-NH3 F, Soils are analysed following a KCl extraction.
Inorg-115	Sulphate by turbidity using Discrete Analyser
Inorg-087	Chloride by colourimetry using Discrete Analyser
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Inorg-064	sPOCAS determined using titrimetric and ICP-AES techniques. Based on Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004.
Inorg-068	Chromium Reducible Sulfur - Hydrogen Sulfide is quantified by iodometric titration after distillation to determine potential acidity. Based on Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004.
Inorg-008	Moisture content determined by heating at 105 deg C for a minimum of 12 hours.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/10/2016	9488-55	20/10/2016 || 20/10/2016	LCS-1	20/10/2016
Date analysed	-			24/10/2016	9488-55	24/10/2016 || 24/10/2016	LCS-1	24/10/2016
vTRH C_6 - C_9	mg/kg	25	Org-016	<25	9488-55	<25 || <25	LCS-1	104%
vTRH C_6 - C_{10}	mg/kg	25	Org-016	<25	9488-55	<25 || <25	LCS-1	104%
Benzene	mg/kg	0.2	Org-016	<0.2	9488-55	<0.2 || <0.2	LCS-1	102%
Toluene	mg/kg	0.5	Org-016	<0.5	9488-55	<0.5 || <0.5	LCS-1	105%
Ethylbenzene	mg/kg	1	Org-016	<1	9488-55	<1 || <1	LCS-1	100%
m+p-xylene	mg/kg	2	Org-016	<2	9488-55	<2 || <2	LCS-1	106%
o-Xylene	mg/kg	1	Org-016	<1	9488-55	<1 || <1	LCS-1	102%
Naphthalene	mg/kg	1	Org-014	<1	9488-55	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	105	9488-55	104 || 103 || RPD: 1	LCS-1	106%
QUALITY CONTROL TRH Soil C10-C40 NEPM	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/10/2016	9488-67	20/10/2016 || 20/10/2016	LCS-1	20/10/2016
Date analysed	-			21/10/2016	9488-67	22/10/2016 || 22/10/2016	LCS-1	21/10/2016
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	9488-67	<50 || <50	LCS-1	97%
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	9488-67	<100 || <100	LCS-1	87%
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	9488-67	<100 || <100	LCS-1	93%
TRH >C_{10}-C_{16}	mg/kg	50	Org-003	<50	9488-67	<50 || <50	LCS-1	97%
TRH >C_{16}-C_{34}	mg/kg	100	Org-003	<100	9488-67	<100 || <100	LCS-1	87%
TRH >C_{34}-C_{40}	mg/kg	100	Org-003	<100	9488-67	<100 || <100	LCS-1	93%
Surrogate o-Terphenyl	%		Org-003	78	9488-67	82 || 82 || RPD: 0	LCS-1	108%
QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/10/2016	9488-67	20/10/2016 || 20/10/2016	LCS-1	20/10/2016
Date analysed	-			22/10/2016	9488-67	22/10/2016 || 22/10/2016	LCS-1	22/10/2016
Naphthalene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	94%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	86%
Acenaphthene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	92%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	98%
Anthracene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	92%
Pyrene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	90%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	102%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(b,j&k) fluoranthene	mg/kg	0.2	Org-012	<0.2	9488-67	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	9488-67	<0.05 || <0.05	LCS-1	98%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		Org-012	94	9488-67	96 || 94 || RPD: 2	LCS-1	86%
QUALITY CONTROL Speciated Phenols in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-		Org-012	20/10/2016	9488-67	20/10/2016 || 20/10/2016	LCS-1	20/10/2016
Date analysed	-		Org-012	22/10/2016	9488-67	22/10/2016 || 22/10/2016	LCS-1	22/10/2016
Phenol	mg/kg	0.2	Org-012	<0.2	9488-67	<0.2 || <0.2	LCS-1	82%
2-Chlorophenol	mg/kg	0.2	Org-012	<0.2	9488-67	<0.2 || <0.2	LCS-1	84%
2-Methylphenol	mg/kg	0.2	Org-012	<0.2	9488-67	<0.2 || <0.2	LCS-1	80%
3/4-Methylphenol	mg/kg	0.4	Org-012	<0.4	9488-67	<0.4 || <0.4	[NR]	[NR]
2-Nitrophenol	mg/kg	0.2	Org-012	<0.2	9488-67	<0.2 || <0.2	[NR]	[NR]
2,4-Dimethylphenol	mg/kg	0.2	Org-012	<0.2	9488-67	<0.2 || <0.2	[NR]	[NR]
2,4-Dichlorophenol	mg/kg	0.2	Org-012	<0.2	9488-67	<0.2 || <0.2	[NR]	[NR]
2,6-Dichlorophenol	mg/kg	0.2	Org-012	<0.2	9488-67	<0.2 || <0.2	LCS-1	82%
2,4,5-Trichlorophenol	mg/kg	0.2	Org-012	<0.2	9488-67	<0.2 || <0.2	[NR]	[NR]
2,4,6-Trichlorophenol	mg/kg	0.2	Org-012	<0.2	9488-67	<0.2 || <0.2	[NR]	[NR]
2,4-Dinitrophenol	mg/kg	2	Org-012	<2	9488-67	<2 || <2	[NR]	[NR]
4-Nitrophenol	mg/kg	4	Org-012	<4	9488-67	<4 || <4	[NR]	[NR]
2,3,4,6-Tetrachlorophenol	mg/kg	0.2	Org-012	<0.2	9488-67	<0.2 || <0.2	[NR]	[NR]
Pentachlorophenol	mg/kg	1	Org-012	<1	9488-67	<1 || <1	LCS-1	86%
4-Chloro-3-Methylphenol	mg/kg	2	Org-012	<2	9488-67	<2 || <2	[NR]	[NR]
Surrogate Phenol-d_6	%		Org-012	90	9488-67	92 || 94 || RPD: 2	LCS-1	92%

QUALITY CONTROL OCP in Soil - NEPM	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/10/2016	9488-67	20/10/2016 || 20/10/2016	LCS-1	20/10/2016
Date analysed	-			22/10/2016	9488-67	22/10/2016 || 22/10/2016	LCS-1	22/10/2016
alpha-BHC	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	86%
Hexachlorobenzene	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	86%
gamma-BHC	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Heptachlor	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	84%
delta-BHC	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	88%
Heptachlor Epoxide	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	88%
gamma-Chlordane	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	88%
alpha-chlordane	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	90%
Dieldrin	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	86%
Endrin	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	92%
Endosulfan II	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
pp-DDD	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	92%
Endrin Aldehyde	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	80%
Methoxychlor	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Mirex	mg/kg	0.5	Org-012	<0.5	9488-67	<0.5 || <0.5	[NR]	[NR]
Toxaphene	mg/kg	2	Org-012	<2	9488-67	<2 || <2	[NR]	[NR]
Surrogate TCMX	%		Org-012	94	9488-67	96 || 94 || RPD: 2	LCS-1	82%

QUALITY CONTROL OP in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/10/2016	9488-67	20/10/2016 || 20/10/2016	LCS-1	20/10/2016
Date analysed	-			22/10/2016	9488-67	22/10/2016 || 22/10/2016	LCS-1	22/10/2016
Chlorpyrifos	mg/kg	0.1	Org-015	<0.1	9488-67	<0.1 || <0.1	LCS-1	90%
Azinphos-methyl	mg/kg	0.1	Org-015	<0.1	[NT]	[NT]	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-015	<0.1	[NT]	[NT]	[NR]	[NR]
Chlorpyrifos-methyl	mg/kg	0.1	Org-015	<0.1	[NT]	[NT]	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-015	<0.1	[NT]	[NT]	[NR]	[NR]
Dichlorovos	mg/kg	0.1	Org-015	<0.1	[NT]	[NT]	[NR]	[NR]
Dimethoate	mg/kg	0.1	Org-015	<0.1	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	0.1	Org-015	<0.1	[NT]	[NT]	LCS-1	80%
Fenitrothion	mg/kg	0.1	Org-015	<0.1	[NT]	[NT]	LCS-1	80%
Malathion	mg/kg	0.1	Org-015	<0.1	[NT]	[NT]	[NR]	[NR]
Parathion	mg/kg	0.1	Org-015	<0.1	[NT]	[NT]	[NR]	[NR]
Ronnel	mg/kg	0.1	Org-015	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-015	94	9488-67	96 || 94 || RPD: 2	LCS-1	82%
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/10/2016	9488-67	20/10/2016 || 20/10/2016	LCS-1	20/10/2016
Date analysed	-			22/10/2016	9488-67	22/10/2016 || 22/10/2016	LCS-1	22/10/2016
Aroclor 1016	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	LCS-1	100%
Aroclor 1260	mg/kg	0.1	Org-012	<0.1	9488-67	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-012	94	9488-67	96 || 94 || RPD: 2	LCS-1	82%

QUALITY CONTROL Synthetic Pyrethroids in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/10/2016	9488-67	20/10/2016 || 20/10/2016	LCS-1	20/10/2016
Date analysed	-			22/10/2016	9488-67	22/10/2016 || 22/10/2016	LCS-1	22/10/2016
Bifenthrin	mg/kg	0.5	Org-012	<0.5	9488-67	<0.5 || <0.5	LCS-1	102%
Cyfluthrin	mg/Kg	2	Org-012	<2	[NT]	[NT]	[NR]	[NR]
Cypermethrin	mg/kg	2	Org-012	<2	[NT]	[NT]	[NR]	[NR]
Deltamethrin	mg/kg	0.5	Org-012	<0.5	[NT]	[NT]	[NR]	[NR]
Esfenvalerate	mg/kg	0.5	Org-012	<0.5	[NT]	[NT]	[NR]	[NR]
□-Cyhalothrin	mg/kg	0.5	Org-012	<0.5	[NT]	[NT]	LCS-1	108%
cis-Permethrin	mg/kg	0.5	Org-012	<0.5	[NT]	[NT]	[NR]	[NR]
trans-Permethrin	mg/kg	0.5	Org-012	<0.5	[NT]	[NT]	[NR]	[NR]
QUALITY CONTROL Triazine Herbicides in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/10/2016	9488-67	20/10/2016 || 20/10/2016	LCS-1	20/10/2016
Date analysed	-			22/10/2016	9488-67	22/10/2016 || 22/10/2016	LCS-1	22/10/2016
Atrazine	mg/kg	0.5	Org-012	<0.5	9488-67	<0.5 || <0.5	LCS-1	88%
QUALITY CONTROL Phenoxy Acid Herbicides in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Clopyralid	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
3,5-Dichlorobenzoic acid	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
o-Chlorophenoxy acetic acid	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
4-CPA	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
Dicamba	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	LCS-1	115%
Mecoprop	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	LCS-1	111%
MCPA	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	LCS-1	100%
Dichloroprop	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
2,4-D	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	LCS-1	81%
Bromoxynil	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
Triclopyr	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
2,4,5-TP (Silvex)	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
2,4,5-T	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	LCS-1	80%
MCPB	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
2.4-DB	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
Dinoseb	mg/kg	1	ORG-031	<1.0	[NT]	[NT]	[NR]	[NR]
Ioxynil	mg/kg	1	ORG-031	<1.0	[NT]	[NT]	[NR]	[NR]
Picloram	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
DCPA (Chlorthal) Diacid	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL Phenoxy Acid Herbicides in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Acifluorfen	mg/kg	2	ORG-031	<2.0	[NT]	[NT]	[NR]	[NR]
2,4,6-T	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
2,6-D	mg/kg	0.5	ORG-031	<0.5	[NT]	[NT]	[NR]	[NR]
Surrogate: 2,4-DCPA	%		ORG-031	88	[NT]	[NT]	LCS-1	94%
QUALITY CONTROL NEPM screen metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			21/10/2016	9488-30	21/10/2016 || 21/10/2016	LCS-1	21/10/2016
Date analysed	-			24/10/2016	9488-30	24/10/2016 || 24/10/2016	LCS-1	24/10/2016
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	9488-30	<4 || <4	LCS-1	96%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	9488-30	<0.4 || <0.4	LCS-1	103%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	9488-30	9 || 13 || RPD: 36	LCS-1	98%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	9488-30	3 || 2 || RPD: 40	LCS-1	99%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	9488-30	5 || 6 || RPD: 18	LCS-1	96%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	9488-30	<0.1 || <0.1	LCS-1	111%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	9488-30	2 || 3 || RPD: 40	LCS-1	98%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	9488-30	28 || 8 || RPD: 111	LCS-1	99%
Selenium	mg/kg	2	Metals-020 ICP-AES	<2	9488-30	<2 || <2	LCS-1	98%
Beryllium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	103%
Boron	mg/kg	3	Metals-020 ICP-AES	<3	[NT]	[NT]	LCS-1	104%
Cobalt	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	104%
Manganese	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	102%
Iron	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	98%
Phosphorus	mg/kg	10	Metals-020 ICP-AES	<10	9488-30	160 || 160 || RPD: 0	LCS-1	94%
Silver	mg/kg	1	Metals-020 ICP-AES	<1	9488-30	<1 || <1	LCS-1	98%
Tin	mg/kg	1	Metals-020 ICP-AES	<1	9488-30	<1 || <1	LCS-1	97%
Molybdenum	mg/kg	1	Metals-020 ICP-AES	<1	9488-30	<1 || <1	LCS-1	95%

QUALITY CONTROL Misc Inorg - soil NEPM	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			24/10/2016	9488-16	24/10/2016 || 24/10/2016	LCS-1	24/10/2016
Date analysed	-			24/10/2016	9488-16	24/10/2016 || 24/10/2016	LCS-1	24/10/2016
Free Cyanide in soil	mg/kg	0.5	Inorg-013	<0.5	9488-16	<0.5 || <0.5	LCS-1	99%
Hexavalent Chromium, Cr^{6+}	mg/kg	1	Inorg-024	<1	9488-16	<1 || <1	LCS-1	98%
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	9488-16	8.8 || 9.0 || RPD: 2	LCS-1	99%
pH 1:5 soil:$CaCl_2$	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-1	100%
Clay in soils <2um	% (w/w)		AS1289.3.6.3	[NT]	[NT]	[NT]	[NR]	[NR]
Total Organic Carbon (Walkley Black)	mg/kg	1000	Inorg-036	<1000	[NT]	[NT]	LCS-1	102%
Nitrate as N in soil	mg/kg	0.5	Inorg-055	<0.5	9488-16	<0.5 || <0.5	LCS-1	78%
Nitrite as N in soil	mg/kg	0.1	Inorg-055	<0.1	9488-16	0.3 || 0.2 || RPD: 40	LCS-1	90%
Ammonia as N in soil	mg/kg	0.5	Inorg-057	<0.5	9488-16	7.1 || 7.0 || RPD: 1	LCS-1	103%
Sulphate, SO4	mg/kg	10	Inorg-115	<10	9488-16	68 || 49 || RPD: 32	LCS-1	90%
Chloride, Cl	mg/kg	10	Inorg-087	<10	9488-16	170 || 170 || RPD: 0	LCS-1	113%

QUALITY CONTROL Cation exchange capacity	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-1	105%
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-1	102%
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-1	101%
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-1	102%
Cation Exchange Capacity	meq/100g	1	Metals-009	<1.0	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL sPOCAS	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			[NT]	9488-56	19/10/2016 || 19/10/2016	LCS-1	19/10/2016
Date analysed	-			[NT]	9488-56	25/10/2016 || 25/10/2016	LCS-1	25/10/2016
pH_{kcl}	pH units		Inorg-064	[NT]	9488-56	9.8 || 9.8 || RPD: 0	LCS-1	100%
TAA	moles H^+/t	5	Inorg-064	[NT]	9488-56	<5 || <5	LCS-1	96%
pH_{ox}	pH units		Inorg-064	[NT]	9488-56	8.0 || 8.0 || RPD: 0	LCS-1	100%
TPA	moles H^+/t	5	Inorg-064	[NT]	9488-56	<5 || <5	LCS-1	87%
S_{KCl}	%w/w S	0.005	Inorg-064	[NT]	9488-56	0.02 || 0.02 || RPD: 0	[NR]	[NR]
Ca_{KCl}	%w/w	0.005	Inorg-064	[NT]	9488-56	0.21 || 0.28 || RPD: 29	[NR]	[NR]
Mg_{KCl}	%w/w	0.005	Inorg-064	[NT]	9488-56	0.034 || 0.041 || RPD: 19	[NR]	[NR]

QUALITY CONTROL sPOCAS	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
S_P	%w/w	0.005	Inorg-064	[NT]	9488-56	0.05 || 0.05 || RPD: 0	[NR]	[NR]
Ca_P	%w/w	0.005	Inorg-064	[NT]	9488-56	7.5 || 7.6 || RPD: 1	[NR]	[NR]
Mg_P	%w/w	0.005	Inorg-064	[NT]	9488-56	0.30 || 0.32 || RPD: 6	[NR]	[NR]
a-ANC_E	moles H^+/t	5	Inorg-064	[NT]	9488-56	4100 || 4100 || RPD: 0	[NR]	[NR]
S_{HCl}	%w/w S	0.005	Inorg-064	[NT]	9488-56	<0.005 || <0.005	[NR]	[NR]
TSA	moles H^+/t	5	Inorg-064	[NT]	9488-56	<5 || <5	[NR]	[NR]
s-TAA	%w/w S	0.01	Inorg-064	[NT]	9488-56	<0.01 || <0.01	[NR]	[NR]
s-TPA	%w/w S	0.01	Inorg-064	[NT]	9488-56	<0.01 || <0.01	[NR]	[NR]
s-TSA	%w/w S	0.01	Inorg-064	[NT]	9488-56	<0.01 || <0.01	[NR]	[NR]
S_{POS}	%w/w	0.005	Inorg-064	[NT]	9488-56	0.03 || 0.03 || RPD: 0	[NR]	[NR]
a-S_{POS}	moles H^+/t	5	Inorg-064	[NT]	9488-56	18 || 20 || RPD: 11	[NR]	[NR]
Ca_A	%w/w	0.005	Inorg-064	[NT]	9488-56	7.3 || 7.3 || RPD: 0	[NR]	[NR]
a-Ca_A	moles H^+/t	5	Inorg-064	[NT]	9488-56	3600 || 3700 || RPD: 3	[NR]	[NR]
s-Ca_A	%w/w S	0.005	Inorg-064	[NT]	9488-56	5.8 || 5.9 || RPD: 2	[NR]	[NR]
Mg_A	%w/w	0.005	Inorg-064	[NT]	9488-56	0.27 || 0.28 || RPD: 4	[NR]	[NR]
a-Mg_A	moles H^+/t	5	Inorg-064	[NT]	9488-56	220 || 230 || RPD: 4	[NR]	[NR]
s-Mg_A	%w/w S	0.005	Inorg-064	[NT]	9488-56	0.36 || 0.37 || RPD: 3	[NR]	[NR]
ANC_E	% $CaCO_3$	0.05	Inorg-064	[NT]	9488-56	21 || 21 || RPD: 0	[NR]	[NR]
s-ANC_E	%w/w S	0.05	Inorg-064	[NT]	9488-56	6.6 || 6.6 || RPD: 0	[NR]	[NR]
Fineness Factor	-	1.5	Inorg-064	[NT]	9488-56	2.0 || 2.0 || RPD: 0	[NR]	[NR]
S_{NAS}	%w/w S	0.005	Inorg-064	[NT]	9488-56	<0.005 || <0.005	[NR]	[NR]
a-S_{NAS}	moles H^+/t	5	Inorg-064	[NT]	9488-56	<5 || <5	[NR]	[NR]
s-S_{NAS}	%w/w S	0.01	Inorg-064	[NT]	9488-56	<0.01 || <0.01	[NR]	[NR]
s-Net Acidity	%w/w S	0.01	Inorg-064	[NT]	9488-56	<0.01 || <0.01	[NR]	[NR]
a-Net Acidity	moles H^+/t	5	Inorg-064	[NT]	9488-56	<5 || <5	[NR]	[NR]
Liming rate	kg $CaCO_3$/t	0.75	Inorg-064	[NT]	9488-56	<0.75 || <0.75	[NR]	[NR]
Net Acidity (WA)	%w/w S	0.005	Inorg-068	[NT]	9488-56	0.029 || 0.032 || RPD: 10	[NR]	[NR]

QUALITY CONTROL sPOCAS	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
a-Net Acidity without ANCE	moles H^+/t	10	Inorg-064	[NT]	9488-56	18 || 20 || RPD: 11	[NR]	[NR]
Liming rate without ANCE	kg $CaCO_3$/t	0.75	Inorg-064	[NT]	9488-56	1.3 || 1.5 || RPD: 14	[NR]	[NR]

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			[NT]
Date analysed	-			[NT]
Moisture	%	0.1	Inorg-008	[NT]

QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			19/10/2016	[NT]	[NT]	LCS-1	19/10/2016
Date analysed	-			19/10/2016	[NT]	[NT]	LCS-1	19/10/2016
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	105%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-1	106%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	107%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	103%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	105%
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	106%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	106%
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	LCS-1	108%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	9488-107	20/10/2016 || 20/10/2016
Date analysed	-	9488-107	24/10/2016 || 24/10/2016
vTRH C_6 - C_9	mg/kg	9488-107	<25 || <25
vTRH C_6 - C_{10}	mg/kg	9488-107	<25 || <25
Benzene	mg/kg	9488-107	<0.2 || <0.2
Toluene	mg/kg	9488-107	<0.5 || <0.5
Ethylbenzene	mg/kg	9488-107	<1 || <1
m+p-xylene	mg/kg	9488-107	<2 || <2
o-Xylene	mg/kg	9488-107	<1 || <1
Naphthalene	mg/kg	9488-107	<1 || <1

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Surrogate aaa-Trifluorotoluene	%	9488-107	103 || 98 || RPD: 5

QUALITY CONTROL TRH Soil C10-C40 NEPM	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	9488-107	20/10/2016 || 20/10/2016
Date analysed	-	9488-107	21/10/2016 || 22/10/2016
TRHC$_{10}$ - C$_{14}$	mg/kg	9488-107	<50 || <50
TRHC$_{15}$ - C$_{28}$	mg/kg	9488-107	<100 || <100
TRHC$_{29}$ - C$_{36}$	mg/kg	9488-107	<100 || <100
TRH>C$_{10}$-C$_{16}$	mg/kg	9488-107	<50 || <50
TRH>C$_{16}$-C$_{34}$	mg/kg	9488-107	<100 || <100
TRH>C$_{34}$-C$_{40}$	mg/kg	9488-107	<100 || <100
Surrogate o-Terphenyl	%	9488-107	81 || 79 || RPD: 2

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	LCS-2	20/10/2016
Date analysed	-	[NT]	[NT]	LCS-2	22/10/2016
Naphthalene	mg/kg	[NT]	[NT]	LCS-2	94%
Acenaphthylene	mg/kg	[NT]	[NT]	LCS-2	86%
Acenaphthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	[NT]	[NT]	LCS-2	92%
Phenanthrene	mg/kg	[NT]	[NT]	LCS-2	98%
Anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	[NT]	[NT]	LCS-2	92%
Pyrene	mg/kg	[NT]	[NT]	LCS-2	90%
Benzo(a)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	[NT]	[NT]	LCS-2	102%
Benzo(b,j&k)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	[NT]	[NT]	LCS-2	98%
Indeno(1,2,3-c,d)pyrene	mg/kg	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d$_{14}$	%	[NT]	[NT]	LCS-2	86%

QUALITY CONTROL NEPM screen metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	9488-61	21/10/2016 || 21/10/2016	LCS-2	21/10/2016
Date analysed	-	9488-61	24/10/2016 || 24/10/2016	LCS-2	24/10/2016
Arsenic	mg/kg	9488-61	4 || <4	LCS-2	96%
Cadmium	mg/kg	9488-61	<0.4 || <0.4	LCS-2	103%
Chromium	mg/kg	9488-61	14 || 15 || RPD: 7	LCS-2	98%
Copper	mg/kg	9488-61	5 || 5 || RPD: 0	LCS-2	99%
Lead	mg/kg	9488-61	6 || 6 || RPD: 0	LCS-2	96%
Mercury	mg/kg	9488-61	<0.1 || <0.1	LCS-2	113%
Nickel	mg/kg	9488-61	5 || 6 || RPD: 18	LCS-2	98%
Zinc	mg/kg	9488-61	8 || 9 || RPD: 12	LCS-2	99%
Selenium	mg/kg	9488-61	<2 || <2	LCS-2	98%
Beryllium	mg/kg	[NT]	[NT]	LCS-2	103%
Boron	mg/kg	[NT]	[NT]	LCS-2	104%
Cobalt	mg/kg	[NT]	[NT]	LCS-2	104%
Manganese	mg/kg	[NT]	[NT]	LCS-2	102%
Iron	mg/kg	[NT]	[NT]	LCS-2	98%
Phosphorus	mg/kg	9488-61	280 || 270 || RPD: 4	LCS-2	96%
Silver	mg/kg	9488-61	<1 || <1	LCS-2	98%
Tin	mg/kg	9488-61	<1 || <1	LCS-2	97%
Molybdenum	mg/kg	9488-61	<1 || <1	LCS-2	95%

QUALITY CONTROL Misc Inorg - soil NEPM	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	9488-89	24/10/2016 || 24/10/2016
Date analysed	-	9488-89	24/10/2016 || 24/10/2016
Free Cyanide in soil	mg/kg	9488-89	<0.5 || <0.5
Hexavalent Chromium, Cr^{6+}	mg/kg	9488-89	<1 || <1
pH 1:5 soil:water	pH Units	[NT]	[NT]
pH 1:5 soil:$CaCl_2$	pH Units	[NT]	[NT]
Clay in soils <2um	% (w/w)	[NT]	[NT]
Total Organic Carbon (Walkley Black)	mg/kg	[NT]	[NT]
Nitrate as N in soil	mg/kg	9488-89	7.7 || 7.8 || RPD: 1
Nitrite as N in soil	mg/kg	9488-89	<0.1 || <0.1
Ammonia as N in soil	mg/kg	9488-89	<0.5 || <0.5
Sulphate, SO4	mg/kg	[NT]	[NT]
Chloride, Cl	mg/kg	[NT]	[NT]

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	9488-107	20/10/2016
Date analysed	-	[NT]	[NT]	9488-107	25/10/2016
vTRH C_6 - C_9	mg/kg	[NT]	[NT]	9488-107	101%
vTRH C_6 - C_{10}	mg/kg	[NT]	[NT]	9488-107	101%
Benzene	mg/kg	[NT]	[NT]	9488-107	99%
Toluene	mg/kg	[NT]	[NT]	9488-107	103%
Ethylbenzene	mg/kg	[NT]	[NT]	9488-107	98%
m+p-xylene	mg/kg	[NT]	[NT]	9488-107	103%
o-Xylene	mg/kg	[NT]	[NT]	9488-107	98%
Naphthalene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	9488-107	102%

QUALITY CONTROL TRH Soil C10-C40 NEPM	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	9488-103	20/10/2016
Date analysed	-	[NT]	[NT]	9488-103	21/10/2016
$TRHC_{10}$ - C_{14}	mg/kg	[NT]	[NT]	9488-103	90%
$TRHC_{15}$ - C_{28}	mg/kg	[NT]	[NT]	9488-103	81%
$TRHC_{29}$ - C_{36}	mg/kg	[NT]	[NT]	9488-103	71%
TRH>C_{10}-C_{16}	mg/kg	[NT]	[NT]	9488-103	90%
TRH>C_{16}-C_{34}	mg/kg	[NT]	[NT]	9488-103	81%
TRH>C_{34}-C_{40}	mg/kg	[NT]	[NT]	9488-103	71%
Surrogate o-Terphenyl	%	[NT]	[NT]	9488-103	104%
QUALITY CONTROL NEPM screen metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	9488-103	21/10/2016 || 21/10/2016	9488-29	21/10/2016
Date analysed	-	9488-103	24/10/2016 || 24/10/2016	9488-29	24/10/2016
Arsenic	mg/kg	9488-103	<4 || <4	9488-29	93%
Cadmium	mg/kg	9488-103	<0.4 || <0.4	9488-29	95%
Chromium	mg/kg	9488-103	17 || 17 || RPD: 0	9488-29	92%
Copper	mg/kg	9488-103	1 || <1	9488-29	100%
Lead	mg/kg	9488-103	6 || 6 || RPD: 0	9488-29	91%
Mercury	mg/kg	9488-103	<0.1 || <0.1	9488-29	113%
Nickel	mg/kg	9488-103	4 || 4 || RPD: 0	9488-29	90%
Zinc	mg/kg	9488-103	5 || 4 || RPD: 22	9488-29	96%
Selenium	mg/kg	9488-103	<2 || <2	9488-29	96%
Beryllium	mg/kg	[NT]	[NT]	9488-29	93%
Boron	mg/kg	[NT]	[NT]	9488-29	105%
Cobalt	mg/kg	[NT]	[NT]	9488-29	96%
Manganese	mg/kg	[NT]	[NT]	9488-29	114%
Iron	mg/kg	[NT]	[NT]	9488-29	#
Phosphorus	mg/kg	[NT]	[NT]	9488-29	#
Silver	mg/kg	9488-103	<1 || <1	9488-29	97%
Tin	mg/kg	9488-103	<1 || <1	9488-29	89%
Molybdenum	mg/kg	9488-103	<1 || <1	9488-29	88%

QUALITY CONTROL Misc Inorg - soil NEPM	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	9488-16	24/10/2016
Date analysed	-	[NT]	[NT]	9488-16	24/10/2016
Free Cyanide in soil	mg/kg	[NT]	[NT]	9488-16	83%
Hexavalent Chromium, Cr^{6+}	mg/kg	[NT]	[NT]	9488-16	93%
pH 1:5 soil:water	pH Units	[NT]	[NT]	[NR]	[NR]
pH 1:5 soil:$CaCl_2$	pH Units	[NT]	[NT]	[NR]	[NR]
Clay in soils <2um	% (w/w)	[NT]	[NT]	[NR]	[NR]
Total Organic Carbon (Walkley Black)	mg/kg	[NT]	[NT]	[NR]	[NR]
Nitrate as N in soil	mg/kg	[NT]	[NT]	9488-16	#
Nitrite as N in soil	mg/kg	[NT]	[NT]	9488-16	104%
Ammonia as N in soil	mg/kg	[NT]	[NT]	9488-16	74%
Sulphate, SO4	mg/kg	[NT]	[NT]	[NR]	[NR]
Chloride, Cl	mg/kg	[NT]	[NT]	[NR]	[NR]
QUALITY CONTROL NEPM screen metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	9488-98	21/10/2016
Date analysed	-	[NT]	[NT]	9488-98	24/10/2016
Arsenic	mg/kg	[NT]	[NT]	9488-98	98%
Cadmium	mg/kg	[NT]	[NT]	9488-98	73%
Chromium	mg/kg	[NT]	[NT]	9488-98	84%
Copper	mg/kg	[NT]	[NT]	9488-98	111%
Lead	mg/kg	[NT]	[NT]	9488-98	70%
Mercury	mg/kg	[NT]	[NT]	9488-98	102%
Nickel	mg/kg	[NT]	[NT]	9488-98	71%
Zinc	mg/kg	[NT]	[NT]	9488-98	85%
Selenium	mg/kg	[NT]	[NT]	9488-98	96%
Beryllium	mg/kg	[NT]	[NT]	9488-98	82%
Boron	mg/kg	[NT]	[NT]	9488-98	124%
Cobalt	mg/kg	[NT]	[NT]	9488-98	78%
Manganese	mg/kg	[NT]	[NT]	9488-98	84%
Iron	mg/kg	[NT]	[NT]	9488-98	#
Phosphorus	mg/kg	[NT]	[NT]	9488-98	#
Silver	mg/kg	[NT]	[NT]	9488-98	111%
Tin	mg/kg	[NT]	[NT]	9488-98	80%
Molybdenum	mg/kg	[NT]	[NT]	9488-98	##

Report Comments:

Acid Herbicides analysed by MPL, report 187514.

Clay analysed by Envirolab Sydney, report 155602.

METALS - # Percent recovery is not possible to report due to the high concentration of Iron & Phosphorus in the samples. However an acceptable recovery was obtained for the LCS.

Percent recovery not available due to matrix interference for Molybdenum, however an acceptable recovery was achieved for the LCS.

The RPD for duplicate results 9488-30 for Zinc is accepted due to the inhomogeneous nature of the sample. Triplicate analysis confirms this.

sPOCAS analysed by MPL, report no. 187397

INORGANICS: # Spike recovery was not available for Nitrate due to sample matrix interference. However an acceptable recovery was achieved for the LCS.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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.

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 batched 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: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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DATA QUALITY ASSESSMENT SUMMARY

Report Details	
Envirolab Report Reference	9488
Client ID	LBW Environmental Projects
Project Reference	150738-01 - Smith Bay Baseline Assessment
Date Issued	26/10/2016

QC DATA:

All laboratory QC data was within the Envirolab Group's specifications except:

QC Type	*Reference*	*Analysis*	*Comments*
Precision(as %RPD)	9488-30	Zinc	111% RPD fails internal acceptance criteria
Spike Recovery %	9488-29	Iron	Fails internal acceptance criteria
Spike Recovery %	9488-29	Phosphorus	Fails internal acceptance criteria
Spike Recovery %	9488-16	Nitrate as N in soil	Fails internal acceptance criteria
Spike Recovery %	9488-98	Iron	Fails internal acceptance criteria
Spike Recovery %	9488-98	Molybdenum	Fails internal acceptance criteria
Spike Recovery %	9488-98	Phosphorus	Fails internal acceptance criteria

The RPD for duplicate results 9488-30 for Zinc is accepted due to the inhomogeneous nature of the sample. Triplicate analysis confirms this.

Percent recovery is not possible to report due to the high concentration of Iron & Phosphorus in the samples. However an acceptable recovery was obtained for the LCS.

Spike recovery was not available for Nitrate due to sample matrix interference. However an acceptable recovery was achieved for the LCS.

Percent recovery not available due to matrix interference for Molybdenum, however an acceptable recovery was achieved for the LCS.

See Report 9488-[R00] for QA/QC details

HOLDING TIME COMPLIANCE EVALUATION:

The table below summarizes compliance with preservation / holding times (based on AS/APHA/ISO/NEPM/USEPA reference documents and standards):-

Analysis	*Date Sampled*	*Date Extracted*	*Date Analysed*	*Accept*
Cation exchange capacity	12/10/2016			✓
	13/10/2016			✓
HM in water - dissolved	13/10/2016	19/10/2016	19/10/2016	✓
Misc Inorg - soil NEPM				
Ammonia as N in soil	12/10/2016	24/10/2016	24/10/2016	✓
	13/10/2016	24/10/2016	24/10/2016	✓
Chloride, Cl	12/10/2016	24/10/2016	24/10/2016	✓
	13/10/2016	24/10/2016	24/10/2016	✓
Sulphate, SO4	12/10/2016	24/10/2016	24/10/2016	✓
	13/10/2016	24/10/2016	24/10/2016	✓

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Clay in soils <2um	12/10/2016	24/10/2016	24/10/2016	✓
	13/10/2016	24/10/2016	24/10/2016	✓
Free Cyanide in soil	13/10/2016	24/10/2016	24/10/2016	✓
Hexavalent Chromium, Cr^{6+}	13/10/2016	24/10/2016	24/10/2016	✓
Nitrate as N in soil	12/10/2016	24/10/2016	24/10/2016	✓
	13/10/2016	24/10/2016	24/10/2016	✓
Nitrite as N in soil	12/10/2016	24/10/2016	24/10/2016	✓
	13/10/2016	24/10/2016	24/10/2016	✓
pH 1:5 soil:water	12/10/2016	24/10/2016	24/10/2016	X
	13/10/2016	24/10/2016	24/10/2016	X
pH 1:5 soil:$CaCl_2$	12/10/2016	24/10/2016	24/10/2016	X
	13/10/2016	24/10/2016	24/10/2016	X
Total Organic Carbon (Walkley Black)	12/10/2016	24/10/2016	24/10/2016	✓
	13/10/2016	24/10/2016	24/10/2016	✓
Moisture	12/10/2016	21/10/2016	24/10/2016	✓
	13/10/2016	21/10/2016	24/10/2016	✓
NEPM screen metals in soil	12/10/2016	21/10/2016	24/10/2016	✓
	13/10/2016	21/10/2016	24/10/2016	✓
OCP in Soil - NEPM	12/10/2016	20/10/2016	22/10/2016	✓
	13/10/2016	20/10/2016	22/10/2016	✓
OP in Soil	12/10/2016	20/10/2016	22/10/2016	✓
	13/10/2016	20/10/2016	22/10/2016	✓
PAHs in Soil	12/10/2016	20/10/2016	22/10/2016	✓
	13/10/2016	20/10/2016	22/10/2016	✓
PCBs in Soil	13/10/2016	20/10/2016	22/10/2016	✓
Phenoxy Acid Herbicides in Soil	12/10/2016	24/10/2016	25/10/2016	✓
	13/10/2016	24/10/2016	25/10/2016	✓
Speciated Phenols in Soil	13/10/2016	20/10/2016	22/10/2016	✓
sPOCAS	13/10/2016	19/10/2016	25/10/2016	X
Synthetic Pyrethroids in soil	13/10/2016	20/10/2016	22/10/2016	✓
TRH Soil C10-C40 NEPM	12/10/2016	20/10/2016	22/10/2016	✓
	13/10/2016	20/10/2016	21/10/2016	✓
	13/10/2016	20/10/2016	22/10/2016	✓
Triazine Herbicides in Soil	13/10/2016	20/10/2016	22/10/2016	✓
vTRH(C6-C10)/BTEXN in Soil	12/10/2016	20/10/2016	24/10/2016	✓
	13/10/2016	20/10/2016	24/10/2016	✓

Sample received for Spocas outside recommended technical holding time.

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COMPLIANCE TO QC FREQUENCY (NEPM):

Internal laboratory QC rate complies with NEPM requirements (LCS/MB/MS 1 in 20, Duplicates 1 in 10 samples). Note, samples are batched together with other sample consignments in order to assign QC sample frequency.

	Evaluation
Duplicate(s) was performed as per NEPM frequency	✓
Laboratory Control Sample(s) was analysed with the samples received	✓
A Method Blank was performed with the samples received	✓
Matrix spike(s) was performed as per NEPM frequency	✓

Refer to Certificate of Analysis for all Quality Control data.

ADDITIONAL REPORT COMMENTS:

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SAMPLE RECEIPT ADVICE

Client Details	
Client	LBW Environmental Projects
Attention	Brad Fitzgerald

Sample Login Details	
Your Reference	150738-01 - Smith Bay Baseline Assessment
Envirolab Reference	**9488**
Date Sample Received	18/10/2016
Date Instructions Received	18/10/2016
Date Results Expected to be Reported	**26/10/2016**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	108 Soils, 2 Waters
Turnaround Time Requested	Standard
Temperature on receipt (°C)	6.4C
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Pamela Adams	Analisa Mathrick
Phone: 03 9763 2500	Phone: 03 9763 2500
Fax: 03 9763 2633	Fax: 03 9763 2633
Email: padams@envirolab.com.au	Email: amathrick@envirolab.com.au

Sample and Testing Details on following page

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Sample Id	vTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	Speciated Phenols in Soil	OCP in Soil - NEPM	OP in Soil	PCBs in Soil	Synthetic Pyrethroids in soil	Triazine Herbicides in Soil	Phenoxy Acid Herbicides in Soil	NEPM screen metals in soil	Ammonia as N in soil	Chloride, Cl	Clay in soils <2um	Free Cyanide in soil	Hexavalent Chromium, Cr6+	Nitrate as N in soil	Nitrite as N in soil	pH 1:5 soil:water	pH 1:5 soil:CaCl2	Sulphate, SO4	Total Organic Carbon (Walkley Black)	Cation exchange capacity	sPOCAS	HM in water - dissolved	On Hold
BH1-01	✓	✓	✓							✓	✓	✓					✓	✓								
BH1-02																										✓
BH1-03																										✓
BH1-04																										✓
BH2-01	✓	✓	✓		✓	✓					✓								✓							
BH2-02																										✓
BH2-03																										✓
BH2-04																										✓
BH3-01																										✓
BH3-02	✓	✓	✓		✓	✓					✓								✓							
BH3-03																										✓
BH3-04																										✓
BH3-05																										✓
BH4-01					✓	✓				✓	✓	✓					✓	✓	✓							
BH4-02																										✓
BH4-03	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓					
BH4-04																										✓
BH5-01	✓	✓	✓		✓	✓					✓	✓					✓	✓	✓							
BH5-02																										✓
BH5-03																										✓
BH5-04																										✓
BH6-01	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓							
BH6-02																										✓
BH6-03																										✓
BH6-04																										✓
BH7-01	✓	✓	✓								✓															
BH7-02																										✓
BH7-03																										✓
BH8-01	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓							
BH8-02					✓	✓					✓	✓					✓	✓	✓							
BH8-03																										✓
BH8-04																										✓
BH8-05																										✓
BH8-06																										✓
BH8-07																										✓
BH9-01					✓	✓				✓	✓	✓					✓	✓	✓							
BH9-02																										✓
BH9-03											✓		✓						✓		✓					

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Sample Id	vTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	Speciated Phenols in Soil	OCP in Soil - NEPM	OP in Soil	PCBs in Soil	Synthetic Pyrethroids in soil	Triazine Herbicides in Soil	Phenoxy Acid Herbicides in Soil	NEPM screen metals in soil	Ammonia as N in soil	Chloride, Cl	Clay in soils <2um	Free Cyanide in soil	Hexavalent Chromium, Cr6+	Nitrate as N in soil	Nitrite as N in soil	pH 1:5 soil:water	pH 1:5 soil:CaCl2	Sulphate, SO4	Total Organic Carbon (Walkley Black)	Cation exchange capacity	sPOCAS	HM in water - dissolved	On Hold
BH9-04																										✓
BH9-05																										✓
BH10-01	✓	✓	✓		✓	✓					✓		✓								✓					
BH10-02																										✓
BH10-03																										✓
BH10-04																										✓
BH11-01											✓								✓							
BH11-02																										✓
BH11-03											✓		✓	✓						✓	✓	✓	✓			
BH11-04																										✓
BH12-01					✓	✓				✓	✓	✓					✓	✓								
BH12-02																										✓
BH12-03																										✓
BH12-04																										✓
BH13-01											✓								✓							
BH13-02																										✓
BH13-04	✓	✓	✓										✓								✓					
BH13-05																								✓		
BH13-06																										✓
BH14-01											✓								✓							
BH14-02																										✓
BH14-03																										✓
BH15-01											✓	✓					✓	✓	✓							
BH15-02																										✓
BH15-03																										✓
BH16-01	✓	✓	✓								✓								✓							
BH16-02																										✓
BH16-03																										✓
BH17-01	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓								
BH17-02																										✓
BH17-03																										✓
BH17-04																										✓
BH17-05																										✓
BH18-01	✓	✓	✓		✓	✓					✓	✓	✓				✓	✓			✓					
BH18-02																										✓
BH18-03																										✓
BH18-04																										✓
BH19-01										✓	✓	✓					✓	✓								
BH19-02																										✓
BH19-03																										✓
BH19-04																										✓

ENVIROLAB SERVICES

A division of Envirolab Group

ENVIROLAB GROUP

Envirolab Services Pty Ltd - Melbourne
ABN 37 112 535 645 -02
1 Dalmore Drive, Scoresby, VIC 3179 Australia
PH +613 9763 2500 Fax +613 9763 2633
melbourne@envirolab.com.au
www.envirolab.com.au

Sample Id	vTRH(C6-C10)/BTEXN in Soil	TRH Soil C10-C40 NEPM	PAHs in Soil	Speciated Phenols in Soil	OCP in Soil - NEPM	OP in Soil	PCBs in Soil	Synthetic Pyrethroids in soil	Triazine Herbicides in Soil	Phenoxy Acid Herbicides in Soil	NEPM screen metals in soil	Ammonia as N in soil	Chloride, Cl	Clay in soils <2um	Free Cyanide in soil	Hexavalent Chromium, Cr6+	Nitrate as N in soil	Nitrite as N in soil	pH 1:5 soil:water	pH 1:5 soil:CaCl2	Sulphate, SO4	Total Organic Carbon (Walkley Black)	Cation exchange capacity	sPOCAS	HM in water - dissolved	On Hold
BH20-01					✓	✓				✓	✓								✓							
BH20-02																										✓
BH20-03																										✓
BH20-04											✓			✓						✓		✓	✓			
T1-01	✓	✓	✓		✓	✓		✓			✓															
T1-02	✓	✓	✓		✓	✓		✓			✓															
T1-03																										✓
T1-04																										✓
T1-05																										✓
T2-01	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓								
T2-02																										✓
T2-03																										✓
T2-04																										✓
T2-05																										✓
T3-01																										✓
T3-02																										✓
T3-03																										✓
T3-04	✓	✓	✓								✓	✓					✓	✓								
T4-01	✓	✓	✓		✓	✓		✓			✓															
T4-02																										✓
T4-03																										✓
T4-04																										✓
T4-05																										✓
T5-01	✓	✓	✓		✓	✓					✓															
T5-02																										✓
T5-03																										✓
T5-04																										✓
T6-01	✓	✓	✓		✓	✓					✓	✓					✓	✓								
R1																									✓	
R2																									✓	
BH10-05																										✓

LBW | environmental projects

184 Magill Road, Norwood SA 5067
PO Box 225 Stepney S.A 5069
P: 08 8331 2417 F: 08 8331 2415

E: admin@lbwenvironment.com.au
ABN: 58 123 992 274

LABORATORY TESTING ORDER

Project Title : Smith Bay Baseline Assessment
Job Number : 150738-01
Project Manager: Brad Fitzgerald
Email: brad.fitzgerald@lbwep.com.au
Phone: 08 8331 2417
Results to: results@lbwenvironment.com.au
Invoice to: admin@lbwenvironment.com.au

LBW | ep's COC REFERENCE (sample delivery group): 150738-01 LTO-02

Primary Laboratory: Envirolab
Laboratory Quote Ref: 16078SA
Secondary Laboratory: ALS
Laboratory Quote Ref:

Turnaround Required: Standard

Envirolab Services
1a Dalmore Drive
Caribbean Park
Scoresby VIC 3179
Ph: (03) 9763 2500

Job No: 9488
Date Received: 17/10/16 + 18/10/16
Time Received: 10:00
Received by: MS
Temp: Cool/Ambient 6.4°C
Cooling: Ice/Icepack
Security: Intact/Broken/None

SAMPLE DETAILS				CHEMICAL TESTING REQUIRED												
Date Sampled	Sample ID	Sample Matrix	Additional Information / Comments	NEPM HIL Screen	NEPM EIL Screen	Heavy Metals (12)	pH	OCP, OPP	Herbicides (Acid Herbs)	TRH, BTEX, PAH	Nitrate, nitrite, ammonia, phosphorus	Sulphate, chloride	SPOCAS	Termiticides (SP)		
13.10.2016	1 BH1-01	Soil				1			1	1	1					
13.10.2016	2 BH1-02	Soil														
13.10.2016	3 BH1-03	Soil														
13.10.2016	4 BH1-04	Soil														
13.10.2016	5 BH2-01	Soil				1	1	1		1						
13.10.2016	6 BH2-02	Soil														
13.10.2016	7 BH2-03	Soil														
13.10.2016	8 BH2-04	Soil														
13.10.2016	9 BH3-01	Soil														
13.10.2016	10 BH3-02	Soil				1	1	1		1						
13.10.2016	11 BH3-03	Soil														
13.10.2016	12 BH3-04	Soil														
13.10.2016	13 BH3-05	Soil														
13.10.2016	14 BH4-01	Soil				1	1	1	1		1					
13.10.2016	15 BH4-02	Soil														
13.10.2016	16 BH4-03	Soil		1			1				1	1				
13.10.2016	17 BH4-04	Soil														
13.10.2016	18 BH5-01	Soil				1	1	1		1	1					
13.10.2016	19 BH5-02	Soil														
13.10.2016	20 BH5-03	Soil														
13.10.2016	21 BH5-04	Soil														
LBW | ep AUTHORISATION		LABORATORY RECEIPT		1	0	5	5	4	2	4	4	1	0	0	0	0

Requested by: Brad Fitzgerald
Date\time requested: 18-Oct-16
Signature: Brad Fitzgerald

Received by: M.SAAD ES
Date\time received: 17-18/10/16 10:00
Signature:

Additional Comments

LBW | environmental projects

184 Magill Road, Norwood SA 5067
PO Box 225 Stepney S.A. 5069
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E: admin@lbwenvironment.com.au
ABN: 58 126 992 274

LABORATORY TESTING ORDER

Project Title : Smith Bay Baseline Assessment
Job Number : 150738-01
Project Manager: Brad Fitzgerald
Email: brad.fitzgerald@lbwep.com.au
Phone: 08 8331 2417
Results to: results@lbwenvironment.com.au
Invoice to: admin@lbwenvironment.com.au

Primary Laboratory: Envirolab
Laboratory Quote Ref: 16078SA
Secondary Laboratory: ALS
Laboratory Quote Ref:

LBW | ep's COC REFERENCE (sample delivery group): 150738-01 LTO-02

Turnaround Required: Standard

SAMPLE DETAILS				CHEMICAL TESTING REQUIRED											
Date Sampled	Sample ID	Sample Matrix	Additional Information / Comments	NEPM HIL Screen	NEPM EIL Screen	Heavy Metals (12)	pH	OCP, OPP	Herbicides	TRH, BTEX, PAH	Nitrate, nitrite, ammonia, phosphorus	Sulphate, chloride	SPOCAS	Termiticides		
13.10.2016	22 BH6-01	Soil		1			1				1					
13.10.2016	23 BH6-02	Soil														
13.10.2016	24 BH6-03	Soil														
13.10.2016	25 BH6-04	Soil														
13.10.2016	26 BH7-01	Soil				1				1						
13.10.2016	27 BH7-02	Soil														
13.10.2016	28 BH7-03	Soil														
13.10.2016	29 BH8-01	Soil		1			1				1					
13.10.2016	30 BH8-02	Soil				1	1	1			1					
13.10.2016	31 BH8-03	Soil														
13.10.2016	32 BH8-04	Soil														
13.10.2016	33 BH8-05	Soil														
13.10.2016	34 BH8-06	Soil														
13.10.2016	35 BH8-07	Soil														
12.10.2016	36 BH9-01	Soil				1	1	1	1		1					
12.10.2016	37 BH9-02	Soil														
12.10.2016	38 BH9-03	Soil				1	1					1				
12.10.2016	39 BH9-04	Soil														
12.10.2016	40 BH9-05	Soil														
12.10.2016	41 BH10-01	Soil				1		1		1		1				
12.10.2016	42 BH10-02	Soil														
12.10.2016	43 BH10-03	Soil														
LBW | ep AUTHORISATION		**LABORATORY RECEIPT**		2	0	5	5	3	1	2	4	2	0	0	0	0

Requested by: Brad Fitzgerald	Received by: M. SHAD
Date\time requested: 18-Oct-16	Date\time received: 17+18/10/16 10:00
Signature: Brad Fitzgerald	Signature:

Additional Comments

LBW | environmental projects

184 Magill Road, Norwood SA 5067
PO Box 225 Stepney SA 5069
P: 08 8331 2417 F: 08 8331 2415

E: admin@lbwenvironment.com.au
ABN: 58 126 992 274

LABORATORY TESTING ORDER

Project Title : Smith Bay Baseline Assessment
Job Number : 150738-01
Project Manager: Brad Fitzgerald
Email: brad.fitzgerald@lbwep.com.au
Phone: 08 8331 2417
Results to: results@lbwenvironment.com.au
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Primary Laboratory: Envirolab
Laboratory Quote Ref: 16078SA
Secondary Laboratory: ALS
Laboratory Quote Ref:

LBW | ep's COC REFERENCE (sample delivery group): 150738-01 LTO-02

Turnaround Required: Standard

SAMPLE DETAILS				CHEMICAL TESTING REQUIRED												
Date Sampled	Sample ID	Sample Matrix	Additional Information / Comments	NEPM HIL Screen	NEPM EIL Screen	Heavy Metals (12)	pH	OCP, OPP	Herbicides	TRH, BTEX, PAH	Nitrate, nitrite, ammonia, phosphorus	Sulphate, chloride	SPOCAS	Termiticides		
13.10.2016	44 BH10-04	Soil														
13.10.2016	45 BH11-01	Soil				1	1									
13.10.2016	46 BH11-02	Soil														
13.10.2016	47 BH11-03	Soil			1	1						1				
13.10.2016	48 BH11-04	Soil														
13.10.2016	49 BH12-01	Soil				1		1	1		1					
13.10.2016	50 BH12-02	Soil														
13.10.2016	51 BH12-03	Soil														
13.10.2016	52 BH12-04	Soil														
13.10.2016	53 BH13-01	Soil				1	1									
13.10.2016	54 BH13-02	Soil														
13.10.2016	BH13-03 *	Soil	*Not received													
13.10.2016	55 BH13-04	Soil								1		1				
13.10.2016	56 BH13-05	Soil											1			
12.10.2016	57 BH13-06	Soil														
12.10.2016	58 BH14-01	Soil				1	1									
12.10.2016	59 BH14-02	Soil														
12.10.2016	60 BH14-03	Soil														
12.10.2016	61 BH15-01	Soil				1	1				1					
12.10.2016	62 BH15-02	Soil														
12.10.2016	63 BH15-03	Soil														
12.10.2016	64 BH16-01	Soil				1	1			1						
LBW | ep AUTHORISATION		**LABORATORY RECEIPT**		0	1	7	5	1	1	2	2	2	1	0	0	0

Requested by: Brad Fitzgerald	Received by:
Date\time requested: 18-Oct-16	Date\time received:
Signature: Brad Fitzgerald	Signature:

Additional Comments

LBW | environmental projects

184 Magill Road, Norwood SA 5067
PO Box 225 Stepney SA 5069
P: 08 8331 2417 F: 08 8331 2415

E: admin@lbwenvironment.com.au
ABN: 58 126 992 274

LABORATORY TESTING ORDER

Project Title : Smith Bay Baseline Assessment
Job Number : 150738-01
Project Manager: Brad Fitzgerald
Email: brad.fitzgerald@lbwep.com.au
Phone: 08 8331 2417
Results to: results@lbwenvironment.com.au
Invoice to: admin@lbwenvironment.com.au

Primary Laboratory: Envirolab
Laboratory Quote Ref: 16078SA
Secondary Laboratory: ALS
Laboratory Quote Ref:

LBW | ep's COC REFERENCE (sample delivery group)	Turnaround Required
150738-01 LTO-02	Standard

SAMPLE DETAILS				CHEMICAL TESTING REQUIRED													
Date Sampled	Sample ID	Sample Matrix	Additional Information / Comments	NEPM HIL Screen	NEPM EIL Screen	Heavy Metals (12)	pH	OCP, OPP	Herbicides	TRH, BTEX, PAH	Nitrate, nitrite, ammonia, phosphorus	Sulphate, chloride	SPOCAS	Termiticides			
13.10.2016	65 BH16-02	Soil											/	as per client request. MS 18/10/16.			
13.10.2016	66 BH16-03	Soil															
13.10.2016	67 BH17-01	Soil		1							1						
13.10.2016	68 BH17-02	Soil															
13.10.2016	69 BH17-03	Soil															
13.10.2016	70 BH17-04	Soil															
13.10.2016	71 BH17-05	Soil															
13.10.2016	72 BH18-01	Soil				1		1		1	1	1					
13.10.2016	73 BH18-02	Soil	additional bag														
13.10.2016	74 BH18-03	Soil															
13.10.2016	75 BH18-04	Soil															
13.10.2016	BH18-05	Soil	Please forward to ALS for testing			1		1	1	1		1					
13.10.2016	76 BH19-01	Soil				1			1		1						
13.10.2016	77 BH19-02	Soil															
12.10.2016	78 BH19-03	Soil															
12.10.2016	79 BH19-04	Soil															
12.10.2016	80 BH20-01	Soil				1	1	1	1								
12.10.2016	81 BH20-02	Soil															
12.10.2016	82 BH20-03	Soil															
12.10.2016	83 BH20-04	Soil	additional bag		1	1											
13.10.2016	84 T1-01	Soil				1		1		1				1			
13.10.2016	85 T1-02	Soil				1		1		1				1			
LBW | ep AUTHORISATION		LABORATORY RECEIPT		1	1	7	1	5	3	4	3	2	1	2	0	0	

Requested by:	Received by:	Additional Comments
Brad Fitzgerald		
Date\time requested: 18-Oct-16	Date\time received:	
Signature: Brad Fitzgerald	Signature:	

LBW | environmental projects

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E: admin@lbwenvironment.com.au
ABN: 53 125 992 274

LABORATORY TESTING ORDER

Project Title : Smith Bay Baseline Assessment
Job Number : 150738-01
Project Manager: Brad Fitzgerald
Email: brad.fitzgerald@lbwep.com.au
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Primary Laboratory: Envirolab
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Secondary Laboratory: ALS
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LBW | ep's COC REFERENCE (sample delivery group)	Turnaround Required
150738-01 LTO-02	Standard

SAMPLE DETAILS				CHEMICAL TESTING REQUIRED												
Date Sampled	Sample ID	Sample Matrix	Additional Information / Comments	NEPM HIL Screen	NEPM EIL Screen	Heavy Metals (12)	pH	OCP, OPP	Herbicides	TRH, BTEX, PAH	Nitrate, nitrite, ammonia, phosphorus	Sulphate, chloride	SPOCAS	Termiticides		
13.10.2016	86 T1-03	Soil														
13.10.2016	87 T1-04	Soil														
13.10.2016	88 T1-05	Soil														
13.10.2016	89 T2-01	Soil		1							1					
13.10.2016	90 T2-02	Soil														
13.10.2016	91 T2-03	Soil														
13.10.2016	92 T2-04	Soil														
13.10.2016	93 T2-05	Soil														
13.10.2016	94 T3-01	Soil														
13.10.2016	95 T3-02	Soil														
13.10.2016	96 T3-03	Soil														
13.10.2016	97 T3-04	Soil				1				1	1					
13.10.2016	98 T4-01	Soil				1		1		1				1		
13.10.2016	99 T4-02	Soil														
13.10.2016	100 T4-03	Soil														
13.10.2016	101 T4-04	Soil														
13.10.2016	102 T4-05	Soil	additional bag													
13.10.2016	103 T5-01	Soil				1		1		1						
13.10.2016	104 T5-02	Soil														
13.10.2016	105 T5-03	Soil														
13.10.2016	106 T5-04	Soil														
13.10.2016	107 T6-01	Soil				1		1		1	1					
LBW | ep AUTHORISATION		LABORATORY RECEIPT		1	0	4	0	3	0	4	3	0	0	1	0	0

Requested by:	Received by:	Additional Comments
Brad Fitzgerald		
Date\time requested: 18-Oct-16	Date\time received:	
Signature: Brad Fitzgerald	Signature:	

LBW | environmental projects

184 Magill Road, Norwood SA 5067
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LABORATORY TESTING ORDER

Project Title : Smith Bay Baseline Assessment
Job Number : 150738-01
Project Manager: Brad Fitzgerald
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Primary Laboratory: Envirolab
Laboratory Quote Ref: 16078SA
Secondary Laboratory: ALS
Laboratory Quote Ref:

LBW | ep's COC REFERENCE (sample delivery group)	Turnaround Required
150738-01 LTO-02	Standard

	SAMPLE DETAILS				CHEMICAL TESTING REQUIRED												
	Date Sampled	Sample ID	Sample Matrix	Additional Information / Comments	Metals 8												
108	12.10.2016	R1	Water		1												
109	13.10.2016	R2	Water		1												
110	12/10/16	BH10-05	extra Sample.														
					2	0	0	0	0	0	0	0	0	0	0	0	0

LBW | ep AUTHORISATION	LABORATORY RECEIPT	
Requested by: Brad Fitzgerald	Received by:	Additional Comments
Date\time requested: 18-Oct-16	Date\time received:	
Signature: Brad Fitzgerald	Signature:	

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM1612432**	Page	: 1 of 8
Client	: **L.B.W. ENVIRONMENTAL PROJECTS**	Laboratory	: Environmental Division Melbourne
Contact	: MR BRAD FITZGERALD	Contact	: KIEREN BURNS
Address	: 184 MAGILL ROAD NORWOOD SA, AUSTRALIA 5067	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 08 8331 2417	Telephone	: +61-3-8549 9600
Project	: 150738-01	Date Samples Received	: 19-Oct-2016 17:45
Order number	: ----	Date Analysis Commenced	: 20-Oct-2016
C-O-C number	: 150738-01 LTO-02	Issue Date	: 27-Oct-2016 15:27
Sampler	: ----		
Site	: Smith Bay Baseline Assessment		
Quote number	: ----		
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*
Chris Lemaitre	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Lana Nguyen	Senior LCMS Chemist	Sydney Organics, Smithfield, NSW
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

- ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- 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: SOIL (Matrix: SOIL)			Client sample ID	BH18-05	----	----	----	----
			Client sampling date / time	[13-Oct-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit	EM1612432-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	16.8	----	----	----	----
ED040N: Sulfate - Calcium Phosphate Soluble (NEPM)								
Sulfate as SO4 2-	14808-79-8	50	mg/kg	<50	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	20	----	----	----	----
EG005T: Total Metals by ICP-AES								
Molybdenum	7439-98-7	2	mg/kg	<2	----	----	----	----
Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
Silver	7440-22-4	2	mg/kg	<2	----	----	----	----
Tin	7440-31-5	5	mg/kg	<5	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	16	----	----	----	----
Copper	7440-50-8	5	mg/kg	<5	----	----	----	----
Lead	7439-92-1	5	mg/kg	6	----	----	----	----
Nickel	7440-02-0	2	mg/kg	4	----	----	----	----
Zinc	7440-66-6	5	mg/kg	6	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH18-05	----	----	----	----
				Client sampling date / time	[13-Oct-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1612432-001	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH18-05	----	----	----	----
				Client sampling date / time	[13-Oct-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1612432-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ 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	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH18-05	----	----	----	----
				Client sampling date / time	[13-Oct-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1612432-001	--------	--------	--------	--------
					Result	----	----	----	----
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	1330-20-7	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP202A: Phenoxyacetic Acid Herbicides by LCMS									
4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg		<0.02	----	----	----	----
2.4-DB	94-82-6	0.02	mg/kg		<0.02	----	----	----	----
Dicamba	1918-00-9	0.02	mg/kg		<0.02	----	----	----	----
Mecoprop	93-65-2	0.02	mg/kg		<0.02	----	----	----	----
MCPA	94-74-6	0.02	mg/kg		<0.02	----	----	----	----
2.4-DP	120-36-5	0.02	mg/kg		<0.02	----	----	----	----
2.4-D	94-75-7	0.02	mg/kg		<0.02	----	----	----	----
Triclopyr	55335-06-3	0.02	mg/kg		<0.02	----	----	----	----
2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg		<0.02	----	----	----	----
2.4.5-T	93-76-5	0.02	mg/kg		<0.02	----	----	----	----
MCPB	94-81-5	0.02	mg/kg		<0.02	----	----	----	----
Picloram	1918-02-1	0.02	mg/kg		<0.02	----	----	----	----
Clopyralid	1702-17-6	0.02	mg/kg		<0.02	----	----	----	----
Fluroxypyr	69377-81-7	0.02	mg/kg		<0.02	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		102	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		79.6	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		99.3	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		100	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		77.3	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		113	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		108	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH18-05	----	----	----	----
				Client sampling date / time	[13-Oct-2016]	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1612432-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)T: PAH Surrogates - Continued									
4-Terphenyl-d14	1718-51-0	0.5	%		116	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		68.0	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		99.3	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		88.5	----	----	----	----
EP202S: Phenoxyacetic Acid Herbicide Surrogate									
2.4-Dichlorophenyl Acetic Acid	19719-28-9	0.02	%		105	----	----	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	38	128
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	33	139
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2.4.6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124
EP202S: Phenoxyacetic Acid Herbicide Surrogate			
2.4-Dichlorophenyl Acetic Acid	19719-28-9	45	139

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM1612432**	Page	: 1 of 10
Client	: **L.B.W. ENVIRONMENTAL PROJECTS**	Laboratory	: Environmental Division Melbourne
Contact	: MR BRAD FITZGERALD	Contact	: KIEREN BURNS
Address	: 184 MAGILL ROAD NORWOOD SA, AUSTRALIA 5067	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: +61 08 8331 2417	Telephone	: +61-3-8549 9600
Project	: 150738-01	Date Samples Received	: 19-Oct-2016
Order number	: ----	Date Analysis Commenced	: 20-Oct-2016
C-O-C number	: 150738-01 LTO-02	Issue Date	: 27-Oct-2016
Sampler	: ----		
Site	: Smith Bay Baseline Assessment		
Quote number	: ----		
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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

Signatories	*Position*	*Accreditation Category*
Chris Lemaitre	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Lana Nguyen	Senior LCMS Chemist	Sydney Organics, Smithfield, NSW
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 624542)									
EM1612426-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	29.1	28.8	0.956	0% - 20%
EM1612440-002	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	11.1	10.9	1.95	0% - 50%
ED040N: Sulfate - Calcium Phosphate Soluble (NEPM) (QC Lot: 629461)									
EM1612432-001	BH18-05	ED040N: Sulfate as SO4 2-	14808-79-8	50	mg/kg	<50	<50	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 630503)									
EM1612405-004	Anonymous	ED045G: Chloride	16887-00-6	10	mg/kg	440	440	0.00	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 628635)									
EM1612227-002	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	12	14	12.6	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	4	4	0.00	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	20	8	91.6	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	9	10	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	11	11	0.00	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	9	10	0.00	No Limit
EM1612432-001	BH18-05	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	16	16	0.00	No Limit
		EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	4	4	0.00	No Limit
		EG005T: Silver	7440-22-4	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005T: Total Metals by ICP-AES (QC Lot: 628635) - continued									
EM1612432-001	BH18-05	EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	6	6	0.00	No Limit
		EG005T: Selenium	7782-49-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Tin	7440-31-5	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	6	6	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 628634)									
EM1612227-002	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EM1612432-001	BH18-05	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 627274)									
EM1612432-001	BH18-05	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 627274)									
EM1612432-001	BH18-05	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 627274) - continued									
EM1612432-001	BH18-05	EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 627273)									
EM1612432-001	BH18-05	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 624154)									
EM1612426-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	46	35	27.6	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 627272)									
EM1612432-001	BH18-05	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 624154)									
EM1612426-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	61	44	31.6	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 627272)									
EM1612432-001	BH18-05	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 627272) - continued									
EM1612432-001	BH18-05	EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 624154)									
EM1612426-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	0.5	0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	2.0	1.5	25.9	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	8.8	6.9	24.4	0% - 50%
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	1.7	1.3	27.4	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QC Lot: 626976)									
EM1612432-001	BH18-05	EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	<0.02	0.00	No Limit
		EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	<0.02	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED040N: Sulfate - Calcium Phosphate Soluble (NEPM) (QCLot: 629461)								
ED040N: Sulfate as SO4 2-	14808-79-8	50	mg/kg	<50	3000 mg/kg	101	86	110
ED045G: Chloride by Discrete Analyser (QCLot: 630503)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	50 mg/kg	106	93	111
				<10	5000 mg/kg	104	93	111
EG005T: Total Metals by ICP-AES (QCLot: 628635)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	103	79	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	97.8	85	109
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	99.5	89	113
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	95.7	84	116
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	97.5	85	107
EG005T: Molybdenum	7439-98-7	2	mg/kg	<2	7.9 mg/kg	99.9	86	112
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	100	89	111
EG005T: Selenium	7782-49-2	5	mg/kg	<5	5.37 mg/kg	101	93	109
EG005T: Silver	7440-22-4	2	mg/kg	<2	2.1 mg/kg	103	80	108
EG005T: Tin	7440-31-5	5	mg/kg	<5	5.2 mg/kg	99.2	92	114
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	99.0	89	111
EG035T: Total Recoverable Mercury by FIMS (QCLot: 628634)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	87.6	85	103
EP068A: Organochlorine Pesticides (OC) (QCLot: 627274)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	74.6	45	131
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	80.0	45	125
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	80.5	46	134
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	79.0	49	133
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	77.9	52	128
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	72.7	48	128
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	81.4	52	128
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	78.8	52	130
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	81.9	51	131
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	82.3	57	135
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	81.6	51	131
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	72.7	51	131
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	82.1	51	131
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	73.2	41	131
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	82.1	52	132

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 627274) - continued								
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	104	50	134
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	77.2	49	130
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	78.3	50	132
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	68.5	38	140
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	80.1	64	132
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	61.7	41	141
EP068B: Organophosphorus Pesticides (OP) (QCLot: 627274)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	83.2	54	135
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	85.3	51	143
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	72.2	10	136
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	82.3	43	128
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	82.5	53	131
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	80.1	53	131
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	79.7	51	133
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	80.4	51	130
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	86.2	54	130
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	73.3	51	135
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	78.9	49	133
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	78.1	50	134
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	78.9	53	131
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	75.7	46	134
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	80.6	51	133
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	79.8	51	133
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	81.6	51	133
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	50.1	14	124
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 627273)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	105	80	121
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	105	70	130
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	103	80	120
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	112	70	124
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	104	80	122
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	108	80	126
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	117	70	128
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	115	80	125
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	97.4	70	130
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	102	80	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	97.0	70	124
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	97.1	75	125

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 627273) - continued								
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	86.0	65	125
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	96.3	65	128
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	96.2	65	126
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	94.5	65	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 624154)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	104	70	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 627272)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	751 mg/kg	98.9	65	131
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3103 mg/kg	99.6	70	126
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1482 mg/kg	105	70	122
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 624154)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	98.4	68	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 627272)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1135 mg/kg	99.0	68	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	4080 mg/kg	96.3	72	116
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	162 mg/kg	108	38	132
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080: BTEXN (QCLot: 624154)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	109	74	124
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	112	77	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	99.0	73	125
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	101	77	128
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	105	81	128
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	110	66	130
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 626976)								
EP202: 4-Chlorophenoxy acetic acid	122-88-3	0.02	mg/kg	<0.02	0.1 mg/kg	102	54	128
EP202: 2.4-DB	94-82-6	0.02	mg/kg	<0.02	0.1 mg/kg	107	46	130
EP202: Dicamba	1918-00-9	0.02	mg/kg	<0.02	0.1 mg/kg	102	52	135
EP202: Mecoprop	93-65-2	0.02	mg/kg	<0.02	0.1 mg/kg	89.5	60	130
EP202: MCPA	94-74-6	0.02	mg/kg	<0.02	0.1 mg/kg	107	57	131
EP202: 2.4-DP	120-36-5	0.02	mg/kg	<0.02	0.1 mg/kg	86.1	50	141
EP202: 2.4-D	94-75-7	0.02	mg/kg	<0.02	0.1 mg/kg	99.6	69	131
EP202: Triclopyr	55335-06-3	0.02	mg/kg	<0.02	0.1 mg/kg	102	51	141
EP202: 2.4.5-TP (Silvex)	93-72-1	0.02	mg/kg	<0.02	0.1 mg/kg	93.1	41	126
EP202: 2.4.5-T	93-76-5	0.02	mg/kg	<0.02	0.1 mg/kg	113	57	139
EP202: MCPB	94-81-5	0.02	mg/kg	<0.02	0.1 mg/kg	94.3	39	137

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 626976) - continued								
EP202: Picloram	1918-02-1	0.02	mg/kg	<0.02	0.1 mg/kg	105	49	129
EP202: Clopyralid	1702-17-6	0.02	mg/kg	<0.02	0.1 mg/kg	101	49	106
EP202: Fluroxypyr	69377-81-7	0.02	mg/kg	<0.02	0.1 mg/kg	106	53	128

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
ED045G: Chloride by Discrete Analyser (QCLot: 630503)							
EM1612405-005	Anonymous	ED045G: Chloride	16887-00-6	2000 mg/kg	119	93	125
EG005T: Total Metals by ICP-AES (QCLot: 628635)							
EM1612227-005	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	116	78	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	107	84	116
		EG005T: Chromium	7440-47-3	50 mg/kg	106	79	121
		EG005T: Copper	7440-50-8	50 mg/kg	103	82	124
		EG005T: Lead	7439-92-1	50 mg/kg	98.7	76	124
		EG005T: Molybdenum	7439-98-7	50 mg/kg	81.3	79	117
		EG005T: Nickel	7440-02-0	50 mg/kg	103	78	120
		EG005T: Selenium	7782-49-2	50 mg/kg	88.2	71	125
		EG005T: Zinc	7440-66-6	50 mg/kg	101	74	128
EG035T: Total Recoverable Mercury by FIMS (QCLot: 628634)							
EM1612227-005	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	84.2	76	116
EP068A: Organochlorine Pesticides (OC) (QCLot: 627274)							
EM1612535-010	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	63.8	22	139
		EP068: Heptachlor	76-44-8	0.5 mg/kg	56.0	18	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	93.1	23	136
		EP068: Dieldrin	60-57-1	0.5 mg/kg	90.6	42	136
		EP068: Endrin	72-20-8	0.5 mg/kg	67.9	23	146
		EP068: 4.4`-DDT	50-29-3	0.5 mg/kg	20.2	20	133
EP068B: Organophosphorus Pesticides (OP) (QCLot: 627274)							
EM1612535-010	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	89.2	49	135
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	72.5	41	127
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	80.6	47	133
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	83.4	45	133
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	64.4	40	128

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 627273)							
EM1612535-007	Anonymous	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	105	67	117
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	117	52	148
EP080/071: Total Petroleum Hydrocarbons (QCLot: 624154)							
EM1612426-002	Anonymous	EP080: C6 - C9 Fraction	----	28 mg/kg	99.8	42	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 627272)							
EM1612535-001	Anonymous	EP071: C10 - C14 Fraction	----	751 mg/kg	101	53	123
		EP071: C15 - C28 Fraction	----	3103 mg/kg	100	70	124
		EP071: C29 - C36 Fraction	----	1482 mg/kg	106	64	118
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 624154)							
EM1612426-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	90.7	39	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 627272)							
EM1612535-001	Anonymous	EP071: >C10 - C16 Fraction	----	1135 mg/kg	100	65	123
		EP071: >C16 - C34 Fraction	----	4080 mg/kg	97.4	67	121
		EP071: >C34 - C40 Fraction	----	162 mg/kg	112	44	126
EP080: BTEXN (QCLot: 624154)							
EM1612426-002	Anonymous	EP080: Benzene	71-43-2	2 mg/kg	117	50	136
		EP080: Toluene	108-88-3	2 mg/kg	119	56	139
EP202A: Phenoxyacetic Acid Herbicides by LCMS (QCLot: 626976)							
EM1612432-001	BH18-05	EP202: Mecoprop	93-65-2	0.1 mg/kg	100	60	140
		EP202: MCPA	94-74-6	0.1 mg/kg	94.7	57	143
		EP202: 2.4-D	94-75-7	0.1 mg/kg	92.6	68	139
		EP202: Triclopyr	55335-06-3	0.1 mg/kg	113	51	145
		EP202: 2.4.5-T	93-76-5	0.1 mg/kg	96.6	57	142
		EP202: Picloram	1918-02-1	0.1 mg/kg	107	49	138
		EP202: Clopyralid	1702-17-6	0.1 mg/kg	93.3	49	149

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM1612432**	Page	: 1 of 7
Client	: **L.B.W. ENVIRONMENTAL PROJECTS**	Laboratory	: Environmental Division Melbourne
Contact	: MR BRAD FITZGERALD	Telephone	: +61-3-8549 9600
Project	: 150738-01	Date Samples Received	: 19-Oct-2016
Site	: Smith Bay Baseline Assessment	Issue Date	: 27-Oct-2016
Sampler	: ----	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

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS)					
Sulfate - Calcium Phosphate Soluble	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

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							
Soil Glass Jar - Unpreserved (EA055-103)							
BH18-05	13-Oct-2016	----	----	----	20-Oct-2016	27-Oct-2016	✓
ED040N: Sulfate - Calcium Phosphate Soluble (NEPM)							
Soil Glass Jar - Unpreserved (ED040N)							
BH18-05	13-Oct-2016	25-Oct-2016	11-Apr-2017	✓	26-Oct-2016	11-Apr-2017	✓
ED045G: Chloride by Discrete Analyser							
Soil Glass Jar - Unpreserved (ED045G)							
BH18-05	13-Oct-2016	26-Oct-2016	10-Nov-2016	✓	27-Oct-2016	23-Nov-2016	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
BH18-05	13-Oct-2016	25-Oct-2016	11-Apr-2017	✓	25-Oct-2016	11-Apr-2017	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
BH18-05	13-Oct-2016	25-Oct-2016	10-Nov-2016	✓	25-Oct-2016	10-Nov-2016	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
BH18-05	13-Oct-2016	24-Oct-2016	27-Oct-2016	✓	24-Oct-2016	03-Dec-2016	✓
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
BH18-05	13-Oct-2016	24-Oct-2016	27-Oct-2016	✓	24-Oct-2016	03-Dec-2016	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BH18-05	13-Oct-2016	24-Oct-2016	27-Oct-2016	✓	24-Oct-2016	03-Dec-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
BH18-05	**13-Oct-2016**	**20-Oct-2016**	27-Oct-2016	✓	**21-Oct-2016**	27-Oct-2016	✓
Soil Glass Jar - Unpreserved (EP071)							
BH18-05	**13-Oct-2016**	**24-Oct-2016**	27-Oct-2016	✓	**24-Oct-2016**	03-Dec-2016	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
BH18-05	**13-Oct-2016**	**20-Oct-2016**	27-Oct-2016	✓	**21-Oct-2016**	27-Oct-2016	✓
Soil Glass Jar - Unpreserved (EP071)							
BH18-05	**13-Oct-2016**	**24-Oct-2016**	27-Oct-2016	✓	**24-Oct-2016**	03-Dec-2016	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
BH18-05	**13-Oct-2016**	**20-Oct-2016**	27-Oct-2016	✓	**21-Oct-2016**	27-Oct-2016	✓
EP202A: Phenoxyacetic Acid Herbicides by LCMS							
Soil Glass Jar - Unpreserved (EP202)							
BH18-05	**13-Oct-2016**	**25-Oct-2016**	27-Oct-2016	✓	**25-Oct-2016**	04-Dec-2016	✓

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)							
Chloride Soluble By Discrete Analyser	ED045G	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055-103	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate - Calcium Phosphate Soluble	ED040N	1	1	**100.00**	**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	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chloride Soluble By Discrete Analyser	ED045G	2	3	**66.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate - Calcium Phosphate Soluble	ED040N	1	1	**100.00**	**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	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride Soluble By Discrete Analyser	ED045G	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate - Calcium Phosphate Soluble	ED040N	1	1	**100.00**	**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	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride Soluble By Discrete Analyser	ED045G	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate - Calcium Phosphate Soluble	ED040N	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard

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*	
Matrix Spikes (MS) - Continued							
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	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	**11.11**	**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	EA055-103	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Sulfate - Calcium Phosphate Soluble	ED040N	SOIL	In house: The sample is extracted with a calcium phosphate solution. The phosphate ion displaces the adsorbed sulfate while calcium ions depress the extraction of interfering S from soil organic matter. SO4 in the extract is determined by ICPAES and reported as dry weight in the original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 406)
Chloride Soluble By Discrete Analyser	ED045G	SOIL	In house: Referenced to APHA 4500-Cl- E. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm. Analysis is performed on a 1:5 soil / water leachate.
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 (2013) 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 (2013) Schedule B(3)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D 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 (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Phenoxyacetic Acid Herbicides (LCMS - Standard DL)	EP202	SOIL	In house: LCMS (Electrospray in negative mode). Residues of acid herbicides are extracted from soil samples under the alkaline condition. An aliquot of the alkaline aqueous phase is taken and acidified before a SPE cleanup. After eluting off from the SPE cartridge, residues of acid herbicides are dissolved in HPLC mobile phase prior to instrument analysis.

Preparation Methods	Method	Matrix	Method Descriptions

Preparation Methods	Method	Matrix	Method Descriptions
Calcium Phosphate Extraction for Sulphate as SO4 2-	ED040NPR	SOIL	The sample is extracted with a calcium phosphate solution. The phosphate ion displaces the adsorbed sulphate while calcium ions depress the extraction of interfering S from soil organic matter. SO4 in the extract is determined by ICPAES and reported as dry weight in the original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 406)
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled 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 (2013) Schedule B(3) (Method 202)
Extraction for Phenoxy Acid Herbicides in Soils.	EP202-PR	SOIL	In-House: Alkaline extract followed by SPE clean up of acidified portion of the sample extract.
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.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EM1612432**

Client	: **L.B.W. ENVIRONMENTAL PROJECTS**	Laboratory	: Environmental Division Melbourne
Contact	: MR BRAD FITZGERALD	Contact	: KIEREN BURNS
Address	: 184 MAGILL ROAD NORWOOD SA, AUSTRALIA 5067	Address	: 4 Westall Rd Springvale VIC Australia 3171
E-mail	: brad.fitzgerald@lbwep.com.au	E-mail	:
Telephone	: +61 08 8331 2417	Telephone	: +61-3-8549 9600
Facsimile	: +61 08 8331 2415	Facsimile	: +61-3-8549 9601
Project	: 150738-01	Page	: 1 of 2
Order number	: ----	Quote number	: EM2015LBWENV0001 (ADBQ/001/15)
C-O-C number	: 150738-01 LTO-02	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Smith Bay Baseline Assessment		
Sampler	:		

Dates

Date Samples Received	: 19-Oct-2016 5:45 PM	Issue Date	: 20-Oct-2016
Client Requested Due Date	: 28-Oct-2016	Scheduled Reporting Date	: **28-Oct-2016**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 14.7°C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please direct any queries related to sample condition / numbering / breakages to Client Services.**
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.
- **Analytical work for this work order will be conducted at ALS Springvale and ALS Sydney.**
- **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.**

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 to 15:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory for processing purposes and will be shown bracketed without a time component.

Matrix: **SOIL**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	SOIL - EA055-103 Moisture Content	SOIL - ED040N Calcium Phosphate Extractable Sulfate	SOIL - ED045G (solids) Chloride Soluble by Discrete Analyser	SOIL - EP202(solids) Phenoxyacetic acids	SOIL - S-12 OC/OP Pesticides	SOIL - S-26 8 metals/TRH/BTEXN/PAH
EM1612432-001	[13-Oct-2016]	BH18-05	✓	✓	✓	✓	✓	✓

Proactive Holding Time Report

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

Requested Deliverables

BRAD FITZGERALD

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

INVOICES ADDRESS

- A4 - AU Tax Invoice (INV)	Email	admin@lbwep.com.au

RESULTS

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

#9488

LBW environmental projects

184 Magill Road, Norwood SA 5067
PO Box 225 Stepney SA 5069
P: 08 8331 2417 F: 08 8331 2415

E: admin@lbwenvironment.com.au
ABN: 58 126 992 274

LABORATORY TESTING ORDER

Project Title : Smith Bay Baseline Assessment
Job Number : 150738-01
Project Manager: Brad Fitzgerald
Email: brad.fitzgerald@lbwep.com.au
Phone: 08 8331 2417
Results to: results@lbwenvironment.com.au
Invoice to: admin@lbwenvironment.com.au

Primary Laboratory: Envirolab
Laboratory Quote Ref: 16078SA
Secondary Laboratory: ALS
Laboratory Quote Ref:

LBW|ep's COC REFERENCE (sample delivery group): 150738-01 LTO-02

Turnaround Required: Standard

SAMPLE DETAILS				CHEMICAL TESTING REQUIRED												
Date Sampled	Sample ID	Sample Matrix	Additional Information / Comments	NEPM HIL Screen	NEPM EIL Screen	Heavy Metals (12)	pH	OCP, OPP	Herbicides	TRH, BTEX, PAH	Nitrate, nitrite, ammonia, phosphorus	Sulphate, chloride	SPOCAS	Termiticides		
13.10.2016	BH16-02	Soil											1			
13.10.2016	BH16-03	Soil														
13.10.2016	BH17-01	Soil		1							1					
13.10.2016	BH17-02	Soil														
13.10.2016	BH17-03	Soil														
13.10.2016	BH17-04	Soil														
13.10.2016	BH17-05	Soil														
13.10.2016	BH18-01	Soil				1		1		1	1	1				
13.10.2016	BH18-02	Soil	additional bag													
13.10.2016	BH18-03	Soil														
13.10.2016	BH18-04	Soil														
13.10.2016	BH18-05	Soil	Please forward to ALS for testing			1		1	1	1		1				
13.10.2016	BH19-01	Soil				1			1		1					
13.10.2016	BH19-02	Soil														
12.10.2016	BH19-03	Soil														
12.10.2016	BH19-04	Soil														
12.10.2016	BH20-01	Soil				1	1	1	1							
12.10.2016	BH20-02	Soil														
12.10.2016	BH20-03	Soil														
12.10.2016	BH20-04	Soil	additional bag		1	1										
13.10.2016	T1-01	Soil				1		1		1				1		
13.10.2016	T1-02	Soil				1		1		1				1		
LBW|ep AUTHORISATION		**LABORATORY RECEIPT**		1	1	7	1	5	3	4	3	2	1	2	0	0

(1)

Requested by: Brad Fitzgerald	Received by: Tom (ALS)
Date\time requested: 18-Oct-16	Date\time received: 17:44, 19/10
Signature: Brad Fitzgerald	Signature:

Additional Comments

Environmental Division
Melbourne
Work Order Reference
EM1612432

Telephone : + 61-3-8549 9600

I:\Jobs\2015\150738-01 KIPT Smith Bay- Baseline Site Assessment\COC\150738-01 LTO-02.xlsx

Relinquished : M-SAAD ECS
19/10/16.

Appendix L

Laboratory Reports and Chain of Custody Documentation - Water

1 Dalmore Drive, Scoresby, Victoria 3179
tel: +61 3 9763 2500

email: melbourne@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Melbourne | ABN 37 112 535 645 - 002

CERTIFICATE OF ANALYSIS 9476

Client:
LBW Environmental Projects
184 Magill Road
Norwood
SA 5067

Attention: Brad Fitzgerald

Sample log in details:

Your Reference:	**150738-01 - KIPT Smith Bay Baseline Assessm.**
No. of samples:	2 Waters
Date samples received / completed instructions received	17/10/2016 / 17/10/2016

This report supersedes 9476_R00 due to client request for TDS and salinity to be added.

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: / Issue Date:	26/10/16 / 23/11/16
Date of Preliminary Report:	Not Issued

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

Results Approved By:

Pamela Adams
Laboratory Manager

Chris De Luca
Senior Chemist

VOCs in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9476-1 GW1 12/10/2016 Water
Date extracted	-	21/10/2016
Date analysed	-	21/10/2016
Dichlorodifluoromethane	µg/L	<50
Chloromethane	µg/L	<50
Vinyl Chloride	µg/L	<50
Bromomethane	µg/L	<50
Chloroethane	µg/L	<50
Trichlorofluoromethane	µg/L	<50
1,1-Dichloroethene	µg/L	<5
Trans-1,2-dichloroethene	µg/L	<5
1,1-dichloroethane	µg/L	<5
Cis-1,2-dichloroethene	µg/L	<5
Bromochloromethane	µg/L	<5
Chloroform	µg/L	<5
2,2-dichloropropane	µg/L	<5
1,2-dichloroethane	µg/L	<5
1,1,1-trichloroethane	µg/L	<5
1,1-dichloropropene	µg/L	<5
Cyclohexane	µg/L	<5
Carbon tetrachloride	µg/L	<5
Benzene	µg/L	<5
Dibromomethane	µg/L	<5
1,2-dichloropropane	µg/L	<5
Trichloroethene	µg/L	<5
Bromodichloromethane	µg/L	<5
trans-1,3-dichloropropene	µg/L	<5
cis-1,3-dichloropropene	µg/L	<5
1,1,2-trichloroethane	µg/L	<5
Toluene	µg/L	<5
1,3-dichloropropane	µg/L	<5
Dibromochloromethane	µg/L	<5
1,2-dibromoethane	µg/L	<5
Tetrachloroethene	µg/L	<5
1,1,1,2-tetrachloroethane	µg/L	<5
Chlorobenzene	µg/L	<5
Ethylbenzene	µg/L	<5
Bromoform	µg/L	<5
m+p-xylene	µg/L	<10
Styrene	µg/L	<5
1,1,2,2-tetrachloroethane	µg/L	<5

VOCs in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9476-1 GW1 12/10/2016 Water
o-xylene	µg/L	<5
1,2,3-trichloropropane	µg/L	<5
Isopropylbenzene	µg/L	<5
Bromobenzene	µg/L	<5
n-propyl benzene	µg/L	<5
2-chlorotoluene	µg/L	<5
4-chlorotoluene	µg/L	<5
1,3,5-trimethyl benzene	µg/L	<5
Tert-butyl benzene	µg/L	<5
1,2,4-trimethyl benzene	µg/L	<5
1,3-dichlorobenzene	µg/L	<5
Sec-butyl benzene	µg/L	<5
1,4-dichlorobenzene	µg/L	<5
4-isopropyl toluene	µg/L	<5
1,2-dichlorobenzene	µg/L	<5
n-butyl benzene	µg/L	<5
1,2-dibromo-3-chloropropane	µg/L	<5
1,2,4-trichlorobenzene	µg/L	<5
Hexachlorobutadiene	µg/L	<5
1,2,3-trichlorobenzene	µg/L	<5
Surrogate Dibromofluoromethane	%	114
Surrogate toluene-d8	%	99
Surrogate 4-BFB	%	100

vTRH(C6-C10)/BTEXN in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	 9476-1 GW1 12/10/2016 Water
Date extracted	-	21/10/2016
Date analysed	-	21/10/2016
TRHC6 - C9	µg/L	<50
TRHC6 - C10	µg/L	<50
TRHC6 - C10 less BTEX (F1)	µg/L	<50
Benzene	µg/L	<5
Toluene	µg/L	<5
Ethylbenzene	µg/L	<5
m+p-xylene	µg/L	<10
o-xylene	µg/L	<5
Naphthalene	µg/L	<5
Surrogate Dibromofluoromethane	%	116
Surrogate toluene-d8	%	99
Surrogate 4-BFB	%	99

TRH Water(C10-C40) NEPM Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9476-1 GW1 12/10/2016 Water	9476-2 GW2 13/10/2016 Water
Date extracted	-	18/10/2016	18/10/2016
Date analysed	-	19/10/2016	19/10/2016
$TRHC_{10}$ - C_{14}	µg/L	<50	330,000
$TRHC_{15}$ - C_{28}	µg/L	210	1,200,000
$TRHC_{29}$ - C_{36}	µg/L	120	28,000
$TRH>C_{10}$ - C_{16}	µg/L	81	710,000
$TRH>C_{10}$ - C_{16} less Naphthalene (F2)	µg/L	81	[NT]
$TRH>C_{16}$ - C_{34}	µg/L	250	830,000
$TRH>C_{34}$ - C_{40}	µg/L	<100	13,000
Surrogate o-Terphenyl	%	83	#

sTRH in Water (C10-C36) Silica Gel Clean		
Our Reference:	UNITS	9476-2
Your Reference	----------	GW2
Date Sampled	----------	13/10/2016
Type of sample		Water
Date extracted	-	18/10/2016
Date analysed	-	25/10/2016
TRHC$_{10}$ - C$_{14}$ (silica)	µg/L	230,000
TRHC$_{15}$ - C$_{28}$ (silica)	µg/L	940,000
TRHC$_{29}$ - C$_{36}$ (silica)	µg/L	17,000
TRH>C$_{10}$ - C$_{16}$ (silica)	µg/L	530,000
TRH>C$_{16}$ - C$_{34}$ (silica)	µg/L	650,000
TRH>C$_{34}$ - C$_{40}$ (silica)	µg/L	7,100
Surrogate o-Terphenyl	%	#

TRH ID (C10-C36)*		
Our Reference:	UNITS	9476-3
Your Reference	----------	GW2 (Product)
Date Sampled	----------	13/10/2016
Type of sample		Product
TRH ID - best match*	-	^

PAHs in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	 9476-1 GW1 12/10/2016 Water
Date extracted	-	18/10/2016
Date analysed	-	19/10/2016
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
Total +ve PAH's	µg/L	<1
Benzo(a)pyrene TEQ	µg/L	<5
Surrogate p-Terphenyl-d_{14}	%	74

PCBs in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9476-1 GW1 12/10/2016 Water
Date extracted	-	18/10/2016
Date analysed	-	19/10/2016
Aroclor 1016	µg/L	<2
Aroclor 1221	µg/L	<2
Aroclor 1232	µg/L	<2
Aroclor 1242	µg/L	<2
Aroclor 1248	µg/L	<2
Aroclor 1254	µg/L	<2
Aroclor 1260	µg/L	<2
Surrogate TCLMX	%	56 #

OCP in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	 9476-1 GW1 12/10/2016 Water
Date extracted	-	18/10/2016
Date analysed	-	19/10/2016
alpha-BHC	µg/L	<0.2
HCB	µg/L	<0.2
beta-BHC	µg/L	<0.2
gamma-BHC	µg/L	<0.2
Heptachlor	µg/L	<0.2
delta-BHC	µg/L	<0.2
Aldrin	µg/L	<0.2
Heptachlor Epoxide	µg/L	<0.2
gamma-Chlordane	µg/L	<0.2
alpha-Chlordane	µg/L	<0.2
Endosulfan I	µg/L	<0.2
pp-DDE	µg/L	<0.2
Dieldrin	µg/L	<0.2
Endrin	µg/L	<0.2
Endosulfan II	µg/L	<0.2
pp-DDD	µg/L	<0.2
Endrin Aldehyde	µg/L	<0.2
pp-DDT	µg/L	<0.2
Endosulfan Sulphate	µg/L	<0.2
Methoxychlor	µg/L	<0.2
Surrogate TCMX	%	56 #

Phthalates in water		
Our Reference:	UNITS	9476-1
Your Reference	----------	GW1
Date Sampled	----------	12/10/2016
Type of sample		Water
Date extracted	-	18/10/2016
Date analysed	-	19/10/2016
Dimethyl phthalate	µg/L	<10
Diethylphthalate	µg/L	<10
Di-n-butylphthalate	µg/L	<50
Butylbenzylphthalate	µg/L	<10
Bis(2-ethylhexyl) phthalate	µg/L	<50
Di-n-octylphthalate	µg/L	<10
Surrogate p-Terphenyl-d_{14}	%	74

Speciated Phenols in Water		
Our Reference:	UNITS	9476-1
Your Reference	----------	GW1
Date Sampled	----------	12/10/2016
Type of sample		Water
Date extracted	-	18/10/2016
Date analysed	-	19/10/2016
Phenol	µg/L	<1
2-Chlorophenol	µg/L	<1
2-Methylphenol	µg/L	<1
3/4-Methylphenol	µg/L	<2
2-Nitrophenol	µg/L	<1
2,4-Dimethylphenol	µg/L	<1
2,4-Dichlorophenol	µg/L	<1
2,6-Dichlorophenol	µg/L	<1
2,4,5-Trichlorophenol	µg/L	<1
2,4,6-Trichlorophenol	µg/L	<1
2,4-Dinitrophenol	µg/L	<10
4-Nitrophenol	µg/L	<20
2,3,4,6-Tetrachlorophenol	µg/L	<1
2-methyl-4,6-dinitrophenol	µg/L	<10
Pentachlorophenol	µg/L	<5
4-Chloro-3-Methylphenol	µg/L	<1
Surrogate Phenol-d_6	%	48

All metals in water-dissolved Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9476-1 GW1 12/10/2016 Water	9476-2 GW2 13/10/2016 Water
Date prepared	-	18/10/2016	18/10/2016
Date analysed	-	18/10/2016	18/10/2016
Aluminium-Dissolved	µg/L	<10	18
Antimony-Dissolved	µg/L	<1	<1
Arsenic-Dissolved	µg/L	7	30
Barium-Dissolved	µg/L	140	41
Beryllium-Dissolved	µg/L	<0.5	<0.5
Boron-Dissolved	µg/L	3,000	290
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1
Cobalt-Dissolved	µg/L	4	1
Copper-Dissolved	µg/L	4	3
Iron-Dissolved	µg/L	12	2,800
Lead-Dissolved	µg/L	<1	3
Manganese-Dissolved	µg/L	36	46
Mercury-Dissolved	µg/L	<0.05	<0.05
Molybdenum-Dissolved	µg/L	7	<1
Nickel-Dissolved	µg/L	2	2
Selenium-Dissolved	µg/L	10	2
Silver-Dissolved	µg/L	<1	<1
Thallium-Dissolved	µg/L	<1	<1
Tin-Dissolved	µg/L	<1	5
Vanadium-Dissolved	µg/L	4	<1
Zinc-Dissolved	µg/L	17	31

Metals in Waters - Total Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9476-1 GW1 12/10/2016 Water	9476-2 GW2 13/10/2016 Water
Date prepared	-	20/10/2016	20/10/2016
Date analysed	-	20/10/2016	20/10/2016
Phosphorus - Total	mg/L	0.1	23

Ion Balance Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	9476-1 GW1 12/10/2016 Water
Date prepared	-	18/10/2016
Date analysed	-	18/10/2016
Calcium - Dissolved	mg/L	380
Potassium - Dissolved	mg/L	140
Sodium - Dissolved	mg/L	5,300
Magnesium - Dissolved	mg/L	580
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	<5
Bicarbonate Alkalinity as $CaCO_3$	mg/L	2,500
Carbonate Alkalinity as $CaCO_3$	mg/L	<5
Total Alkalinity as $CaCO_3$	mg/L	2,500
Sulphate, SO4	mg/L	620
Chloride, Cl	mg/L	8,500
Ionic Balance	%	-0.34

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	 9476-1 GW1 12/10/2016 Water
Date prepared	-	17/10/2016
Date analysed	-	18/10/2016
Fluoride, F	mg/L	0.5
Total Cyanide	mg/L	<0.004
Hexavalent Chromium, Cr^{6+}	mg/L	<0.005
Total Nitrogen in water	mg/L	43
Nitrite as N in water	mg/L	0.045
Nitrate as N in water	mg/L	0.79
Ammonia as N in water	mg/L	0.16
TKN in water	mg/L	42
Total Dissolved Solids (grav)	mg/L	18,000
Salinity as NaCl*	g/L	15

Method ID	Methodology Summary
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
AT-008	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-012	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.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA 22nd ED, 4110 -B. Alternatively determined by colourimetry/turbidity using Discrete Analyer.
Inorg-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 10% ie total anions = total cations +/-10%.
Inorg-026	Fluoride determined by ion selective electrode (ISE) in accordance with APHA latest edition, 4500-F-C.
Inorg-013	Cyanide - total determined colourimetrically after distillation, based on APHA latest edition, 4500-CN_C,E. Free cyanide determined colourimetrically after filtration and confirmed by diffusion. Solids are extracted in a caustic media prior to distillation and analysis.
Inorg-024	Hexavalent Chromium (Cr6+) - determined colourimetrically by discrete analyser.

Method ID	Methodology Summary
Inorg-055/062	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen.
Inorg-055	Nitrite - determined colourimetrically based on APHA latest edition NO2- B. Soils are analysed following a water extraction.
Inorg-055	Nitrate - determined colourimetrically. Soils are analysed following a water extraction.
Inorg-057	Ammonia - determined colourimetrically based on EPA350.1 and APHA latest edition 4500-NH3 F, Soils are analysed following a KCl extraction.
Inorg-062	TKN - determined colourimetrically based on APHA latest edition 4500 Norg.
Inorg-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180oC +/-5oC.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25oC in accordance with APHA latest edition 2510 and Rayment & Lyons.

QUALITY CONTROL VOCs in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			21/10/2016	[NT]	[NT]	LCS-1	21/10/2016
Date analysed	-			21/10/2016	[NT]	[NT]	LCS-1	21/10/2016
Dichlorodifluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Chloromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Vinyl Chloride	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Bromomethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Chloroethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Trichlorofluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
1,1-Dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,1-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-1	101%
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Bromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Chloroform	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-1	112%
2,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-1	100%
1,1,1-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-1	124%
1,1-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Cyclohexane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Carbon tetrachloride	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Dibromomethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Trichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-1	114%
Bromodichloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-1	122%
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,1,2-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Toluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,3-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Dibromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-1	105%
1,2-dibromoethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Tetrachloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-1	118%
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Chlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Ethylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Bromoform	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
m+p-xylene	µg/L	2	Org-013	<2	[NT]	[NT]	[NR]	[NR]
Styrene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL VOCs in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
o-xylene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,3-trichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Isopropylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Bromobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
n-propyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
2-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
4-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,3,5-trimethyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Tert-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,4-trimethyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,3-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Sec-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,4-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
4-isopropyl toluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
n-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Hexachlorobutadiene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-013	111	[NT]	[NT]	LCS-1	93%
Surrogate toluene-d8	%		Org-013	100	[NT]	[NT]	LCS-1	101%
Surrogate 4-BFB	%		Org-013	97	[NT]	[NT]	LCS-1	105%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			21/10/2016	[NT]	[NT]	LCS-1	21/10/2016
Date analysed	-			21/10/2016	[NT]	[NT]	LCS-1	21/10/2016
TRHC$_6$ - C$_9$	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-1	105%
TRHC$_6$ - C$_{10}$	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-1	105%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-1	106%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-1	105%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-1	105%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-1	105%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-1	104%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-1	105%
Surrogate Dibromofluoromethane	%		Org-016	116	[NT]	[NT]	LCS-1	91%
Surrogate toluene-d8	%		Org-016	102	[NT]	[NT]	LCS-1	100%
Surrogate 4-BFB	%		Org-016	101	[NT]	[NT]	LCS-1	103%
QUALITY CONTROL TRH Water(C10-C40) NEPM	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			18/10/2016	[NT]	[NT]	LCS-1	18/10/2016
Date analysed	-			18/10/2016	[NT]	[NT]	LCS-1	18/10/2016
TRHC$_{10}$ - C$_{14}$	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-1	60%
TRHC$_{15}$ - C$_{28}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-1	73%
TRHC$_{29}$ - C$_{36}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-1	93%
TRH>C$_{10}$ - C$_{16}$	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-1	60%
TRH>C$_{16}$ - C$_{34}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-1	73%
TRH>C$_{34}$ - C$_{40}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-1	93%
Surrogate o-Terphenyl	%		Org-003	68	[NT]	[NT]	LCS-1	116%

QUALITY CONTROL sTRH in Water (C10-C36) Silica Gel Clean	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			18/10/2016	[NT]	[NT]	LCS-1	25/10/2016
Date analysed	-			25/10/2016	[NT]	[NT]	LCS-1	25/10/2016
TRHC$_{10}$ - C$_{14}$ (silica)	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-1	76%
TRHC$_{15}$ - C$_{28}$ (silica)	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-1	124%
TRHC$_{29}$ - C$_{36}$ (silica)	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-1	90%
TRH>C$_{10}$ - C$_{16}$ (silica)	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-1	77%
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	µg/L	50	Org-003	<50	[NT]	[NT]	[NR]	[NR]
TRH>C$_{16}$ - C$_{34}$ (silica)	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-1	130%
TRH>C$_{34}$ - C$_{40}$ (silica)	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-1	94%
Surrogate o-Terphenyl	%		Org-003	75	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL TRH ID (C10-C36)*	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
TRH ID - best match*	-		AT-008	[NT]	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL PAHs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			18/10/2016	[NT]	[NT]	LCS-1	18/10/2016
Date analysed	-			19/10/2016	[NT]	[NT]	LCS-1	19/10/2016
Naphthalene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-1	80%
Acenaphthylene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-1	84%
Acenaphthene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-1	90%
Phenanthrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-1	86%
Anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-1	100%
Pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-1	98%
Benzo(a)anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-1	96%
Benzo(b,j&k) fluoranthene	µg/L	2	Org-012	<2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-1	108%
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL PAHs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Surrogate p-Terphenyl-d_{14}	%		Org-012	66	[NT]	[NT]	LCS-1	84%
QUALITY CONTROL PCBs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			18/10/2016	[NT]	[NT]	LCS-1	18/10/2016
Date analysed	-			19/10/2016	[NT]	[NT]	LCS-1	19/10/2016
Aroclor 1016	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1221	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1232	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1242	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1248	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1254	µg/L	2	Org-006	<2	[NT]	[NT]	LCS-1	100%
Aroclor 1260	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	60	[NT]	[NT]	LCS-1	62%
QUALITY CONTROL OCP in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			18/10/2016	[NT]	[NT]	LCS-1	18/10/2016
Date analysed	-			19/10/2016	[NT]	[NT]	LCS-1	19/10/2016
alpha-BHC	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	LCS-1	94%
HCB	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
beta-BHC	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	LCS-1	90%
gamma-BHC	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
Heptachlor	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	LCS-1	96%
delta-BHC	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
Aldrin	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	LCS-1	92%
Heptachlor Epoxide	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	LCS-1	96%
gamma-Chlordane	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	LCS-1	98%
alpha-Chlordane	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
Endosulfan I	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
pp-DDE	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	LCS-1	100%
Dieldrin	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	LCS-1	96%
Endrin	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	LCS-1	108%
Endosulfan II	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
pp-DDD	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	LCS-1	100%
Endrin Aldehyde	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
pp-DDT	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	LCS-1	98%
Methoxychlor	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-005	60	[NT]	[NT]	LCS-1	62%

QUALITY CONTROL Phthalates in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			18/10/2016	[NT]	[NT]	LCS-1	18/10/2016
Date analysed	-			19/10/2016	[NT]	[NT]	LCS-1	19/10/2016
Dimethyl phthalate	µg/L	10	Org-012	<10	[NT]	[NT]	LCS-1	98%
Diethylphthalate	µg/L	10	Org-012	<10	[NT]	[NT]	LCS-1	98%
Di-n-butylphthalate	µg/L	50	Org-012	<50	[NT]	[NT]	[NR]	[NR]
Butylbenzylphthalate	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Bis(2-ethylhexyl) phthalate	µg/L	50	Org-012	<50	[NT]	[NT]	[NR]	[NR]
Di-n-octylphthalate	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		Org-012	66	[NT]	[NT]	LCS-1	84%

QUALITY CONTROL Speciated Phenols in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			18/10/2016	[NT]	[NT]	LCS-1	18/10/2016
Date analysed	-			19/10/2016	[NT]	[NT]	LCS-1	19/10/2016
Phenol	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-1	58%
2-Chlorophenol	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-1	80%
2-Methylphenol	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-1	74%
3/4-Methylphenol	µg/L	2	Org-012	<2	[NT]	[NT]	[NR]	[NR]
2-Nitrophenol	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
2,4-Dimethylphenol	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
2,4-Dichlorophenol	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
2,6-Dichlorophenol	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-1	82%
2,4,5-Trichlorophenol	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
2,4,6-Trichlorophenol	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
2,4-Dinitrophenol	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
4-Nitrophenol	µg/L	20	Org-012	<20	[NT]	[NT]	[NR]	[NR]
2,3,4,6-Tetrachlorophenol	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
2-methyl-4,6-dinitrophenol	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Pentachlorophenol	µg/L	5	Org-012	<5	[NT]	[NT]	LCS-1	100%
4-Chloro-3-Methylphenol	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Phenol-d_6	%		Org-012	52	[NT]	[NT]	LCS-1	60%

QUALITY CONTROL All metals in water-dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			18/10/2016	[NT]	[NT]	LCS-1	18/10/2016
Date analysed	-			18/10/2016	[NT]	[NT]	LCS-1	18/10/2016
Aluminium-Dissolved	µg/L	10	Metals-022 ICP-MS	<10	[NT]	[NT]	LCS-1	111%
Antimony-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	111%
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	103%
Barium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	107%
Beryllium-Dissolved	µg/L	0.5	Metals-022 ICP-MS	<0.5	[NT]	[NT]	LCS-1	99%
Boron-Dissolved	µg/L	5	Metals-022 ICP-MS	<5	[NT]	[NT]	LCS-1	108%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-1	107%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	108%
Cobalt-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	99%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	101%
Iron-Dissolved	µg/L	10	Metals-022 ICP-MS	<10	[NT]	[NT]	LCS-1	105%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	103%
Manganese-Dissolved	µg/L	5	Metals-022 ICP-MS	<5	[NT]	[NT]	LCS-1	103%
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	LCS-1	115%
Molybdenum-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	101%
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	101%
Selenium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	105%
Silver-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	105%
Thallium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	109%
Tin-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	118%
Vanadium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	109%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-1	101%

QUALITY CONTROL Metals in Waters - Total	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			20/10/2016	9476-1	20/10/2016 || 20/10/2016	LCS-1	20/10/2016
Date analysed	-			20/10/2016	9476-1	20/10/2016 || 20/10/2016	LCS-1	20/10/2016
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	9476-1	0.1 || 0.2 || RPD: 67	LCS-1	94%
QUALITY CONTROL Ion Balance	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			18/10/2016	9476-1	18/10/2016 || 18/10/2016	LCS-1	18/10/2016
Date analysed	-			18/10/2016	9476-1	18/10/2016 || 18/10/2016	LCS-1	18/10/2016
Calcium - Dissolved	mg/L	0.5	Metals-020 ICP-AES	<0.5	9476-1	380 || 360 || RPD: 5	LCS-1	108%
Potassium - Dissolved	mg/L	0.5	Metals-020 ICP-AES	<0.5	9476-1	140 || 130 || RPD: 7	LCS-1	108%
Sodium - Dissolved	mg/L	0.5	Metals-020 ICP-AES	<0.5	9476-1	5300 || 5100 || RPD: 4	LCS-1	105%
Magnesium - Dissolved	mg/L	0.5	Metals-020 ICP-AES	<0.5	9476-1	580 || 560 || RPD: 4	LCS-1	106%
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	5	Inorg-006	<5	9476-1	<5 || <5	[NR]	[NR]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	9476-1	2500 || 2500 || RPD: 0	LCS-1	108%
Carbonate Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	9476-1	<5 || <5	[NR]	[NR]
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	9476-1	2500 || 2500 || RPD: 0	LCS-1	108%
Sulphate, SO4	mg/L	1	Inorg-081	<1	9476-1	620 || 660 || RPD: 6	LCS-1	110%
Chloride, Cl	mg/L	1	Inorg-081	<1	9476-1	8500 || 7900 || RPD: 7	LCS-1	123%
Ionic Balance	%		Inorg-040	[NT]	9476-1	-0.34 || 0.77 || RPD: 516	[NR]	[NR]

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			17/10/2016	[NT]	[NT]	LCS-1	17/10/2016
Date analysed	-			18/10/2016	[NT]	[NT]	LCS-1	18/10/2016
Fluoride, F	mg/L	0.1	Inorg-026	<0.1	[NT]	[NT]	LCS-1	96%
Total Cyanide	mg/L	0.004	Inorg-013	<0.004	[NT]	[NT]	LCS-1	117%
Hexavalent Chromium, Cr^{6+}	mg/L	0.005	Inorg-024	<0.005	[NT]	[NT]	LCS-1	90%
Total Nitrogen in water	mg/L	0.1	Inorg-055/062	<0.1	[NT]	[NT]	[NR]	[NR]
Nitrite as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	LCS-1	86%
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	LCS-1	83%
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	[NT]	[NT]	LCS-1	80%
TKN in water	mg/L	0.1	Inorg-062	<0.1	[NT]	[NT]	LCS-1	102%
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	<5	[NT]	[NT]	LCS-1	98%
Salinity as NaCl*	g/L	1	Inorg-002	<1.0	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL Ion Balance	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	9476-1	18/10/2016
Date analysed	-	[NT]	[NT]	9476-1	18/10/2016
Calcium - Dissolved	mg/L	[NT]	[NT]	9476-1	103%
Potassium - Dissolved	mg/L	[NT]	[NT]	9476-1	106%
Sodium - Dissolved	mg/L	[NT]	[NT]	9476-1	96%
Magnesium - Dissolved	mg/L	[NT]	[NT]	9476-1	101%
Hydroxide Alkalinity (OH^-) as $CaCO_3$	mg/L	[NT]	[NT]	[NR]	[NR]
Bicarbonate Alkalinity as $CaCO_3$	mg/L	[NT]	[NT]	[NR]	[NR]
Carbonate Alkalinity as $CaCO_3$	mg/L	[NT]	[NT]	[NR]	[NR]
Total Alkalinity as $CaCO_3$	mg/L	[NT]	[NT]	[NR]	[NR]
Sulphate, SO4	mg/L	[NT]	[NT]	[NR]	[NR]
Chloride, Cl	mg/L	[NT]	[NT]	[NR]	[NR]
Ionic Balance	%	[NT]	[NT]	[NR]	[NR]

Report Comments:

Total Cyanide and TKN analysed by Envirolab Sydney, report 155513.

SVOC: # Percent recovery low due to sample emulsification.

*Acid Extractable Metals in Soil:

^Compared to the Envirolab Reference library the closest match to sample GW2-product was diesel.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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.

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 batched 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: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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DATA QUALITY ASSESSMENT SUMMARY

Report Details	
Envirolab Report Reference	9476
Client ID	LBW Environmental Projects
Project Reference	150738-01 - KIPT Smith Bay Baseline Assessm.
Date Issued	26/10/2016

QC DATA:

All laboratory QC data was within the Envirolab Group's specifications except:

QC Type	*Reference*	*Analysis*	*Comments*
Surrogate Recovery %	9476-1	OCP in water - Surrogate TCMX	Fails internal acceptance criteria
Surrogate Recovery %	9476-1	PCBs in Water - Surrogate TCLMX	Fails internal acceptance criteria
Surrogate Recovery %	9476-2	TRH Water(C10-C40) NEPM - Surrogate	Fails internal acceptance criteria
Surrogate Recovery %	9476-2	sTRH in Water (C10-C36) Silica Gel Clean - Surrogate	Fails internal acceptance criteria

See Report 9476-[R00] for QA/QC details

HOLDING TIME COMPLIANCE EVALUATION:

The table below summarizes compliance with preservation / holding times (based on AS/APHA/ISO/NEPM/USEPA reference documents and standards):-

Analysis	*Date Sampled*	*Date Extracted*	*Date Analysed*	*Accept*
All metals in water-dissolved	12/10/2016	18/10/2016	18/10/2016	✓
	13/10/2016	18/10/2016	18/10/2016	✓
Ion Balance				
Bicarbonate Alkalinity as $CaCO_3$	12/10/2016	18/10/2016	18/10/2016	✓
Carbonate Alkalinity as $CaCO_3$	12/10/2016	18/10/2016	18/10/2016	✓
Hydroxide Alkalinity (OH^-) as $CaCO_3$	12/10/2016	18/10/2016	18/10/2016	✓
Total Alkalinity as $CaCO_3$	12/10/2016	18/10/2016	18/10/2016	✓
Chloride, Cl	12/10/2016	18/10/2016	18/10/2016	✓
Sulphate, SO4	12/10/2016	18/10/2016	18/10/2016	✓
Ionic Balance	12/10/2016	18/10/2016	18/10/2016	✓
Calcium - Dissolved	12/10/2016	18/10/2016	18/10/2016	✓
Potassium - Dissolved	12/10/2016	18/10/2016	18/10/2016	✓
Magnesium - Dissolved	12/10/2016	18/10/2016	18/10/2016	✓
Sodium - Dissolved	12/10/2016	18/10/2016	18/10/2016	✓
Metals in Waters - Total	12/10/2016	20/10/2016	20/10/2016	✓
	13/10/2016	20/10/2016	20/10/2016	✓
Miscellaneous Inorganics				
Ammonia as N in water	12/10/2016	17/10/2016	18/10/2016	✓
	13/10/2016	17/10/2016	18/10/2016	✓
Total Cyanide	12/10/2016	17/10/2016	18/10/2016	✓

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Fluoride, F	12/10/2016	17/10/2016	18/10/2016	✓
Hexavalent Chromium, Cr^{6+}	12/10/2016	17/10/2016	18/10/2016	✓
Nitrate as N in water	12/10/2016	17/10/2016	18/10/2016	✓
	13/10/2016	17/10/2016	18/10/2016	✓
Nitrite as N in water	12/10/2016	17/10/2016	18/10/2016	✓
	13/10/2016	17/10/2016	18/10/2016	✓
TKN in water	12/10/2016	17/10/2016	18/10/2016	✓
	13/10/2016	17/10/2016	18/10/2016	✓
Total Nitrogen in water	12/10/2016	17/10/2016	18/10/2016	✓
	13/10/2016	17/10/2016	18/10/2016	✓
OCP in water	12/10/2016	18/10/2016	19/10/2016	✓
PAHs in Water	12/10/2016	18/10/2016	19/10/2016	✓
PCBs in Water	12/10/2016	18/10/2016	19/10/2016	✓
Phthalates in water	12/10/2016	18/10/2016	19/10/2016	✓
Speciated Phenols in Water	12/10/2016	18/10/2016	19/10/2016	✓
sTRH in Water (C10-C36) Silica Gel Clean	13/10/2016	18/10/2016	25/10/2016	✓
TRH ID (C10-C36)*	13/10/2016			✓
TRH Water(C10-C40) NEPM	12/10/2016	18/10/2016	19/10/2016	✓
	13/10/2016	18/10/2016	19/10/2016	✓
VOCs in water	12/10/2016	21/10/2016	21/10/2016	✓
vTRH(C6-C10)/BTEXN in Water	12/10/2016	21/10/2016	21/10/2016	✓

COMPLIANCE TO QC FREQUENCY (NEPM):

Internal laboratory QC rate complies with NEPM requirements (LCS/MB/MS 1 in 20, Duplicates 1 in 10 samples). Note, samples are batched together with other sample consignments in order to assign QC sample frequency.

	Evaluation
Duplicate(s) was performed as per NEPM frequency	✓
Laboratory Control Sample(s) was analysed with the samples received	✓
A Method Blank was performed with the samples received	✓
Matrix spike(s) was performed as per NEPM frequency	✓

Refer to Certificate of Analysis for all Quality Control data.

ADDITIONAL REPORT COMMENTS:

Total Cyanide and TKN analysed by Envirolab Sydney, report 155513.

SVOC: # Percent recovery low due to sample emulsification.

*Acid Extractable Metals in Soil:

^Compared to the Envirolab Reference library the closest match to sample GW2-product was diesel.

LBW | environmental projects

184 Magill Road, Norwood SA 5067
PO Box 225 Stepney SA 5069
P: 08 8331 2417 F: 08 8331 2415

E: admin@lbwenvironment.com.au
A'BN: 58 126 992 274

LABORATORY TESTING ORDER

Project Title : KIPT Smith Bay Baseline Assessment
Job Number : 150738-01
Project Manager: Brad Fitzgerald
Email: brad.fitzgerald@lbwep.com.au
Phone: 08 8331 2417
Results to: results@lbwenvironment.com.au
Invoice to: admin@lbwenvironment.com.au

Primary Laboratory: Envirolab
Laboratory Quote Ref: 16078SA
Secondary Laboratory:
Laboratory Quote Ref:

LBW | ep's COC REFERENCE (sample delivery group)	Turnaround Required
150738-01 LTO-1	Standard

	SAMPLE DETAILS			CHEMICAL TESTING REQUIRED												
	Date Sampled	Sample ID	Sample Matrix	Additional Information / Comments	NEPM OIL	Major Ions (Ca, K, Mg, Na, Cl, SO4, & alkalinity)	Nutrients (total nitrogen, nitrite, nitrate, ammonia, TKN and total P		TRH with silica gel clean up	metals - NEPM 13	Product I.D.						
1	12.10.2016	GW1	water		1	1	1										
2	13.10.2016	GW2	liquid				1		1	1							
3-	↓	GW2 - product	↓								1						

Envirolab Services
1a Dalmore Drive
Caribbean Park
Scoresby VIC 3179
Ph: (03) 9763 2500

Job No: 9476 - 17/10/16
Date Received:
Time Received: 10:00
Received by: MS
Temp: Cool/Ambient 14.5°C
Cooling: Ice/Icepack
Security: Intact/Broken/None

LBW | ep AUTHORISATION	LABORATORY RECEIPT	Additional Comments
Requested by: Brad Fitzgerald	Received by: M. SAAD	
Date\time requested: 17-Oct-16	Date\time received: 17/10/16 10:00	
Signature: Brad Fitzgerald	Signature:	

COC received 17/10/16

1 Dalmore Drive, Scoresby, Victoria 3179
tel: +61 3 9763 2500

email: melbourne@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Melbourne | ABN 37 112 535 645 - 002

CERTIFICATE OF ANALYSIS 9476-A

Client:
LBW Environmental Projects
184 Magill Road
Norwood
SA 5067

Attention: Brad Fitzgerald

Sample log in details:

Your Reference:	**150738-01 - KIPT Smith Bay Baseline Assessm.**
No. of samples:	2 Waters
Date samples received / completed instructions received	17/10/2016 / 27/10/2016

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: / Issue Date:	7/11/16 / 7/11/16
Date of Preliminary Report:	Not Issued

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

Chris De Luca
Senior Chemist

sTRH in Water (C10-C36) Silica Gel Clean		
Our Reference:	UNITS	9476-A-1
Your Reference	----------	GW1
Date Sampled	----------	12/10/2016
Type of sample		Water
Date extracted	-	18/10/2016
Date analysed	-	04/11/2016
TRHC$_{10}$ - C$_{14}$ (silica)	µg/L	<50
TRHC$_{15}$ - C$_{28}$ (silica)	µg/L	<100
TRHC$_{29}$ - C$_{36}$ (silica)	µg/L	<100
TRH>C$_{10}$ - C$_{16}$ (silica)	µg/L	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	µg/L	<50
TRH>C$_{16}$ - C$_{34}$ (silica)	µg/L	<100
TRH>C$_{34}$ - C$_{40}$ (silica)	µg/L	<100
Surrogate o-Terphenyl	%	65%

Method ID	Methodology Summary
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).

QUALITY CONTROL sTRH in Water (C10-C36) Silica Gel Clean	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			18/10/2016	[NT]	[NT]	LCS-1	04/11/2016
Date analysed	-			04/11/2016	[NT]	[NT]	LCS-1	04/11/2016
TRHC10 - C14 (silica)	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-1	87%
TRHC15 - C28 (silica)	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-1	80%
TRHC29 - C36 (silica)	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-1	90%
TRH>C10 - C16 (silica)	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-1	91%
TRH>C10 - C16 less Naphthalene (F2)	µg/L	50	Org-003	<50	[NT]	[NT]	[NR]	[NR]
TRH>C16 - C34 (silica)	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-1	99%
TRH>C34 - C40 (silica)	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-1	100%
Surrogate o-Terphenyl	%		Org-003	66	[NT]	[NT]	[NR]	[NR]

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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.

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 batched 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: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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www.envirolab.com.au

DATA QUALITY ASSESSMENT SUMMARY

Report Details	
Envirolab Report Reference	9476-A
Client ID	LBW Environmental Projects
Project Reference	150738-01 - KIPT Smith Bay Baseline Assessm.
Date Issued	07/11/2016

QC DATA:

All laboratory QC data was within the Envirolab Group's specifications

See Report 9476-A-[R00] for QA/QC details

HOLDING TIME COMPLIANCE EVALUATION:

The table below summarizes compliance with preservation / holding times (based on AS/APHA/ISO/NEPM/USEPA reference documents and standards):-

Analysis	*Date Sampled*	*Date Extracted*	*Date Analysed*	*Accept*
sTRH in Water (C10-C36) Silica Gel Clean	12/10/2016	18/10/2016	04/11/2016	✓

COMPLIANCE TO QC FREQUENCY (NEPM):

Internal laboratory QC rate complies with NEPM requirements (LCS/MB/MS 1 in 20, Duplicates 1 in 10 samples). Note, samples are batched together with other sample consignments in order to assign QC sample frequency.

	Evaluation
Duplicate(s) was performed as per NEPM frequency	✓
Laboratory Control Sample(s) was analysed with the samples received	✓
A Method Blank was performed with the samples received	✓
Matrix spike(s) was performed as per NEPM frequency	✓

Refer to Certificate of Analysis for all Quality Control data.

ADDITIONAL REPORT COMMENTS:

ENVIROLAB SERVICES

A division of Envirolab Group

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melbourne@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	LBW Environmental Projects
Attention	Brad Fitzgerald

Sample Login Details	
Your Reference	150738-01 - KIPT Smith Bay Baseline Assessm.
Envirolab Reference	**9476-A**
Date Sample Received	17/10/2016
Date Instructions Received	27/10/2016
Date Results Expected to be Reported	**07/11/2016**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	2 Waters
Turnaround Time Requested	Standard
Temperature on receipt (°C)	14.5C
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Pamela Adams	Analisa Mathrick
Phone: 03 9763 2500	Phone: 03 9763 2500
Fax: 03 9763 2633	Fax: 03 9763 2633
Email: padams@envirolab.com.au	Email: amathrick@envirolab.com.au

Sample and Testing Details on following page

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melbourne@envirolab.com.au
www.envirolab.com.au

Sample Id	*sTRH in Water (C10-C36) Silica Gel Clean*	*On Hold*
GW1	✓	
GW2		✓
GW2 (Product)		✓

9476-A

Marian Saad

From: Viviana Paradiso
Sent: Thursday, 27 October 2016 4:27 PM
To: MelbourneMailbox
Subject: FW: 9476 Silica Gel Clean-up

Please see request below.

Regards,

Viviana Paradiso | Customer Service Representative Adelaide | Envirolab Group

Great Chemistry, Great Service.

7a The Parade Norwood SA 5067
T 08 7087 6800 **F** 08 8362 1776 **M** 0427292399
vparadiso@envirolab.com.au | www.envirolab.com.au

Follow this link to provide feedback on our service.

Latest Links Below:

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

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From: Brad Fitzgerald [mailto:brad.fitzgerald@lbwep.com.au]
Sent: Thursday, 27 October 2016 3:53 PM
To: Adelaide Distribution
Cc: Alex Stenta
Subject: 9476 Silica Gel Clean-up

Hi,

#1

Can I please get a silica gel clean up on GW1 from report 9476?

Kind regards,
Brad

Brad Fitzgerald
Senior Environmental Consultant

LBW | environmental projects

184 Magill Road, Norwood SA 5067 | PO Box 225 Stepney SA 5069