Phase 2 Environmental Site Assessment, Smelter Site, Additional Investigations

Prepared for:
Hydro Aluminium Kurri Kurri Pty Ltd

Prepared by:
ENVIRON Australia Pty Ltd

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Acronyms and Abbreviations

ACM	Asbestos Containing Materials
AEC	Area of Environmental Concern
AHD	Australian Height Datum
ALS	Australian Laboratory Services
ASET	Australian Safer Environment and Technology Pty Ltd. (Laboratory)
ANZECC	Australian and New Zealand Environment and Conservation Council
B(a)P	Benzo(a)pyrene
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene & Xylenes (Monocyclic aromatic Hydrocarbons)
CN	Cyanide (total or free)
CT	Certificate of Title
DP	Deposited Plan
DQO	Data Quality Objective
EIL	Ecological Investigation Level
EPA	Environment Protection Authority
ESA	Environmental Site Assessment
Ha	Hectare
km	Kilometres
LOR	Limit of Reporting
m	Metres
MAH	Monocyclic Aromatic Hydrocarbons
Mercury	Inorganic mercury unless noted otherwise
Metals	As: Arsenic, Cd: Cadmium, Cr: Chromium, Cu: Copper, Fe: Iron, Ni: Nickel, Pb: Lead, Zn: Zinc, Hg: Mercury, Se: Selenium
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Litre
m BGL	Metres below ground level
mg/L	Micrograms per Litre
MW	Monitoring well
NATA	National Association of Testing Authorities
NC	Not Calculated
ND	Not Detected
NEHF	National Environmental Health Forum
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
n	Number of Samples
OCPs	Organochlorine Pesticides
OH&S	Occupational Health & Safety
OPPs	Organophosphorus Pesticides
PAEC	Potential Area of Environmental Concern
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PID	Photoionisation Detector
PQL	Practical Quantitation Limit
pH	a measure of acidity, hydrogen ion activity
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percent Difference
SILs	Soil Investigation Levels
SMF	Synthetic Mineral Fibre
SVOCs	Semi Volatile Organic Compounds
TPHs	Total Petroleum Hydrocarbons
UCL	Upper Confidence Limit
VENM	Virgin Excavated Natural Material
VOCs	Volatile Organic Compounds
µg/L	Micrograms per Litre
-	On tables is "not calculated", "no criteria" or "not applicable”

Executive Summary

ENVIRON Australia Pty Limited (ENVIRON) was commissioned by Hydro Aluminium Kurri Kurri Pty Limited (Hydro) to complete Stage 2 of a Phase 2 Environmental Site Assessment (ESA) at the Hydro Kurri Kurri Aluminium Smelter located of Hart Road, Loxford, New South Wales. The site incorporates 60ha of Smelter Site and approximately 2,000ha of surrounding buffer land and is hereinafter referred to as 'the site'. The initial Stage 1 phase of work was completed in November 2012. The objective of the Stage 2 investigations was to build upon the results of the Stage 1 in assessing the presence of contamination at the Smelter site and to assess the suitability of the site for the purposes of General Industrial (IN1), Heavy Industrial (IN3) and Environmental Conservation (E2) landuse.

The scope of work for the Stage 2 investigations includes the following:

- Review of previous investigations and identification of data gaps;
- Development of a Sampling, Analysis and Quality plan (SAQP);
- Soil sampling at five areas of environmental concern (AECs) identified from the Stage 1 investigations and five new potential areas of environmental concern (PAECs);
- The installation of seven new groundwater wells at three of the AECs;
- Groundwater sampling of the seven new and 17 existing wells;
- Laboratory analysis for soil and groundwater samples;
- Assessment of laboratory results against site criteria;
- Refinement of the conceptual site model (CSM);
- Identification of additional site investigation works to refine the CSM; and
- Assessment of areas requiring remediation.

The CSM assumed a future commercial/industrial site landuse, and considered off-site receptors in the down-hydraulic gradient area. The following complete source-pathway-receptor linkages were identified in the CSM:

- Inhalation of dust generated from surface soil impacts by current and future on-site commercial/industrial adult employees;
- Direct contact with impacted soil and groundwater by current and future on-site intrusive maintenance workers;
- Direct contact with impacted sediment by current and future on-site commercial/industrial employees.

In order to further refine the CSM, a number of targeted investigations are required to be performed at the West Surge Pond, the Sub-Stations and the Area East of the Clay Borrow Pit.

Based upon the source-pathway-receptor linkages identified in the refined CSM, surface soil and sediment remediation at the following AECs is required:

- Capped Waste Stockpile: This AEC has been assessed separately to this investigation;
- Anode Waste Pile: PAH contamination in surface soils to 0.2m bgs. Delineation and remediation of PAH hot spot at MW103;
- Diesel Spray Area: PAH contamination of fill material at 0.4m to 0.6m bgs. Delineation and remediation required;
- Drainage Lines: PAH contamination of sediments in drainage lines around the Capped Waste Stockpile and the Anode Waste Pile;
- East Surge Pond: PAH contamination of sediments;
- Carbon Plant: PAH contamination of shallow soils to 0.4m bgs in grassed areas and gardens beds at the western end of the Carbon Plant;
- Bake Furnace Scrubber: PAH contamination in shallow soils to 0.3m bgs in grassed areas below the scrubber duct work. Delineation of remediation of PAH hot spot at HA115; and
- Area east of the Playing Fields: Buried wastes to be remediated for aesthetic reasons. Delineation and remediation of PAH hot spot identified in south east corner at TP117.

Vertical delineation of the soil contamination at each AEC was completed as part of the Stage 2 investigations. The soil contamination identified is PAH (primarily benzo(a)pyrene) contamination in fill, which has not extended into the underlying alluvial sands and has not impacted groundwater. Lateral delineation of soil contamination has been completed to the extent practicable at this time given buildings, stockpiles, roads and services limit potential sampling locations. Lateral delineation of soil contamination and hot spots will be required at some AECs (e.g. Anode Waste Pile, Diesel Spray Area) prior to remediation.

ENVIRON recommends the preparation of a Remedial Action Plan (RAP) for the Smelter Site to develop remediation and validation plans for each of the seven AECs identified above. The Remediation Action Plan should be prepared in accordance with NSW EPA (2011) Guidelines for Consultants Reporting on Contaminated Sites. As remediation is likely to occur following or during the demolition of the buildings on the Smelter Site, the RAP should consider impacts to surface soils that may occur during demolition. Validation sampling programs for each area should consider contamination identified in this Phase 2 ESA, as well as additional contamination impacts to surface soils that may occur through demolition.

ENVIRON recommends a health risk assessment be completed to derive site-specific criterion for fluoride for maintenance and construction employees and assess the requirement for remediation of fluoride in groundwater beneath the Smelter Site.

Hydro has separately engaged an EPA-accredited Site Auditor to assess the appropriateness of the Remedial Action Plan and to assess if the site can be made suitable for the proposed landuse by implementation of the Remedial Action Plan. Following the completion of the remediation, the Site Auditor will provide a Site Audit Statement certifying that the site is suitable for the proposed use.

1 Introduction

1.1 Background

This report presents the findings of Stage 2 of a Phase 2 Environmental Site Assessment (ESA) which was performed at the former Hydro Kurri Kurri Aluminium Smelter located off Hart Road, Loxford, New South Wales (NSW). The site incorporates 60ha of Smelter Site and 2,000ha of surrounding buffer land and is hereinafter referred to as 'the site'. This report relates to the part of the site used for Smelter operations and ancillary land use in the immediate vicinity of the operations, herein referred to as 'the Smelter site' and defined as shown on Figure 2. Hydro owned land outside of the Smelter Site has been investigated under separate cover.

The work has been performed at the request of Mr Richard Brown, Hydro Aluminium Kurri Kurri Pty Limited (the 'Client') (Hydro).

1.2 Objectives and Scope of Work

The objective of Stage 2 of the Phase 2 ESA investigations is to build upon the results of Stage 1 completed in 2012, in assessing the presence of contamination at the Smelter site and to assess the suitability of the site for the purposes of General Industrial (IN1), Heavy Industrial (IN3) and Environmental Conservation (E2) landuse.

The scope of work for Stage 2 investigations includes the following:

- Review of the Stage 1 works, any subsequent information and identification of remaining data gaps;
- Development of a Sampling, Analysis and Quality plan (SAQP);
- Soil sampling and the installation of new groundwater wells;
- Groundwater sampling of new and existing wells;
- Laboratory analysis for soil and groundwater samples;
- Assessment of laboratory results against site criteria;
- Assessment of data quality and reliability;
- Refinement of the conceptual site model; and
- Assessment of areas requiring remediation.

1.3 Project Background

Hydro suspended operations at the Kurri Kurri Smelter in 2012 and following a two year period of care and maintenance, closure was announced in May 2014. Environmental investigations are being undertaken to understand remediation requirements at the site and the potential for land divestment.

The Kurri Kurri Smelter produced 180,000 tonnes of aluminium metal per annum. The smelter commenced production in 1969 with a single pot line. A second pot line was commissioned in 1979, and a third added in 1985. In 2002, Hydro undertook an upgrade program, which increased production capacity to 180,000 tonnes. The smelter is surrounded by a 2,000ha buffer zone, part of which is used for agricultural purposes.

1.4 Limitations

The scope of the Environmental Site Assessment was based on ENVIRON's proposal dated 2 June 2014.

Specific assumptions and limitations identified by ENVIRON as being relevant are set out in the report. The methodology and sources of information used by ENVIRON are outlined in our scope of work. ENVIRON has made no independent verification of this information beyond the agreed scope of works and assumes no responsibility for any inaccuracies or omissions made by others.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose.

2 Site Identification

2.1 Site Location

The site is located approximately 30km west of the town of Newcastle and 150km north of Sydney in New South Wales, Australia.

The site address is:

Hart Road
Loxford
New South Wales 2327
AUSTRALIA

The site includes a 60ha plant area ('the Smelter Site'), which is described by 10 different allotments, Lots 318, 319, 411, 412, 413, 414, 415, 769, 776 in DP 755231, and Lot 3 in DP 456769; and a 2,000ha land parcel, which includes a Buffer Zone around the Smelter Site and land owned by Hydro that is outside the Buffer Zone. The 2,000ha land parcel is described by approximately 75 different allotments.

This Phase 2 ESA is focused on the smelter site only. A location plan of the smelter site is provided in **Figure 1**. The boundary of the smelter site is shown in **Figure 2**. The layout of the smelter is shown in **Figure 3**.

3 Site History

3.1 General

The Smelter was built on previously undeveloped agricultural land. A Buffer Zone of land was purchased around the planned facility as required in the planning approval for the smelter.

The site was developed in 1969 by Alcan Australia Ltd., later Capral Aluminium, with pot-lines commissioned in 1969 (Line 1 – 120 cells; expanded in 1973 to 50,000 tonnes per annum), in 1979 (Line 2 – 120 cells), and in 1985 (Line 3 – 120 cells) for a final capacity of 170,000 tonnes per annum.

The site was purchased by VAW Aluminium in 2000, and became part of Hydro with the purchase of VAW Aluminium in 2001.

3.2 Zoning

3.2.1 Current

The site is currently zoned ‘RU2 Rural Landscape’ under the Cessnock Local Environmental Plan (LEP) 2011. The objectives of the RU2 Rural Landscape zoning are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base;
- To maintain the rural landscape character of the land;
- To provide for a range of compatible land uses, including extensive agriculture;
- To enable other forms of development that are associated with rural activity and require an isolated location or support tourism and recreation; and
- To ensure that the type and intensity of development is appropriate in relation to the rural capability and suitability of the land, the preservation of the agricultural, mineral and extractive production potential of the land, the rural environment (including scenic resources) and the costs of providing services and amenities.

It is noted the current site use is permissible under existing use rights as established within the NSW *Environmental Planning and Assessment Act 1979.*

3.2.2 Proposed Future Land Use

A Rezoning Masterplan (dwp Suters, December 2013) was developed in late 2013 which identifies potential future land uses at the smelter site and buffer zone. The potential future land use at the Smelter site is for the majority of the site to be rezoned General Industrial (IN1), a portion in the north-western corner to the rezoned Heavy Industrial (IN3) and for the remainder to be rezoned Environmental Conservation (E2).

The area to be rezoned General Industrial includes the footprint of the area that has been developed for the Smelter. The area to be rezoned Heavy Industrial includes the Clay Borrow Pit and access road to the west of the Smelter. The area to be rezoned

Environmental Conservation includes bushland immediately surrounding the Smelter footprint that has remained undeveloped aside from access tracks.

An application for rezoning of the land consistent with these uses is being prepared by others.

3.3 Landuse

The smelter site includes a plant area for the aluminium smelter, as shown in **Figure 3**. The majority of the smelter site is developed with buildings and associated hardstand areas. Areas adjacent to the buildings are predominately sealed with concrete or bitumen (car parks, roadways and turning areas). Established garden beds and grassed areas surround some buildings on the eastern portion of the Smelter Site.

The smelter site is accessed through one main entrance located on the southern boundary of the plant off Hart Road. The Smelter Site is currently maintained by a small team of Hydro employees.

The Smelter Site was originally developed in 1969 with the construction of one pot line and associated infrastructure. The plant was expanded in 1973 and again in1985 with the addition of two pot lines and the expansion of other infrastructure. The Smelter Site layout, as shown in **Figure 3**, is described as follows:

- Pot Lines 1, 2 and 3 are located on the western portion of the smelter. Alumina and cryolite were placed within pots and an electrical current applied. Molten aluminium was siphoned from each pot and taken to the Cast House;

- The Cast House is located immediately east of Pot Line 1 near the main entrance. The Cast House produced cast aluminium products to product specifications often including the addition of alloys. The Cast Houses utilised chlorine gas to avoid oxidation during the casting process. The gas was captured when the casting chamber is filled. Wastes from the Cast House included dross and swarf, which have a high aluminium content and were sent for recycling off-site;

- The Carbon Plant is located near the northern plant boundary to the east of the potlines. The Carbon Plant produced anodes from a mixture of coke, pitch and recycled anode butts to produce a green anode. This green anode was then baked within a bake furnace prior to the addition of a cast iron rod, and dispatched to the Pot Rooms. The bake furnace was gas fired however it was previously oil heated. Ancillary operations associated with the Carbon Plant include a liquid pitch tank, petroleum coke storage, the bake furnace scrubber, the rodding building, rodding mix storage building, baked anode storage; and

- A pot reconditioning area was located to the south of Pot Line 1. The pot reconditioning area contains one large building where pots were reconditioned for re-use.

Infrastructure and ancillary structures located within the Smelter Site include:

- A transformer yard and substation are located in the north western corner of the Smelter Site;

- Stormwater on the plant's paved areas is directed via conduits to either the West Surge Pond, which is located on the western boundary of the smelter or the East Surge Pond, which is located on the eastern boundary of the smelter. Surface water runoff from the carpark and administration areas is directed to the South Surge Pond. All ponds overflow to the North Dam, located to the north of the Carbon Plant;

- Smelter wastes including Spent Potlining was stockpiled on a low lying area of the smelter near the eastern plant boundary between 1969 and the early 1990s. The smelter waste mound (known as the Capped Waste Stockpile) was capped with clay in 1995. Since this time smelter wastes have been stockpiled separately or recycled. Spent potlinings are now stored in purpose-built sheds, of which there are ten located to the south of the Capped Waste Stockpile;

- A maintenance compound is located in the centre of the smelter, south of the Carbon Plant. The compound is used for maintenance activities as well as storage of equipment and spare parts;

- A diesel refuelling area is located in the centre of the smelter. The diesel refuelling area contains one above ground storage tank (AST) and a wash bay;

- A diesel spray area is located at the rear of the Carbon Plant on the northern smelter boundary, which was used to treat rust coatings from cathode rods prior to reuse; and

- Offices, a security gate house, canteen, two playing fields and a gym are located within the smelter site.

- Storage area west of Pot Lines

- The Clay Borrow Pit

- And vegetated area forming part of the buffer zone for the site

The infrastructure and ancillary structures described above are included on **Figure 3**. It is noted that the Smelter Site is currently in care and maintenance following closure of the site operations in May 2014.

3.4 Licences, Permits and Approvals

3.4.1 Planning Approvals

Three planning approvals have been granted at the site throughout the period of operations as follows:

- 5th November 1980: The Minister for Environment and Planning granted development approval for the proposed expansion of the Kurri Kurri Smelter by construction of a third pot line and associated production and support facilities. The approval includes 51 consent conditions relating to the upgrade and the operations at the site, including assessment of smelter emissions, monitoring of air, vegetation, native vegetation, vineyards, other cultivated vegetation, forage, rainwater, surface water, groundwater, water at Wentworth Swamp, native and feral animals, farm animals, bees and ecosystem monitoring.

- 11th January 1993: The Council of the City of Cessnock granted approval for the upgrade of waste storage facilities including capping of the Alcan Mound (Capped Waste Stockpile) and construction of above ground sheds for future storage of SPL. There are 37 consent conditions relating to the capping of the Alcan Mound (Capped Waste Stockpile) and construction of the storage sheds.

- 21st August 2002: The Minister for Planning granted approval for the installation of a Greenmix Plant scrubber, upgrade of the Anode Plant and upgrades to Pot Line 1. A series of consent conditions were included on this approval, including environmental performance requirements for air quality, dust emissions, discharge limits and water quality impacts.

3.4.2 Environmental Protection Licence

The Smelter Site operates under Licence EPL 1548 which licenced the carrying out of aluminium production >10,000 T and metal waste generation of >100 T generated or stored during the operation of the smelter. In August 2014, a variation was made to the licence and the scheduled activity under the licence is currently for waste storage.

A licence transfer was approved on 25 August 2000. Licence variations have been issued on 1 February 2002, 27 October 2004, 16 June 2011, 30 March 2012 and 18 August 2014. A search of the EPL on the Office of Environment and Heritage website indicates that non-compliance load based licencing data was received in annual returns from 2004 (total solid particles), 2008 (nitrogen oxides) and 2013 (clerical error).

3.5 Previous ENVIRON Investigations

ENVIRON has completed a number of investigations at the Kurri Kurri Aluminium Smelter since operations were suspended in 2012. These investigations included a historical review of the Smelter Site. Investigations completed by ENVIRON that are relevant to this investigation are outlined below.

3.5.1 Stage 1 of the Phase 2 ESA

ENVIRON completed Stage 1 of the staged Phase 2 ESA in 2012. Stage 1 included the following documents:

- ENVIRON (March 2012) 'Sampling, Analysis and Quality Plan, Kurri Kurri Aluminium Smelter'

- ENVIRON (1 November 2012) 'Phase 2 Environmental Site Assessment, Kurri Kurri Aluminium Smelter'

Stage 1 involved the following tasks:

- A desktop study, including a review of historical information and background data and a site walkover;

- The identification of 20 potential areas of concern and five potential contaminants of concern relating to the production of aluminium and the ancillary operations;
- The development of a SAQP to assess the potential areas and chemicals of concern;
- Field investigations, including the drilling of 31 boreholes, installation of 21 groundwater monitoring wells, collection of 45 surface soil samples, 14 sediment samples and 28 groundwater samples;
- Analysis of soil, groundwater and sediment samples for a range of potential contaminants of concern;
- The development of a conceptual site model including sources of contamination, receptors and pathways between the sources and receptors; and
- Recommendations for further investigations.

Note that these results are compared against the most relevant guidelines available in 2012, as follows:

- NSW DEC (2006) Guidelines for the NSW Site Auditor Scheme (Second Edition);
- NSW EPA (1994) Guidelines for Assessing Service Station Sites
- NEPC (1999) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM).

As the NEPM (1999) guidelines were updated in 2013, the 2012 soil results were re-assessed using the NEPM (2013) guidelines as part of this current investigation. Soil results from the 2012 investigation for all AECs compared against NEPM (2013) are included in **Appendix A**.

The Phase 2 ESA identified ten areas of concern that require further evaluation, as follows:

- AEC 1: Capped Waste Stockpile – soil and groundwater
- AEC 2: Anode Waste Pile - soil
- AEC 3: Refuelling Area - groundwater
- AEC 4: Diesel Spray Area - soil
- AEC 6: East Surge Pond - sediments
- AEC 8 Carbon Plant (western end only) - soil
- AEC 11: Washdown Bay – soil
- AEC12: Pot Lines - soil
- AEC15: West Surge Pond - sediments

- Groundwater beneath the Smelter Site.

3.5.2 Capped Waste Stockpile

Following the Phase 2 ESA, the Capped Waste Stockpile was notified as potentially contaminated land to the New South Wales Environment Protection Authority (EPA) under Section 60 of the Contaminated Land Management Act 1997. In response, the EPA requested further information regarding the contamination status of the notified area. ENVIRON completed an Environmental Site Assessment on the notified area in 2013, which included the following tasks:

- Review and collation of relevant historical information pertaining to the Capped Waste Stockpile and the surrounding leachate impact area;
- Field sampling of 14 groundwater monitoring wells;
- Completion of a pumping test to assess aquifer behaviour;
- Water quality sampling of 14 wells following pumping to assess variations in response to changes in the aquifer; and
- Completion of a report identifying known information, data gaps and recommendations for further investigations to address the data gaps.

The recommended further investigations were undertaken, including a Preliminary Screening Level human health risk assessment to identify guidelines for fluoride in soil and water at the site for human health; a Tier 2 ecological risk assessment to assess impacted from leachate migration on the local ecology; delineation of the plume using a combination of existing data and further field investigations and commencement of a quarterly monitoring regime to monitor the leachate plume.

The following documents were prepared for the Capped Waste Stockpile, noting the groundwater monitoring is currently on-going:

- ENVIRON (12 August 2012) ‘Section 60 Notification Supporting Information’
- ENVIRON (13 December 2012) ‘Environmental Site Assessment, Alcan Mound, Kurri Kurri Aluminium Smelter’
- ENVIRON (March 2013) ‘Tier 2 Ecological Risk Assessment, Kurri Kurri Aluminium Smelter’
- ENVIRON (2 April 2013) Preliminary Screening Level, Health Risk Assessment for Fluoride and Aluminium, Part of the Kurri Kurri Aluminium Smelter, Hart Road, Loxford’
- ENVIRON (11 October 2013) ‘Plume Delineation Report, Alcan Mound’

As the Capped Waste Stockpile is being assessed separately, it will not be included in this report.

3.5.3 Clay Borrow Pit

The Clay Borrow Pit was assessed as an AEC in the 2012 Phase 2 ESA. Historical records indicate the Clay Borrow Pit was the source of clay materials for capping of the Capped Waste Stockpile located on the eastern side of the Smelter Site and undertaken in the 1990’s. The resultant void was later filled with inert materials from the Smelter Site primarily comprising bake furnace refractory, concrete and asphalt. Filling has reinstated the excavation to ground level. Subsequent filling has resulted in above ground stockpiling of these smelter materials in this area.

Soil samples were analysed for hydrocarbons, heavy metals, fluoride, and a range of semi-volatile hydrocarbon including PAHs, pesticide, and chlorinated hydrocarbons. Groundwater samples were also analysed for hydrocarbons, heavy metals, fluoride, cyanide, and a range of semi-volatile hydrocarbon including PAHs, pesticide, and chlorinated hydrocarbons.

Sampling of the soil matrix identified slightly elevated fluoride concentrations but other potential contaminants were either below detectable limits or below guideline concentrations. However, the presence of fill represents an impact on visual amenity and safety risk to the proposed future industrial use of the property.

Evaluation of groundwater quality from within the in-filled borrow pit (MW05) found elevated concentrations of fluoride (15,000µg/L). The fluoride concentration, compared to a background concentration of 1000µg/L in MW06, is considered to be elevated.

Remediation of the Clay Borrow Pit is required to remove the aesthetic impact from the presence of these materials and to mitigate possible impacts to groundwater. ENVIRON completed a Remedial Action Work Plan (July 2014) for this Clay Borrow Pit Area.

3.5.4 Ecological Risk Assessment

A Tier 2 Ecological Risk Assessment was completed in March 2013 (2013a) as there are no ecological assessment guidelines in Australia for fluoride and aluminium. The ecological risk assessment included an assessment of surface water quality at sites upstream and downstream of the Smelter Site in relation to fluoride and aluminium. The ecological risk assessment identified that the fluoride and aluminium concentrations present at the Capped Waste Stockpile have not impacted on the aquatic species at the receptor point at Swamp Creek.

3.5.5 Health Risk Assessment

A Health Risk Assessment was completed in April 2013 (2013b) as there are no human health assessment guidelines in Australia for fluoride and aluminium. The human health risk assessment allowed for the development of site-specific preliminary guidelines for fluoride and aluminium concentrations in soils, groundwater and surface water at the Smelter Site. The site-specific preliminary guidelines have been used as part of this investigation and are outlined in **Sections 8.1** and **8.2**.

3.5.6 Phase 1 ESA

A Phase 1 ESA was completed in October 2013 (2013c) to identify any potential areas of concern that were not identified in the high level review completed as part of the 2012 Phase 2 ESA. The Phase 1 ESA included the following tasks:

- A review of historical reports relating to land use and operations at the Smelter Site and Buffer Zone to assess the potential for soil and groundwater or surface water contamination arising from historical and current uses;

- A review of published geological, hydrogeological and hydrological data associated with the Smelter Site and Buffer Zone to establish the environmental setting and sensitivity;

- Detailed review of historical aerial photographs from 1951 (earliest available aerial photo), 1957, 1961, 1966, 1975, 1978, 1987, 1994, 2001, 2006 and 2013;

- Detailed site walkover;

- Interview with Hydro Environmental Manager Mr Kerry McNaughton; and

- Review of previous investigations undertaken by ENVIRON and others.

An Environmental Issues Register was developed for both the Smelter Site and the Buffer Zone, detailing the development on each deposited plan and potential environmental issues relating to the development. The Phase 1 ESA did not identify additional issues as the Smelter Site and therefore the AECs listed in **Section 3.4.1** were recorded on the Environmental Issues Register.

4 Site Condition and Surrounding Environment

4.1 Topography

The Smelter Site is located between low residual hills to the west and low lying swampy land to the north and east. Low lying areas were filled to create a flat, elevated platform at approximately 14m AHD for construction. The Smelter Site is relatively flat with a gentle slope from west to east, from the plant area towards the surrounding water courses.

Surrounding the Smelter Site the landforms in the north and east comprises low-lying swamps, with many surface water drainage ponds and creeks, interspersed with topographical rises comprising residual soils. In the south and west, the landform is predominantly residual hills with gully formations draining to the north and east.

4.2 Boundary Conditions

The boundary of the Smelter Site is shown in **Figure 2**. The western, northern and southern boundaries are identifiable by roads or tracks, including the recently completed Hunter Expressway on the southern boundary of the Smelter Site. The majority of the eastern boundary is within bushland and is not easily identifiable on the ground.

The smelter plant within the Smelter Site is fully fenced. It is evident along the northern and eastern fenceline that the smelter is on higher ground than the surrounding Buffer Zone, indicating this area has been filled to create a level platform for the Smelter plant.

4.3 Visible Signs of Contamination

During site visits conducted by ENVIRON on 6 and 15 May 2014, visible signs of contamination were noted at the following areas:

- In the garden bed adjacent to the Butt Tunnel Sump in the south west corner of the Carbon Plant. Surface soils in the garden bed are discoloured black (see **Figure 7**);

- As staining on the external concrete surrounding two hydraulic rooms in the Carbon Plant (see **Figure 7**);

- As staining on the external concrete surrounding the Heating Transfer Medium (HTM) electric heater room and gas heater room in the Carbon Plant (see **Figure 7**);

- As staining on the external concrete surrounding hydraulic rooms in the Casting Plant; and

- Hydraulic oil on the floor of the Butt Crushing Plant (see **Figure 7**).

ENVIRON notes that the concrete floors of the hydraulic rooms are elevated compared to the surrounding ground level, and reportedly the concrete floors beneath the hydraulic rooms are thicker compared to other building structures.

4.4 Visible Signs of Plant Stress

During site visits conducted by ENVIRON throughout 2012, 2013 and 2014, visible signs of plant stress were observed down gradient of the Capped Waste Stockpile near the eastern site boundary, as shown in **Figure 2**. The plant stress is likely due to a perched fluoride and cyanide groundwater plume originating from the Capped Waste Stockpile which is being assessed separately to this investigation. Consequently, environmental issues associated with the Capped Waste Stockpile are not discussed further in this report.

4.5 Presence of Drums, Wastes and Fill Material

Drums were observed by ENVIRON at the drum store in the eastern portion of the Smelter Site on 15 May 2014. The drum store comprised empty 44 gallon drums of Castrol oil.

During the site visit, smelter wastes were observed at the Anode Waste Pile, where ahead of schedule anodes are stockpiled prior to disposal or reuse and at the Clay Borrow Pit, where refractory bricks and concrete are stockpiled. A second anode waste pile was also observed immediately east of Pot Line 1, where excess anodes have been stockpiled prior to disposal off-site since the closure of the smelter.

Stockpiles of various waste streams were observed on the storage area west of Pot Line 3 during the 2012 site walkover. It is noted that these stockpiles have since been recycled or disposed of and were not present during the recent investigations.

Fill material was observed to have been used to cap the Capped Waste Stockpile. Assessment of the Capped Waste Stockpile is being completed separately to this investigation and the Capped Waste Stockpile is not discussed further in this report.

4.6 Odours

No odours were noted at the Smelter Site during the investigations conducted between 23 June and 2 July 2014. It is noted that the smelter is no longer operational.

4.7 Conditions of Buildings and Roads

Roads at the Smelter Site were noted to be in good condition during the investigations undertaken between 23 June and 2 July 2014. The condition of buildings at the Smelter Site is gradually deteriorating due to a lack of use. Since operations ceased in 2012 and the smelter was put on a care and maintenance mode, rust has developed on the surface of scrubbers and other plant associated with the pot lines. Office buildings remain in good condition.

The care and maintenance team maintain the condition of the buildings at the Smelter Site.

4.8 Quality of Surface Water

There are five storage ponds located at the smelter as shown on **Figure 3**. Surface water from the smelter is directed to these storage ponds via open channels and some concrete subsurface drainage lines. Surface water ponds known as ‘East’, ‘West’ and ‘South’ are pumped to the North dams where excess surface water is discharged to an irrigation area under license from NSW Office of Environment and Heritage (EPL 1548). Surface water dams were constructed by excavation into the residual underlying extremely weathered bedrock.

Currently, an active leachate interception trench placed at the toe of the Capped Waste Stockpile is intercepting leachate from below the Capped Waste Stockpile and diverting it to the East Surge Pond. Further downgradient, a passive leachate interception trench intercepts groundwater following rain events and diverts this groundwater to the East Surge Pond. Surface water quality data from the East Surge Pond and North Dams are monitored for pH, fluoride and cyanide. Data from 2014 monitoring indicates that pH is neutral at 6.5 to 7 in both dams, fluoride concentrations have varied between 5.6mg/L and 20mg/L in the East Surge Pond and 14.8mg/L to 18mg/L in North Dam No. outlet to irrigation and free cyanide concentrations are generally less than the laboratory detection limit. These fluoride concentrations are elevated compared to background levels, which is likely due to the flow of stormwater past the Anode Waste Pile prior to pumping to the North Dam.

4.9 Flood Potential

The majority of the Smelter Site is located on low lying swampy ground that has been filled. Low lying areas of the site remain susceptible to flooding. The western portion of the Smelter Site is located on ground at a higher elevation and is less likely to flood.

The west, south and east surge ponds collect storm water runoff during rainfall events, which is then pumped to the two North Dams. The East Surge Pond has overflowed during periods of heavy rainfall, with storm water flowing east through the Buffer Zone.

4.10 Local Sensitive Environment

Sensitive environments including a creek and a wetland swamp are located in the vicinity of the Smelter Site.

Swamp Creek is located approximately 400m to the south and east of the Smelter Site, flowing in a northerly direction. Swamp Creek flows north into Wentworth Swamp, a large wetland located approximately 1.6km north of the Smelter Site. Swamp Creek is the receptor for groundwater from the eastern portion of the Smelter Site.

Black Waterholes Creek is located approximately 700m to the north of the Smelter Site, flowing in a northerly direction. Black Waterholes Creek flows north into the western portion of Wentworth Swamp. Black Waterholes Creek is the receptor for groundwater from the western portion of the Smelter Site.

Parts of the surrounding land comprising the Buffer Zone are also considered to contain sensitive environments such as the Kurri Kurri Sand Swamp Woodland and Lower Hunter Spotted Gum – Ironbark Forest endangered ecological communities, as well as Freshwater Wetlands on Coastal Floodplains, River-flat Eucalypt Forest on Coastal Floodplains and Central Hunter Ironbark-Spotted Gum-Grey Box Forest endangered ecological communities.

5 Geology and Hydrogeology

5.1 Geology

According to the review of the regional geology described on the Sydney Basin Geological Sheet, the Smelter Site and Buffer Zone are underlain by siltstone, marl and minor sandstone from the Permian aged Rutherford Formation (Dalwood Group) in the Sydney Basin.

The Sydney Basin is a sedimentary basin consisting of Permian and Triassic sedimentary rocks, which extends from Newcastle in the north to Batemans Bay in the south and to Lithgow, just west of the Blue Mountains. The basin overlies older basement rocks of the Lachlan Fold Belt. The sedimentary rocks of the basin generally consist of near horizontal sandstones and shales, with some recent igneous dykes. Only minor folding and faulting has occurred since these sedimentary rock sequences first formed. The Dalwood Group is stratigraphically located near the base of the Sydney Basin below both the Greta Coal Measures and Newcastle Coal Measures and was deposited in a marine environment.

Undifferentiated Quaternary alluvium occurs in the east and northeast in the Buffer Zone associated with surface water bodies. Quaternary sediments which are associated with Swamp Creek (located to the east of the site), Wentworth Swamps and the Hunter River consist of complex interbedded fluvial and marine sands and estuarine muds deposited within an estuarine environment during periods of sea level rise and fall.

5.2 Location and Extent of Fill

The smelter is located in low lying land that was filled to create a level area for the construction of the smelter. The fill material is generally understood to comprise locally derived fill. During the 2012 Phase 2 ESA investigations, crushed refractory brick fill was observed within fill material underlying the Carbon Plant and the Pot Lines.

Clay fill material from the Clay Borrow Pit in the western portion of the Smelter Site was used to cap the Capped Waste Stockpile in the eastern portion of the Smelter Site in 1996. The excavated portion of the Clay Borrow Pit was backfilled with refractory brick and concrete fill.

A portion of the Smelter Site between the north-western fenceline and the Clay Borrow Pit was also filled with material likely to include refractory bricks and concrete waste. This area was recently filled with excess Virgin Excavated Natural Material (VENM) from the construction of the Hunter Expressway immediately south of the Smelter Site.

5.3 Borehole Logs

Borehole logs are available for the impacted area down gradient of the Capped Waste Stockpile, which has been studied extensively in the past 20 years. This information has been reviewed and assessed separately to this report.

Aside from 2012 Phase 2 ESA completed by ENVIRON, borehole logs at the Smelter Site are limited to the area around the bake furnace at the Carbon Plant. Five geotechnical reports were completed by Douglas Partners Pty Ltd in May 1993, September 2001, August 2002, December 2002 and January 2003 in relation to the bake furnace reconstructions within the Carbon Plant.

Subsurface investigations were completed in the vicinity of the Carbon Plant, with boreholes generally extended to rock to assess suitability for pile foundations. The bake furnaces are contained within pits constructed below ground level with 1.8m of granular backfill below the base of the pit to provide thermal insulation to the underlying soil.

Conditions outlined in **Table 5.1** were encountered during subsurface investigations at the Carbon Plant, located in the north-eastern corner of the Smelter.

Table 5.1: Subsurface Conditions beneath the Carbon Plant

Depth	Lithology
0m to 2m	Fill, gravelly sand/ sandy gravel
2m to between 4.2m and 6.5m	Fill, gravel/ sandy gravel with a trace of some clay
4.2m to 6.5m	Gravelly sand, loose to dense
6.2m to 11.7m	Clay, hard to very stiff
11.6m to 17.4m	Sand, dense to medium dense
17.4m to >24m	Siltstone, low to very low strength at top

During the 2012 Phase 2 ESA, ENVIRON supervised the drilling of 52 boreholes across the Smelter Site. These boreholes extended to a maximum depth of 16m bgs. The subsurface conditions varied across the Smelter Site, but generally comprised fill material overlying estuarine sediments. The fill material, where encountered, generally comprised clayey gravelly sand and included gravel brick fragments. The estuarine sediments generally comprised fine grained sand, with high plasticity clay encountered in some boreholes.

5.4 On-site Wells

During the Phase 2 ESA, ENVIRON supervised the installation of 21 monitoring wells at the Smelter Site. The wells were installed at Potential Areas of Concern, including the Carbon Plant, the Diesel Spray Area, the Refuelling Area and the Anode Waste Pile.

Prior to the Phase 2 ESA, it is understood that a pair of shallow and deep nested wells were installed at the Carbon Plant as part of the geotechnical investigations for the bake furnace reconstructions.

5.5 Depth to Groundwater Table

Groundwater at the Smelter Site was identified at shallow depths within the estuarine sands, between 1m and 5m bgs during the 2012 Phase 2 ESA.

Groundwater at the Carbon Plant was generally not encountered during geotechnical drilling but standing water levels were measured following drilling at depths ranging between 8.8m and 9.4m. Douglas Partners (2002) noted that temperatures of up to 1000ºC were evident at the base of the bake furnace pits, where heat transfer was occurring through the filling and into natural ground. The 2001 Douglas Partners report indicated that soil temperatures of 100 ºC to 160 ºC at depths of up to 12m below slab level were encountered by Dames and Moore in 1977, with soils desiccated to depths of about 8m below slab level.

ENVIRON 2012, and previous investigations by others, identified a shallow sand aquifer extending from the surface to depths of up to 2.0m to the east of Capped Waste Stockpile. Groundwater seepage was observed down-gradient of this area towards the north east. Groundwater flows within the estuarine sands of up to 14m/year have been estimated. Groundwater with the estuarine sands is not used at the site and is not considered a suitable aquifer for use down-gradient of the Smelter Site.

5.6 Direction and Rate of Groundwater Flow

During the 2012 Phase 2 ESA, groundwater was identified flowing north to north east across the Smelter Site. Douglas Partners (2002) measured permeability within the fill of $5x10^{-6}$m/s and in the sand of $8x10^{-6}$m/s.

5.7 Direction of Surface Water Runoff

Stormwater water runoff is managed at the Smelter Site via a series of drainage channels and three surge ponds. Surge ponds discharge to the two North Dams, from which excess stormwater is spray irrigated over an adjacent paddock in accordance with EPL1548. There are no other surface water bodies located on the Smelter Site and therefore surface water at the Smelter Site has not been considered further.

Surface water receptors within the Buffer Zone are identified in **Section 4.10**. Groundwater near the eastern Smelter Site boundary exfiltrates to surface water following high rainfall events due to low lying topography in this area. This exfiltrated groundwater is observed to become overland flow discharging along a surface water flowpath to a small dam. During periods of high rain this surface water within this dam is able to flow through a culvert structure to a larger dam which discharges to Swamp Creek.

5.8 Background Water Quality

A background monitoring well was installed as part of the 2012 Phase 2 assessment. The well was installed approximately 60m west of the Smelter plant in undisturbed bushland in an upgradient location. Analysis of water from the background well in 2012 was completed and the results were below the adopted guidelines, including ANZECC (2000) 95% protection of fresh water species, irrigation and stock watering guidelines for heavy metals aside from zinc, fluoride, free cyanide, PAHs, Semi Volatile Organic Compounds (SVOCs). The zinc concentration (78µg/L) marginally exceeded the ANZECC (2000) hardness modified trigger value of 70µg/L.

5.9 Preferential Water Courses

The 1951 historical aerial photograph shows a former water course extending in a northeast/ southwest direction towards Wentworth Swamp in the west of the Smelter Site. It is understood this water course was filled in and relocated to the west to provide a level platform on which to construct Pot Lines 2 and 3.

5.10 Summary of Local Meteorology

A meteorological tower was constructed at the Smelter Site in the 1990s. Data from the meteorological tower is summarised in the 2012 Annual Environmental Management Report (AECOM 2013). AECOM (2013) includes wind speed and direction, presence or absence of inversion layers, calm conditions, rainfall and temperature.

Median, daily highest and lowest hourly average temperatures have been collected over the past 20 years. AECOM (2013) indicate that the 2012 temperatures were above average for summer days and nights.

AECOM (2013) indicates annual rainfall in 2012 was 515mm, which is below the 20 year average of 619mm.

AECOM (2013) indicates quarterly wind roses show the usual pattern of strongest winds from the northwest in winter, moderate winds from the south and southwest in spring and autumn and moderate to strong southeast winds in summer.

6 Sampling, Analysis and Quality Plan

6.1 Preparation of Sampling, Analysis and Quality Plan

A Sampling, Analysis and Quality Plan (SAQP) was completed by ENVIRON in May 2014 to develop sampling requirements for the additional investigations for the Phase 2 ESA. The SAQP included the following:

- Development of Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs);
- Development of the sampling plan, including:
  - Assessment of the Phase 2 ESA results against National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1);
  - A data gap analysis;
  - Identification of potential areas of concern;
  - The sampling program;
- An outline of soil and groundwater sampling methodologies and sample handling and preservation;
- Assessment criteria; and
- Reporting requirements.

A copy of the SAQP is included in **Appendix B**.

Following service location at the site, the sampling plan was amended to reflect the sampling locations that could be practicably completed. The amended sampling program for the identified areas of environmental concern (AECs) and potential areas of environmental concern (PAECs) is included in **Table 6.1**.

Table 6.1: Sampling Program for AECs and PAECs

No.	AEC/PAEC	Area (m^2)	Media to be Sampled	Type of Sampling	No. of Sample Locations	Targeted Depth/ Sample Depths	Laboratory Analysis
2	AEC: Anode Waste Pile	6,400	Soil	Stratified sampling around outside of stockpile for delineation of contamination	5	Surface soils to 0.5m, samples collected from 0-0.1m and 0.3-0.4m.	Fluoride, PAHs
			Groundwater	Judgemental down gradient sampling	2 existing wells 2 new wells	Groundwater between 4m and 7m.	PAHs
3	AEC: Refuelling Area	600	Groundwater	Down gradient sampling	2 existing wells 2 new wells	Groundwater between 4m and 7m.	TPH, PAHs
4	AEC: Diesel Spray Area	200	Soil	Stratified sampling to delineate contamination	4	Soils to 1m, samples collected from 0-0.1m, 0.4-0.5m, 0.8-0.9m	PAHs
6	AEC: East Surge Pond	4,400	Sediment	Due to sampling difficulties encountered during the Phase 2ESA, ENVIRON recommend sampling of sediments from the East Surge Pond once the sediments have been excavated and stockpiled.			
8	AEC: Carbon Plant (western end only)	96,000	Accessible soil	Grid-based sampling of accessible soils to delineate contamination	14	Surface soils to 0.5m, samples collected from 0-0.1m and 0.3-0.4m	PAHs
			Groundwater	Sampling around and within former Rodding	6 existing wells	Groundwater between 4m and 7m.	PAHs

Table 6.1: Sampling Program for AECs and PAECs

No.	AEC/PAEC	Area (m^2)	Media to be Sampled	Type of Sampling	No. of Sample Locations	Targeted Depth/ Sample Depths	Laboratory Analysis
				and Greenmix buildings	3 new wells		
11	AEC: Washdown Bay	900	Soil	Grid-based sampling to assess contamination	1	Surface soils to 0.5m, samples collected from 0-0.1m and 0.3-0.4m	Fluoride
12	AEC: Pot Lines 1, 2 and 3	180,950	Accessible soil	Stratified sampling where accessible to delineate contamination	11	Surface soils to 0.5m, samples collected from 0-0.1m and 0.1m-0.2m	Fluoride
15	West Surge Pond	4,875	Sediment	Due to sampling difficulties encountered during the Phase 2ESA, ENVIRON recommend sampling of sediments from the West Surge Pond once the sediments have been excavated and stockpiled.			
25	PAEC: Dry Scrubbers (4 separate locations between pot lines)	3,450 per location	Soil	Judgemental sampling to assess contamination	17, at least 4 per location	Surface soils to 0.5m, samples collected from 0-0.1m and 0.1m-0.2m	Fluoride
26	PAEC: Bake Furnace Scrubber	6,550	Soil	Grid-based sampling to assess contamination	10	Surface soils to 0.5m, samples collected from 0-0.1m and 0.3-0.4m	Fluoride, PAHs
27	PAEC: Substations	50 per substation	Soil	Due to health and safety issues with sampling in a live substation, ENVIRON recommends assessment of each substation following decommissioning.			

Table 6.1: Sampling Program for AECs and PAECs

No.	AEC/PAEC	Area (m^2)	Media to be Sampled	Type of Sampling	No. of Sample Locations	Targeted Depth/ Sample Depths	Laboratory Analysis
28	PAEC: Playing Fields (two adjacent)	8,100 per oval	Soil	Grid-based sampling to assess contamination	Western field: 10 locations; Eastern field: 6 locations.	Full depth of fill, samples to be collected within fill	Heavy Metals, PTH, BTEX, PAHs, fluoride
29	PAEC: Area East of Playing Fields	9,900	Soil	Grid-based sampling to assess contamination	11	Full depth of fill, samples to be collected within fill	Heavy Metals, PTH, BTEX, PAHs, fluoride
30	PAEC: Area east of Clay Borrow Pit	28,500	Soil	Due to ground works in this area, including the placement of Virgin Excavated Natural Material excavated from the construction of the Hunter Expressway, works could not be undertaken in this area.			
31	PAEC: Storage Area west of Pot Lines	44,000	Soil	Grid-based sampling to assess contamination	13	Surface soils to 0.5m, samples collected from surface, 0.1m, 0.15m and 0.2m and 0.4m	Heavy Metals, PTH, BTEX, PAHs, fluoride
32	PAEC: Garden beds	NA	Soil	As the majority of the accessible grassed areas were assessed under separate AECs/ PAECs including Pot Lines, Dry Scrubbers and Bake Furnace Scrubber, it was decided to assess garden beds in other areas away from these AECs/ PAECs following a review of soil results from this investigation.			

6.2 Data Quality Objectives and Data Quality Indicators

Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs) were developed by ENVIRON during the development of the SAQP using the US EPA seven-step DQO process. DQOs for the Phase 2 ESA are included in **Section 4** of the SAQP (**Appendix B**) and DQIs are included in **Section 6** of the SAQP (**Appendix B**).

6.3 Project Fieldwork Phase

6.3.1 Soil Sampling

A summary of the completed fieldwork for each PAEC is outlined in **Table 6.1.** The sampling locations were selected as follows:

- For AECs assessed in the 2012 Phase 2 ESA, soil sampling locations were selected to delineate the vertical and lateral extent of soil contamination. As the mechanism of soil contamination is from either aerial fallout or placement of smelter materials on the surface of the site, surface and near surface soils were targeted. These AECs included the Anode Waste Pile, the Refuelling Area, the Diesel Spray Area, the Carbon Plant, the Washdown Bay and the Pot Lines.

- For PAECs identified during the data gap analysis, soil sampling locations were selected to assess the potential for soil contamination in these areas, including vertical delineation. In areas where buried fill may be located, sampling locations were grid based and the vertical extent of the buried fill (where identified) was identified. These PAECs included the playing fields and area to the east and the storage area west of the pot lines. The other PAECs identified during the data gap analysis included the dry scrubbers at the Carbon Plant and the bake furnace scrubbers at the pot lines, which have the potential for surface soil contamination from aerial fallout. Surface and near surface soils were targeted in these areas.

- For AECs and PAECs that could not be assessed at the current time due to safety considerations, such as the substations and sediments in the stormwater ponds, recommendations have been made for assessment in the future.

- One PAEC, the area to the east of the Clay Borrow Pit, was in use for relocation of VENM from the Hunter Expressway at the time of these investigations. This area will remain a data gap until such time as it can be accessed for assessment.

- It was decided that investigation of PAEC 32, the garden beds, would be completed if required following receipt of the soil results from the current investigation.

- It is noted that sampling locations at the Smelter Site were limited by the location of underground services, overhead services and other site structures. Recommendations have been made where sampling was restricted for these reasons.

The sampling locations at each AEC and PAEC are shown in **Figures 4** to **13**. A description of the field methodologies for soil sampling is included in **Appendix C**.

6.3.2 Groundwater Monitoring Well Installation and Sampling

A summary of the fieldwork for AECs relating to groundwater are included in **Table 6.1**. New monitoring wells were installed at the following locations:

- AEC 2 Anode Waste Pile: Two additional wells were installed down gradient of the Anode Waste Pile to delineate the extent of PAH contamination identified in wells MW12 and MW13 during the 2012 Phase 2 ESA.

- AEC 3 Refuelling Area: Two additional wells were installed at the refuelling area to delineate petroleum hydrocarbon contamination identified in well MW08 during the 2012 Phase 2 ESA. One well was installed immediately down gradient of the diesel bowser and one well was installed down gradient of both MW08 and the bowser. The location of the second well was limited by underground electricity cables.

- AEC 8 Carbon Plant: Three additional wells were installed around the western end of the Carbon Plant to assess potential groundwater contamination in this area associated with processes undertaken at the Carbon Plant. One well was located close to the liquid pitch storage area, an area where a Heat Transfer Medium (HTM) oil spill occurred. One well was located within the Rodding Building down gradient of the butt crushing plant, which crushes anode butts for reuse. The bulk of the butt crushing plant is located within a concrete-cased subsurface pit and the machinery uses hydraulic oil. The third well was located on the down gradient side of the Carbon Plant to delineate any contamination identified in this area.

The new and existing monitoring wells were sampled, with the chemicals selected for analysis specific to each area as outlined in **Table 6.2**. A description of the field methodologies is included in **Appendix C**.

Table 6.2: Laboratory Analysis for Groundwater Samples

AEC	Monitoring Well IDs	Analysis
AEC2 Anode Waste Pile	2012 wells: MW12, MW13, New ells: MW103, MW104	PAHs, Heavy Metals, aluminium, fluoride
AEC3 Refuelling Area	2012 wells: MW07, MW08, New wells: MW101, MW102	TPH, Heavy Metals, aluminium, fluoride
AEC 4 Diesel Spray Area	2012 wells: MW19, MW20	PAHs, Heavy Metals, aluminium, fluoride
AEC 8 Carbon Plant (western end)	2012 wells: MW16, MW17, MW18, S3A, S3B New wells: MW105, MW106, MW107	PAHs, Heavy Metals, aluminium, fluoride
Remainder of site (background, Flammable Liquid Store Washbay and eastern end of Carbon Plant)	2012 wells: MW6, MW9, MW10, MW11, MW14, MW15,	Heavy Metals, aluminium, fluoride

7 Quality Assurance and Quality Control

The fieldwork program was undertaken in accordance with the DQOs and DQIs outlined in the SAQP (ENVIRON, 2014k), which is included in **Appendix B**.

A quality assurance assessment of the DQIs for this report is presented in **Appendix D**. An assessment was made of data completeness, comparability, representativeness, precision and accuracy based on field and laboratory considerations, as outlined in NEPC (2013), NSW DEC (2006) and NSW EPA (2007) guidelines.

Overall it is considered that the completed investigation works and the data obtained adequately complied with the DQOs stated in the SAQP and that the data is of suitable quality to meet the project objectives.

8 Basis for Assessment Criteria

8.1 Soil

The criteria proposed for the assessment of soil contamination were sourced from the following reference:

- National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM 2013).

The variation to the National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) was approved on 19 June 2013 by the NSWEPA under the *Contaminated Land Management Act 1997*. NEPM (2013) provide revised health-based soil investigation levels (HILs) and ecological-based investigation levels (EILs) for various land uses. The NEPM 2013 also introduces health-based and ecological screening levels and management limits for petroleum hydrocarbons (HSLs and ESLs). The levels have been derived from recent assessments that more accurately define the exposure mechanisms and risks from sites contaminated with petroleum hydrocarbons.

The guidelines adopted for the site from the NEPM are as follows:

- HIL D – Health investigation level for commercial/industrial such as shops, offices, factories and industrial sites. The HILs are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are generic to all soil types and apply generally to a depth of 3 m below the surface for industrial use.

  The NEPM (2013) commercial/industrial values were derived assuming a typical commercial or light industrial scenario, consisting of single or multistorey buildings where work areas are on the ground floor. NEPM (2013) assumed that the commercial/industrial facility is largely covered by handstand with some limited areas of unsurfaced ground (20% of site is unsurfaced). Opportunities for direct access to soil by employees was considered minimal but there is a potential for employees to inhale, ingest or come into direct contact with dust particles derived from the soil on the site. In absence of site specific details, the generic industrial site use exposure profiles are considered applicable.

- HSLs for commercial/industrial use - Health screening levels for soil vapour intrusion from petroleum hydrocarbons are guidelines that prevent accumulation of vapours at concentrations that may represent a health risk. The HSLs are derived for various depths and are for the same generic land uses as for the HILs. The guidelines are relevant were soils are beneath building or structures such as confined spaces;

- EIL for commercial/ industrial use – ecological investigations levels applicable for assessing risk to terrestrial ecosystems. EILs depend on specific soil physicochemical properties and generally apply to the top 2 m of soil.

- ESLs for commercial/ industrial use – ecological screening levels developed for selected petroleum hydrocarbon compounds and fractions and are applicable for assessing risk to terrestrial ecosystems. These are also generally applicable to the top 2m of soil.

- Management Limits where concentrations above these limits may indicate poor aesthetics, high odour and potentially explosive vapour. Management limits are to be applied after consideration of relevant ESLs and HSLs.

The applicable assessment criteria for heavy metals and PAHs in soil are presented in **Table 8.1**.

Table 8.1: Soil Assessment Criteria (mg/kg) – Health and Ecological Investigation Levels

	HIL D	EIL
Aluminium	NL(site-specific)3	-
Arsenic	3000	160
Cadmium	900	-
Chromium (VI)	3600	-
Chromium (III)	-	320 (1% clay)
Copper	240 000	210[1]
Lead	1500	1800
Nickel	6000	140[1]
Zinc	400 000	440[1]
Mercury (inorganic)	730	-
Fluoride	17,000 (site-specific)2	-
Cyanide (free)	1500	-
Carcinogenic PAHs (as BaP TEQ)	40	-
Total PAHs	4000	-
Naphthalene	-	370

1 EILs were calculated using the average CEC (7.26meq/100g), soil pH (5.5) and total organic carbon (1.3%) values from eight soil samples collected in the Buffer Zone during the March 2014 investigations (see Appendix E). The NEPM (2013) EIL calculator spreadsheet was used to generate the numbers and a site-specific ambient background concentration (ABC) was not included (rather a default ABC was used as calculated in the EIL calculator).

2. Site-specific industrial fluoride value calculated in the *Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium (ENVIRON 2013)*

3. NL: indicates that the site-specific risk-based aluminium screening criteria for industrial soil is a concentration greater than physically possible in soil, and therefore the criteria is defined as 'Non-Limiting' or NL (ENVIRON 2013).

The applicable assessment criteria for petroleum hydrocarbons in soil are presented in **Table 8.2** and **Table 8.3**:

Table 8.2: Soil Assessment Criteria for Vapour Intrusion - HSL D (mg/kg) - Sand

	0 to <1m	1m to <2m	2m to <4m	4m+
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	230	NL	NL	NL
Naphthalene	NL	NL	NL	NL
Benzene	3	3	3	3
F1(4)	260	370	630	NL

Table 8.2: Soil Assessment Criteria for Vapour Intrusion - HSL D (mg/kg) - Sand

	0 to <1m	1m to <2m	2m to <4m	4m+
F2(5)	NL	NL	NL	NL

1 The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

2 (For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

3 To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

4 To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Table 8.3: ESLs and Management Limits for Petroleum Hydrocarbons in Soil

TPH fraction	Soil texture	ESLs (mg/kg dry soil)	Management Limits[1] (mg/kg dry soil)
		Commercial and Industrial	Commercial and Industrial
F1 C6- C10	Fine	215*	800
F2 >C10-C16	Fine	170*	1000
F3 >C16-C34	Fine	2500	5000
F4 >C34-C40	Fine	6600	10 000
Benzene	Fine	95	-
Toluene	Fine	135	-
Ethylbenzene	Fine	185	-
Xylenes	Fine	95	-
Benzo(a)pyrene	Fine	72[5]	-

1 Management limits are applied after consideration of relevant ESLs and HSLs.

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

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

4 To obtain F1, subtract the sum of BTEX from C6-C10 fraction.

5 Benzo(a)pyrene ESL criteria from Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs) (Environmental and Human Health Effects) Scientific Criteria Document (revised)

NEPM (2013) includes a low reliability ecological screening criterion for benzo(a)pyrene of 1.4mg/kg for commercial/industrial land use. This criterion has been adopted from Environment Canada (1999) benzo(a)pyrene soil quality guideline, which is based on toxicity data for a single invertebrate species (an earthworm). Environment Canada revised their benzo(a)pyrene soil quality guideline in 2010 using the Species Sensitivity Distribution method, which is the preferred method for the derivation of ecological investigation levels and can only be used where sufficient toxicity data are available that adhere to rigorous quality control requirements. ENVIRON has elected to use the revised Environment Canada soil quality guideline of 72mg/kg, for commercial/industrial land use, as the most relevant ecological investigation level for benzo(a)pyrene at the Smelter Site as this guideline has been derived from a larger and more up-to-date toxicity database than the NEPM (2013) low reliability criterion.

NEPM (2013) do not provide criteria for fluoride in soils in Australia. Therefore, ENVIRON (2013) conducted a preliminary level Human Health Risk Assessment (HRA) specific to fluoride in order to derive a specific preliminary screening level for fluoride for the Hydro Aluminium Kurri Kurri Smelter . The screening levels are protective of the range of human receptors and are provided in **Table 8.4**.

Table 8.4: Site Specific Soil Assessment Guidelines for Fluoride (mg/kg)	
Preliminary screening levels	
Land Use	**Preliminary screening level**
Commercial/ industrial - soil	17,000mg/kg

Consistent with the guidance provided in the NEPM, the data was assessed against the above adopted site guidelines by:

- Comparing individual concentrations against the relevant guidelines and if discrete samples are in excess of the relevant guideline then;
- Comparing the 95% upper confidence limit of mean against the relevant guideline also ensuring that:
  - the standard deviation of the results is less than 50% of the relevant investigation or screening level, and
  - no single value exceeds 250% of the relevant investigation or screening level.

8.2 Groundwater

The assessment criteria proposed for the assessment of groundwater contamination are sourced from the following references:

- National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM 2013).
- National Health and Medical Research Council (2008) Guidelines for Managing Risks in Recreational Water.
- NSW DEC (2007) Guidelines for the Assessment and Management of Groundwater Contamination.
- ANZECC & ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

8.2.1 Potential Beneficial Uses

NSW DEC (2007) indicates that for assessing groundwater quality, it is first necessary to assess the beneficial uses of groundwater and surface water down gradient of the site.

Aside from the five stormwater storage ponds located at the site, the closest surface water receptor is a natural drainage area called Swamp Creek located to the north-east of the site within an area of the buffer zone used for farming. This drainage area discharges to the Hunter River approximately 15km north-east of the site near Maitland.

Surface water within Swamp Creek is described generally as neutral, ranging between pH 7.0 and 7.8 and conductivity was generally fresh, ranging from 626µS/cm to 1520µS/cm. This surface water body is considered to be a fresh water receptor.

Groundwater is expected to follow the topography and flow north-east towards surface water bodies that feed into the Hunter River.

According to the Office of Industry and Investment, NSW, there are 17 licensed groundwater abstractions (bores) located within the site, which are known to be associated with monitoring of groundwater impact. There are no other licensed groundwater bores within 2km of the site.

Potential beneficial uses of groundwater down gradient of the site include:

- Discharge into Swamp Creek, which supports aquatic ecosystems and potentially flows into the Hunter River;
- Recreational use of Swamp Creek for swimming and fishing; and
- Abstraction of water from Swamp Creek may also be used for stock watering and/ or irrigation.

8.2.2 Appropriate Criteria for Groundwater

Based on the review of potential beneficial uses of groundwater and surface water, the criteria for protection of aquatic ecosystems, recreation, irrigation and stock watering will be used.

The investigation levels presented in ANZECC & ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality are considered applicable for the protection of aquatic ecosystems of receiving waters. ANZECC (2000) advocates a site-specific approach to developing guideline trigger values based on factors such as local biological affects data and the current levels of disturbance of the ecosystem. The guidelines present ‘low risk trigger values’ which are defined as concentrations of key performance parameters below which there is a low risk of adverse biological effects. If these trigger values are exceeded, then further action is required which may include further site-specific investigations to assess potential contamination or management/ remedial action.

Low risk trigger values are presented in Table 3.4.1 of ANZECC (2000) for the protection of 80-99% of species in fresh and marine waters, with trigger values depending on the health of the receiving waters.

Groundwater results will be compared against trigger values for the protection of 95% of freshwater species where available (low reliability values are used in absence of high reliability values). ANZECC (2000) indicates there is currently insufficient data to derive a high reliability trigger value for TPH but propose a low reliability trigger value of 7µg/L. This guideline is considered by industry to be overly conservative and is well below the TPH detection limit that most laboratories can achieve. Therefore the limit of reporting (LOR) will be adopted as a screening trigger for TPH.

Trigger values for cadmium, chromium (III), copper, nickel, lead and zinc can be modified for water hardness in accordance with ANZECC (2000) methodology outlined in Section 3.4.3.2 and Table 3.4.3. The bioavailability of these heavy metals decreases with increasing hardness. Hardness ($CaCO_3$) was tested in up gradient wells at the Clay Borrow Pit during the 2012 Phase 2 ESA investigations, with results indicating 'extremely hard water' (>400mg/L $CaCO_3$) as defined by ANZECC (2000). The average hardness (as $CaCO_3$) reported in MW1, MW3 and MW4 in July 2012 up-gradient from the Clay Borrow Pit (387mg/L) was used to calculate the hardness modified trigger values for this report in accordance with the equations provided in Table 3.4.3 of ANZECC (2000).

Guidelines for Managing Risks in Recreational Water (2008) indicates that a qualitative assessment of recreational use can be undertaken using 10 times the concentrations of chemicals stipulated in the Australian Drinking Water Guidelines (2011). This is based on an assumed contribution for swimming equivalent to 10% of drinking water consumption.

Investigation levels for livestock drinking water are not available for organic contaminants, such a TPH and PAHs. In the absence of available investigation levels, human health drinking water levels will be used from NHMRC (2011) Australian Drinking Water Guidelines for screening criteria.

The ENVIRON (2013) Health Risk Assessment identified a preliminary screening criteria of 1,500µg/L for fluoride for recreational use. This guideline value has been adopted in this evaluation, as Swamp Creek, the closest surface water body, is used recreationally. The guideline that is protective of aquatic ecosystems has not been developed.

A summary of the assessment criteria for groundwater are provided in **Table 8.5**.

Table 8.5: Groundwater Assessment Criteria (µg/L)

Contaminant	95% Protection for Aquatic Ecosystems	Recreational use	Irrigation (long-term trigger value)	Stock Watering
Aluminium	55	9000 (site-specific)	5000	5000
Fluoride	-	1500 (site-specific)	1000	2000
Arsenic (AsIII)	24	100	100	500
Cadmium	2 (HMTV)	20	10	10
Chromium (CrIII)	27 (HMTV)	500 (as CrVI)	100	1000
Copper	12 (HMTV)	20,000	200	500
Lead	87 (HMTV)	100	2000	100

Table 8.5: Groundwater Assessment Criteria (μg/L)

Contaminant	95% Protection for Aquatic Ecosystems	Recreational use	Irrigation (long-term trigger value)	Stock Watering
Nickel	97 (HMTV)	200	200	1000
Zinc	70 (HMTV)	30,000	2000	20,000
Mercury	0.6	10	2	2
TPH C6-C36	LOR	-	LOR	LOR
Benzene	950	10	-	-
Toluene	180 (LR)	250	-	800 (25)
Ethylbenzene	80 (LR)	30	-	300 (3)
Xylene	200	200	-	600 (20)
Benzo(a)pyrene	0.2 (LR)	0.1	-	0.01
Naphthalene	16	-	-	-
Phenanthrene	2	-	-	-
Fluoroanthene	1	-	-	-
Cyanide (free)	7	800	-	-

Notes:
HMTV: hardness modified trigger values calculated in accordance with ANZECC (2000) methodology
LR: low reliability trigger values
Site-specific: fluoride and aluminium recreational values are site-specific and were calculated in the Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium (ENVIRON, 2013)

9 Results

The fieldwork program was undertaken in accordance with the DQOs and DQIs outlined in the SAQP (ENVIRON, 2014k). The results have been presented per AEC/ PAEC with the exception of fluoride results in soil, which are discussed in **Section 9.1**.

The borehole, test pit and hand auger logs are included in **Appendix F**. Laboratory reports for soil are included in **Appendix G**. Laboratory reports for groundwater are included in **Appendix H**.

9.1 Fluoride in Soil

Assessment of the potential for fluoride contamination in soil was undertaken at the following areas of concern:

- AEC 2 Anode Waste Pile (results in Table LR1);
- AEC 11 Washdown Bay (results in Table LR4);
- AEC 12 Pot Lines (results in Table LR5);
- PAEC 25 Dry Scrubbers (results in Table LR5);
- PAEC 26 Bake Furnace Scrubber (results in Table LR6);
- PAEC 28 Playing Fields (results in Table LR7);
- PAEC 29 Area East of the Playing Fields (results in Table LR8); and
- PAEC 31 Storage Area west of Pot Lines (results in Table LR9).

Assessment of the Anode Waste Pile, Carbon Plant, Washdown Bay and the Pot Lines in the 2012 Phase 2 ESA included analysis of total fluoride in soil. There are no national or state guidelines for the assessment of fluoride in soil. A literature review of international guidelines was completed for the 2012 Phase 2 ESA and a criterion of 2000mg/kg was used for fluoride for that investigation. The 2012 Phase 2 ESA recommended undertaking a human health risk assessment to determine a site-specific guideline for fluoride.

The risk assessment was completed in 2013 (ENVIRON (April 2013) *Preliminary Screening Level, Health Risk Assessment for Fluoride and Aluminium, Part of the Kurri Kurri Aluminium Smelter, Hart Road, Loxford*) and provided a guideline for fluoride of 17,000mg/kg for industrial landuse. This guideline is based on soluble fluoride, not total fluoride. As such, analysis of soluble fluoride was completed for the current investigation.

Soluble fluoride concentrations at the AECs assessed during this current investigation are considerably lower than total fluoride results reported in the 2012 Phase 2 ESA. The Health Risk Assessment (ENVIRON 2013) indicates that fluoride salts are strongly sorbed to soil, which explains why the soluble fluoride concentrations are considerably lower than total fluoride concentrations.

Soluble fluoride concentrations at the AECs and PAECs assessed during this investigation are below the site specific guideline of 17,000mg/kg.

9.2 AEC 2 Anode Waste Pile

9.2.1 Soil

Soil results for the Anode Waste Pile from the 2012 Phase 2 ESA and the current investigations are included in **Table LR1**. Soil results from the 2012 Phase 2 ESA indicated there are PAHs in soil at the Anode Waste Pile that exceed the NEPM (2013) HIL D criteria for benzo(a)pyrene TEQ. Five additional soil sampling locations were completed in the recent investigations to assess the nature and extent of the PAHs in soil.

Soil results from the additional investigations identified PAHs exceeding the NEPM (2013) HIL D criteria at two sampling locations, SB105 and MW103. Both soil locations comprised crushed anodes in fill material, which is the likely origin of the PAHs.

Sampling locations at the Anode Waste Pile were limited to accessible areas between anode stockpiles where concrete had not been used as a base to the anode stockpile. Concrete was observed to have been used beneath the majority of the area comprising the Anode Waste Pile, with limited directly accessible ground.

The shallow fill material (0-0.2m bgs) comprised benzo(a)pyrene TEQ concentrations exceeding the NEPM (2013) HIL D criteria (40mg/kg), with a 95% Upper Confidence Limit (UCL) of 48mg/kg.

Deeper fill material (0.2-0.6m bgs) comprised benzo(a)pyrene TEQ concentrations below the NEPM (2013) HIL D criteria, aside from at one location (MW103) which is considered to be a 'hot spot' of contamination.

Based on the laboratory results, shallow fill material has been impacted by PAHs associated with the stockpiling of ahead of schedule anodes at the Anode Waste Pile. Sampling undertaken to date shows that deeper fill material has not been impacted, aside from one location on the northern boundary.

9.2.2 Groundwater

Groundwater results for the Anode Waste Pile from the 2012 Phase 2 ESA and the current investigations are included in **Table LR10**. Groundwater results from the 2012 Phase 2 ESA indicated there were PAHs (fluoranthene and benzo(a)pyrene) in groundwater at concentrations exceeding the ANZECC (2000) low reliability guidelines for protection of fresh water species . Two additional wells were installed across (MW103) and down gradient (MW104) of the existing wells.

In the July 2014 sampling event, PAH concentrations in groundwater at the new and existing wells around the Anode Waste Pile were below the ANZECC (2000) guidelines for 95% protection of fresh water species.

Elevated fluoride and aluminium concentrations were detected at the Anode Waste Pile (MW13: F 40,000µg/L, Al 2,500µg/L; MW103: F 12,000µg/L, Al 7,700µg/L; MW104: F 13,000µg/L, Al 1,300µg/L. Groundwater concentrations are discussed further in **Section 9.10.**

9.3 AEC 3 Refuelling Area

9.3.1 Soil

No soil samples were collected in AEC 3 during this current investigation and the 2012 ESA fieldworks. The refueling area has always been surfaced and fuel infrastructure, including the diesel storage tank, bowser and connecting pipework are above ground. The extent of impacts from the refueling area are therefore best understood by assessing impacts to groundwater.

9.3.2 Groundwater

Groundwater results for the Refuelling Area from the 2012 Phase 2 ESA and the current investigations are included in **Table LR10**. Groundwater results from the 2012 Phase 2 ESA indicated there were C_{15}-C_{28} petroleum hydrocarbons in groundwater close to the Refuelling Area. Two additional groundwater monitoring wells were installed during the recent investigations to assess the extent of the petroleum hydrocarbons in groundwater down gradient of the Refuelling Area.

One new monitoring well, MW101, was located immediately down gradient of the diesel bowser. The other new monitoring well, MW102, was located approximately 8m down gradient of the existing monitoring well MW08. This well could not be located any further away from MW08 due to extensive underground services in the roadway and the location of buildings in this area.

Petroleum hydrocarbon concentrations in groundwater at the existing and new wells are generally below the laboratory limit of reporting, aside from minor TPH C_6-C_9 concentrations (18µg/L) adjacent to the bowser. These concentrations indicate that contamination of groundwater has not occurred from the activities and infrastructure at the refuelling area.

The lack of petroleum hydrocarbons in groundwater down gradient of the Refuelling Area indicates hydrocarbon groundwater contamination issues associated with this area have not been identified.

Fluoride concentrations in three of the four wells and aluminium concentrations in one of the wells exceed the adopted criteria. The elevated fluoride and aluminium concentrations are not associated with any specific activities at the Refuelling Area and are representative of fluoride and aluminium concentrations in groundwater beneath the smelter. Further assessment is included in **Section 9.10**.

9.4 AEC 4 Diesel Spray Area

9.4.1 Soil

Soil results for the Diesel Spray Area from the 2012 Phase 2 ESA and the current investigations are included in **Table LR2**. Soil results from the 2012 Phase 2 ESA indicated there are PAHs in soil at the Diesel Spray Area that exceed the NEPM (2013) HIL D criteria for benzo(a)pyrene TEQ.

Four additional sampling locations were completed in the recent investigations to assess the extent of the PAHs in soil in this area. Results from the current investigation indicate concentrations of PAHs at one location (SB112) at a depth of approximately 0.5m bgs exceed the NEPM (2013) HIL D criteria for benzo(a)pyrene TEQ (40mg/kg).

Of the three locations with PAH concentrations exceeding the criteria, PAH concentrations in borehole MW19 (150.2mg/kg) are more than 2.5 times the guideline and this result is considered a ‘hot spot’ of contamination.

The 95% Upper Confidence Limit (UCL) of the mean for BaP TEQ concentrations (excluding the hot spot concentration) is 84.6mg/kg, which exceeds the guideline. As such, this area is considered to be contaminated with PAHs at a concentration that requires remediation.

The PAH contamination is likely to be associated with black sandy material identified during the field investigations. It is likely that PAH contaminated fill material was used to fill this area prior to the development of the Diesel Spray Area. It is noted that the PAH contamination is limited to the black sandy fill material and has not impacted other fill materials or the underlying alluvial sands. The PAH contamination has also not impacted groundwater. The vertical extent of the black sandy fill material is between 0.4m and 0.8m bgs, as noted in the borehole logs for this AEC. The lateral extent of the PAH contamination requires further delineation.

9.4.2 Groundwater

Groundwater results for the Diesel Spray Area from the 2012 Phase 2 ESA and the current investigations are included in **Table LR10**. During the 2012 Phase 2 ESA groundwater was analysed for TPH and PAHs, with results below the adopted guidelines. During the current Phase 2 ESA groundwater was analysed for heavy metals, with results below the adopted guidelines except for aluminium concentrations in MW20. Further assessment is included in **Section 9.10**.

9.5 AEC 8 Carbon Plant

9.5.1 Soil

Soil results for the Carbon Plant from the 2012 Phase 2 ESA and the current investigations are included in **Table LR3**. Soil results from the 2012 Phase 2 ESA identified PAHs in shallow soil at a sampling location (MW18) at the western end of the Carbon Plant that exceed the NEPM (2013) HIL D criteria for benzo(a)pyrene TEQ. Thirteen additional soil sampling locations were completed in the recent investigations to assess the extent of the PAHs in soil around the western end of the Carbon Plant.

It is noted that borehole MW18 was located in a garden bed adjacent to the butt tunnel sump that was used to collect anode butts prior to reprocessing. Black stained soils were evident in the garden bed, with the source of the contamination likely to be the deposition of carbon dust from the adjacent butt tunnel sump.

Soil results from the western end of the Carbon Plant identified PAH contamination in shallow soil in three grassed areas near the location of MW18. The benzo(a)pyrene TEQ concentrations at one location, HA107 (140mg/kg at 0.1m bgs and 260mg/kg at 0.2m bgs) were more than 2.5 times the adopted soil guideline and these results are considered a ‘hot spot’ of contamination.

Aside from the hot spot, the 95% UCL for benzo(a)pyrene TEQ in grassed areas is 47.3mg/kg, which exceeds the NEPM (2013) HIL D criteria. It is noted that PAH concentrations in grassed areas were elevated compared to areas surfaced with bitumen, further indicating that the mechanism of contamination is from aerial deposition primarily from the Carbon Plant. The analytical soil data indicates that PAH contamination impacts are localised to shallow surface soils and have not impacted soils at depth.

9.5.2 Groundwater

Groundwater results for the Carbon Plant from the 2012 Phase 2 ESA and the current investigations are included in **Tables LR10 and LR11**. Groundwater results from the 2012 Phase 2 ESA indicated there were PAHs (anthracene and benzo(a)pyrene), aluminium and fluoride in groundwater at concentrations exceeding the site criteria near the liquid pitch storage area. Anthracene and benzo(a)pyrene exceeded ANZECC (2000) low reliability trigger values for the protection of 95% of fresh water species. ANZECC (2000) indicates low reliability trigger values should not be used as default guidelines although it is reasonable to use them in the risk-based decision scheme to determine if conditions at the site increase the potential risk.

Two additional wells were installed to target other areas of the Carbon Plant with the potential to have PAH impacts to groundwater, including the Heat Transfer Medium (HTM) oil system (MW105) and the butt crushing plant (MW107). A down gradient monitoring well (MW106) was also installed on the northern side of the Carbon Plant.

PAH concentrations in groundwater at the new and existing wells around the Carbon Plant were below the ANZECC (2000) guidelines for 95% protection of fresh water species. Based on the results of the two rounds of sampling, it is considered that the concentrations of PAHs in groundwater are not significant enough to warrant further investigation.

Fluoride and aluminium were detected at concentrations exceeding the site criteria around the Carbon Plant. The highest concentrations were around the Butt Crushing Plant, which is used to recycle anode butts. Further assessment is included in **Section 9.10**.

9.6 PAEC 26 Bake Furnace Scrubber

9.6.1 Soil

Soil results for the Bake Furnace Scrubber from the current investigations are included in **Table LR6**. Sampling of sediments within a drain near the Bake Furnace Scrubber (D9) was completed during the 2012 Phase 2 ESA. Soil sampling was completed at 10 locations in grassed areas around the Bake Furnace Scrubber to assess the potential for PAH contamination in this area.

Soil results identified PAHs at concentrations exceeding the NEPM (2013) HIL D criteria for benzo(a)pyrene TEQ at three locations, HA115, HA116 and HA117. Two of the concentrations (440mg/kg at HA115 and 120mg/kg at HA117) are more than 2.5 times the guideline (40mg/kg) and these results are considered ‘hot spots’ of contamination.

At HA115, the elevated PAHs were identified in surface soils comprising black ash/ gravel material, likely spilt Ring Furnace Reacted Alumina, which contains unburnt coal tar pitch. This material was not vertically delineated at this location due to limitations with the method of sampling (hand augering). Vertical and lateral delineation of this material is required.

At HA116 and HA117, the elevated PAHs were identified in brown silty sand fill material. This material has been vertically delineated to a depth of 0.3m bgs during this current investigation and the soil data indicates that PAHs have not impacted underlying fill materials. Laterally, this material is considered to be confined to the grassed areas in which the soil samples were located, which were below the scrubber duct work.

9.6.2 Groundwater

No groundwater samples were collected in PAEC 26 during this current investigation or the 2012 ESA field works. It is noted that a down gradient well (MW20) indicates the PAHs in shallow soil have not impacted groundwater.

9.7 PAEC 28 Playing Fields

9.7.1 Soil

Soil results for the Playing Fields from the current investigations are included in **Table LR7**. No sampling was completed at the Playing Fields during the 2012 Phase 2 ESA. Soil sampling was completed at 16 locations during the current investigation to assess the potential for buried fill material in this area.

Fill material was identified within two (TP111 and TP116) of the 16 test pits, which were located in a grid pattern across the two Playing Fields. Fill in TP111 comprised silty clay with some house bricks. Two additional test pits were excavated close by, with one house brick found in one of the pits. The bricks were limited to this area. Fill in TP116 comprised a black slag-like fill material used as bedding sand for a PVC irrigation pipe. This fill was not identified in other test pits and is likely confined to the locations of the irrigation pipes. This material was confirmed to be quarry crusher dust by the Hydro Environment Manager, Mr McNaughton.

As limited fill material was identified, analysis was completed on soil samples from seven of the 16 sampling locations, including the fill identified at both TP111 (house bricks) and TP116 (quarry crusher dust used as bedding sand for irrigation pipes (logged as slag)). Concentrations of petroleum hydrocarbon, PAHs and soluble fluoride were below the NEPM (2013) HIL D criteria, indicating there are no soil contamination issues relating to these compounds in this area.

Lead was detected in the sample of quarry crusher dust from TP116 at a concentration of 1600mg/kg, marginally exceeding the NEPM (2013) HIL D criteria of 1500mg/kg. Copper and zinc were detected in this same sample at concentrations exceeding the NEPM (2013) EIL criteria. The surface soils were observed to comprise black quarry crusher dust used as bedding sand for a PVC irrigation pipe. Given the quarry crusher dust is confined to the locations of the irrigation pipes and has not impacted on grass growth at the playing fields, the elevated copper and zinc concentrations are not considered to require further assessment. The lead concentration is considered to be natural to this material and given that a small volume of quarry crusher dust has been used in the drainage lines, further consideration of this material is also not required.

9.7.2 Groundwater

No groundwater samples were collected in PAEC 28 during this current investigation or the 2012 ESA field works.

9.8 PAEC 29 Area East of Playing Fields

9.8.1 Soil

Soil results from the area east of the Playing Fields are included in **Table LR8**. No sampling was completed in this area during the 2012 Phase 2 ESA. Soil sampling was completed at 10 locations during the current investigation to assess the potential for buried fill in this area.

Fill material was identified in nine of the 10 test pit locations, varying in depth from 1.0m to 1.6m. The fill material comprised wastes such as concrete pieces, refractory brick, metal sheeting, metal reinforcement, plastic sheeting, timber, fence posts, broken glass, electrical wire, steel posts and old cable.

Concentrations of heavy metals, soluble fluoride and petroleum hydrocarbons were below the NEPM (2013) HIL D criteria. PAHs were identified in one soil sample from TP117 at a concentration of 310mg/kg, exceeding the NEPM (2013) HIL D criteria for benzo(a)pyrene TEQ. As this concentration is more than 2.5 times the guideline, it is considered a ‘hot spot’ of contamination.

It is noted that the presence of smelter wastes represents an impact on visual amenity and safety risk to the proposed future commercial/ industrial use of the property.

9.8.2 Groundwater

No groundwater samples were collected in PAEC 29 during this current investigation or the 2012 ESA field works.

9.9 PAEC 31 Storage Area West of Pot Line 3

9.9.1 Soil

Soil results for the Storage Area west of Pot Line 3 are included in **Table LR9**. No sampling was completed in this area during the 2012 Phase 2 ESA. Soil sampling was completed at 13 locations during the current investigation to assess the potential for buried fill in this area.

Minor fill material was identified within 400mm of the site surface across this area, generally comprising gravelly material with minor inclusions of aluminium scrap, metal reinforcement, timber and metal scrap.

Concentrations of heavy metals, soluble fluoride, petroleum hydrocarbons and PAHs were below the NEPM (2013) commercial/ industrial criteria, indicating there are no soil contamination issues in this area.

9.10 Site-Wide Assessment of Groundwater

Groundwater results for the site are included in **Tables LR10 and LR11**. During the 2012 Phase 2 ESA, groundwater wells were installed at identified PAECs to assess the potential for groundwater contamination. In addition, one background well (MW06) was installed during the Phase 2 ESA fieldworks which is located off a fire access trail to the south west of the Smelter Site.

During the current investigation, additional wells were installed to further characterise potential groundwater contamination identified in 2012 at the Refuelling Area, the Carbon Plant and the Anode Waste Pile. Results relating to these areas are discussed above.

A second round of groundwater analysis was completed at seven wells installed across the Smelter Site (at locations including the Diesel Spray Area (MW19 and MW20), Flammable Liquid Store (MW9 and MW10), the Washbay (MW11) and the eastern end of the Carbon Plant (MW14 and MW15)) during the current investigation, with analysis for heavy metals, aluminium and fluoride.

Aluminium was detected at the majority of wells at the Smelter Site at concentrations exceeding the ANZECC (2000) guidelines for 95% protection of fresh water species. The aluminium concentration in the background well (MW06, 180µg/L) exceeded the ANZECC (2000) guideline of 55µg/L in the current sampling round. Aluminium concentrations across the Smelter Site vary between <10µg/L and 5000µg/L. Source related impacts appear to have occurred beneath the Anode Waste Pile and at the Carbon Plant, where consistently higher aluminium concentrations were identified. Aluminium concentrations in two of the three down gradient monitoring wells, including MW15 near the eastern boundary and MW106 near the northern boundary, were at similar concentrations to water in the background well. Concentrations in MW20, near the northern boundary, were elevated above background at 1500µg/L.

Fluoride was detected at the majority of wells at the Smelter Site at concentrations exceeding the ENVIRON (2013) site-specific preliminary irrigation (1mg/L), recreational (1.5mg/L) and/or stock watering (2mg/L) guidelines. The highest fluoride concentrations (40mg/L) were detected in groundwater beneath the Anode Waste Pile are likely due to the storage of anodes in this area. High fluoride concentrations were also detected at the western end of the Carbon Plant in MW18. It is noted that fluoride concentrations in this well have reduced from 35mg/L in 2012 to 17mg/L in 2014, indicating the removal of the fluoride source (the recycling of anode butts in this area) has resulted in a reduction of fluoride in groundwater. Longer term monitoring would be required to confirm this trend.

Zinc was identified in the background well (MW06) and at the Anode Waste Pile (MW103) at concentrations exceeding the ANZECC (2000) hardness modified trigger value. Given zinc concentrations across the remainder of the Smelter Site are below the trigger value and up gradient concentrations are elevated, further assessment of zinc in groundwater at the Smelter Site is not required.

It is noted that elevated heavy metal concentrations were identified in 2012 at well MW12 beneath the Anode Waste Pile. These results appear to be anomalous, with results from the current investigation an order of magnitude lower and consistent with results from other wells in this area.

10 Site Characterisation

10.1 Conceptual Site Model

A conceptual site model (CSM) is a site-specific qualitative description of the source(s) of contamination, the pathway(s) by which contaminants may migrate through the environmental media, and the populations (human or ecological) that may potentially be exposed. This relationship is commonly known as a Source-Pathway-Receptor (SPR) linkage. Where one or more elements of the SPR linkage are missing, the exposure pathway is considered to be incomplete and no further assessment is required.

Following field investigations and an assessment of the laboratory results, ENVIRON developed a preliminary CSM in the 2012 Phase 2 ESA report. This CSM has been updated following the results of the current investigation and is described below.

10.1.1 Contamination Sources

The ‘contaminant source’ is identified by comparison of observed chemical(s) of potential concern (CoPC) concentrations in the media of concern (soil, groundwater) at the site against the adopted screening criteria for this site (refer to **Section 8**). A potential ‘source’ is identified when the CoPC concentration is reported to be present in the environmental media at the site above assessment criteria which have been derived based on human health and ecological protection.

The soil impacts detected on the Smelter Site are primarily associated with PAH impacts, in particular benzo(a)pyrene in shallow soil. Fluoride concentrations are not considered to be a contaminant source, as fluoride salts are strongly sorbed to soil and are not bio-available, with soluble fluoride concentrations below the site-specific criteria.

A summary of the soil contamination detected on the Smelter Site is provided in **Table 10.1** below.

It is noted that the Capped Waste Stockpile and Clay Borrow Pit have not been included in **Table 10.1** as this AEC has been assessed separately to this investigation.

Table 10.1: Summary of Site Soil Contamination

Site Activity	Site Area	Description	Impacts in Soil	Depth of Soil Impact (m bgs)
Waste stockpiling	Anode Waste Pile (AEC 2)	Long term stockpiling of ‘ahead of schedule anodes’ in low lying ground adjacent to the Capped Waste Stockpile.	BaP	0-0.2, fill extends to 0.9
Burial of Waste	Area East of Playing Fields (PAEC 29)	Waste materials, including concrete, refractory brick, metal sheeting, metal reinforcement, plastic sheeting, timber, fence posts, broken glass, electrical wire, steel posts and old cable.	BaP	0.5, fill extends to 1.0
Site Operations	Carbon Plant (AEC 8)	Impacts in the vicinity are likely due to the accumulation of dust from the Carbon Plant. Impacts in garden beds and grassed areas.	BaP	0-0.4

Table 10.1: Summary of Site Soil Contamination

Site Activity	Site Area	Description	Impacts in Soil	Depth of Soil Impact (m bgs)
	Bake Furnace Scrubber (PAEC 26)	Impacts associated with the accumulation of black sandy material likely to be spilt Ring Furnace Reacted Alumina.	BaP	>0.3
		Impacts to shallow surface soil beneath the scrubber duct work.	BaP	0-0.3
Fill Importation	Diesel Spray Area (AEC 4)	Likely that impacted fill material was used to level this portion of the site.	BaP	0.4-0.6

Site-wide groundwater contamination has occurred at the Smelter Site primarily due to the leaching of fluoride and aluminium from smelter materials into groundwater. Fluoride concentrations ranged between 0.22 and 43mg/L, and aluminium concentrations ranged between 0.08 and 13.6mg/L over two sampling rounds.

Impacted sediment is also a media of concern on the Smelter Site at the following areas, and a summary of sediment concentrations reported during the initial Phase 2 investigation is presented in **Appendix A**:

- *Drainage Lines Near Anode Waste Pile and Capped Waste Stockpile (AEC 5)*: PAH contaminated sediments have accumulated in the drainage line adjacent to the Anode Waste Pile and Capped Waste Stockpile.
- *East Surge Pond (AEC 6):* PAH contaminated sediments have accumulated within the East Surge Pond, which is immediately down gradient of the drainage lines near the Anode Waste Pile and the Capped Waste Stockpile; and
- *West Surge Pond (AEC 15)*: Total fluoride at concentrations exceeding the site-specific criteria were detected here. Consistent with soil data, it is likely that analysing for soluble fluoride in sediment will result in West Surge Pond no longer being an AEC. Sampling was not conducted as part of this investigation due to sampling difficulties encountered during the Phase 2 ESA. The sediment can be sampled once the sediments have been excavated and stockpiled.

10.1.2 Human and Ecological Receptors

The receptors identified in this CSM were based on a current and future General Industrial (IN1) and Heavy Industrial (IN3) use of the Smelter Site. Receptors in the hydraulic down-gradient area of the Buffer Zone were also considered during development of this CSM due to potential off-site migration of groundwater impacts and dust deposition from historical sources. Land use in this down-gradient area currently includes the Kurri Kurri Speedway and Junior Motorcycle Club, farmland and vacant bushland.

Receptors not down hydraulic-gradient, such as residents to the south-east, were not considered because:

- recent studies conducted in the Buffer Zone did not identify impacts to surface soil (ENVIRON, 2014a-j);
- they are not located down -hydraulic gradient and therefore any migrating groundwater impacts are unlikely to impact these receptors; and
- the source of aerial dust deposition from the Smelter Site to off-site areas is no longer present because the Smelter has ceased operations. Impacts to Buffer Zone areas has been assessed and reported sepearately (ENVIRON, 2014a-j).

The human receptors identified included:

- current adult Smelter employees, contractors and visitors (non-intrusive site receptors);
- current and future on-site intrusive maintenance and construction workers;
- future on-site commercial/industrial adult employees; and
- off-site recreational users of the Kurri Kurri Speedway and Junior Motorcycle Club located approximately 260m down-gradient of the Smelter Site in the Buffer Zone.

It is noted that there are no current users of the playing fields and due to the industrial nature of the plans for the future site use, there will be no future users of the playing fields, as such human receptors associated with the playing fields do not exist.

The ecological receptors identified included:

- current and future livestock within the Buffer Zone including cattle; and
- native and introduced flora and fauna within the buffer zone including aquatic receptors in Swamp Creek and Wentworth Swamp.

10.1.3 Exposure Pathways

In order for a human receptor to be exposed to a chemical contaminant derived from a site, there should be an exposure pathway linking the source of contamination and the exposed population. An exposure pathway describes the course a chemical or physical agent takes from the source to the exposed individual and generally includes the following elements:

- a source and mechanism of chemical release;
- a retention or transport medium (or media where chemicals are transferred between media);
- a point of potential human contact with the contaminated media; and
- an exposure route (e.g. ingestion, inhalation) at the point of exposure.

A detailed assessment of the potential exposure pathways for the receptors identified above is presented in **Table 10.2** below.

Table 10.2: Exposure Pathways Assessment

Shallow Surface Soil	**Potentially Complete Source-Pathway-Receptor Link ? (Y/N)**				**Justification**
	Current & future on-site employees (non-intrusive)	**Current & future on-site Intrusive Maintenance and Construction Workers**	**Recreational users of Kurri Kurri Speedway**	**Buffer Zone Ecological Receptors**	
Dermal contact with soil & dust	N	**Y**	N	N	Shallow (0-0.4m bgs) impacted soil reported on-site.
Incidential ingestion of dust/soil	N	**Y**	N	N	
Dermal contact with dust only	**Y**	N	N	N	Shallow (0-0.4m bgs) impacted soil reported on-site in unpaved areas – potenital for dust generation. The source of aerial dust deposition to off-site areas no longer present as Smelter is closed and soil impacts not identified in previous studies in the Buffer Zone (ENVIRON, 2014a-j).
Outdoor dust inhalation	**Y**	**Y**	N	N	
Indoor dust inhalation	**Y**	N	N	N	Outdoor dust can be transported indoors.
Indoor inhalation of vapours	N	N	N	N	No volatile chemicals detected in Phase 2 investigations above assessment criteria
Outdoor inhalation of vapours	N	N			
Vegetable/fruit ingestion	N	N	N	N	No vegetable/fruit grown on-site or off-site in the down-gradient Buffer Zone area. Soil impacts not identified in previous studies in the Buffer Zone (ENVIRON, 2014a-j)
Ingestion of Buffer Zone flora (e.g.grass)	N	N	N	N	Cattle in the down-gradient Buffer Zone consume grass however site-specific studies have shown cattle have acceptable levels of fluoride (AECOM 2013). The source of aerial dust deposition to off-site areas no longer present as Smelter is closed.
BaP Impacts to Buried Fill at the Diesel Spray Area (0.4-0.6m bgs)					
Dermal contact with soil and dust	N	**Y**	N	N	Impacted fill material identified at a depth of 0.4-0.6m bgs at the Diesel
Incidential ingestion of dust/ soil	N	**Y**	N	N	

Table 10.2: Exposure Pathways Assessment

Shallow Surface Soil	**Potentially Complete Source-Pathway-Receptor Link ? (Y/N)**				**Justification**
	Current & future on-site employees (non-intrusive)	**Current & future on-site Intrusive Maintenance and Construction Workers**	**Recreational users of Kurri Kurri Speedway**	**Buffer Zone Ecological Receptors**	
					Spray Area.
Dermal contact with dust only	N	N	N	N	No dust generation from impacted material buried at 0.4-0.6m bgs.
Outdoor dust inhalation	N	N	N	N	
Indoor dust inhalation	N	N	N	N	
Indoor inhalation of vapours	N	N	N	N	No volatile chemicals detected in Phase 2 investigations above assessment criteria
Outdoor inhalation of vapours	N	N	N	N	
Vegetatble/ fruit ingestions	N	N	N	N	No vegetable/fruit grown on-site or off-site in the down-gradient Buffer Zone area. Soil impacts not identified in previous studies in the Buffer Zone (ENVIRON, 2014a-j)
Groundwater					
Dermal contact	N	**Y**	N	N	Shallow (~0.5-3mbgs) impacted groundwater detected on-site. During times of flooding, groundwater exflitrates to the surface in the Buffer Zone and can flow to surface water bodies. Studies have shown that concentrations of fluoride and aluminium in surface waters in the Buffer Zone have shown that there have been no impacts on ecology at the downgradient receptor, Swamp Creek (ENVIRON, 2014a).
Incidential ingestion	N	**Y**	N	N	
Potable ingestion	N	N	N	N	No current on-site abstraction wells for potable use of groundwater.
Outdoor inhalation of vapours	N	N	N	N	No volatile chemicals detected in Phase 2 investigations above assessment criteria
Indoor inhalation of vapours	N	N	N	N	

Table 10.2: Exposure Pathways Assessment

Shallow Surface Soil	**Potentially Complete Source-Pathway-Receptor Link ? (Y/N)**				**Justification**
	Current & future on-site employees (non-intrusive)	**Current & future on-site Intrusive Maintenance and Construction Workers**	**Recreational users of Kurri Kurri Speedway**	**Buffer Zone Ecological Receptors**	
Groundwater to surface water pathways	N	N	N	N	Open accessible stormwater drains and ponds on-site are managed under the site's stormwater management system. During times of flooding, groundwater in the Buffer Zone can exfiltrate and flow to surface water bodies. Groundwater can also discharge to surface bodies through groundwater flowpaths. Studies or groundwater and surface water receptors in the Buffer Zone have shown that there have been no impacts on the ecology of the downgradient receptor, Swamp Creek (ENVIRON, 2013a), see **Section 3.4.4.**
Irrigation pathways	na	na	N	N	No current on-site or off-site abstraction wells for irrigation purposes.
Sediment					
Dermal contact	N	**Y**	na	na	Impacted sediments detected in the East Surge Pond and associated drainage lines on-site.
Incidential ingestion	N	**Y**	na	na	
Outdoor inhalation of vapours	N	N	N	N	No volatile chemicals detected in Phase 2 investigations above assessment criteria
Indoor inhalation of vapours	N	N	N	N	

Notes: na: exposure pathway not applicable

10.2 Further Investigations

The following AECs and PAECs were not assessed as part of this Phase 2 ESA and require investigations in the future:

- AEC 15 West Surge Pond: Sampling of the sediment for soluble fluoride should be completed once the sediment is excavated and stockpiled.
- PAEC 27 Substations: Substations are currently live and in use and cannot be assessed until they are isolated. Assessment of each substation for Polychlorinated Biphenyls (PCBs) and Total Petroleum Hydrocarbons (TPH) should be completed once the substations are switched off, isolated and demolition has commenced.
- PAEC 30 Area East of the Clay Borrow Pit: The area has been covered with excess Virgin Excavated Natural Material (VENM) from the construction of the Hunter Expressway. Assessment of buried fill material in this area cannot be completed until the VENM has been removed.

10.2.1 Fluoride Impacts in Groundwater

As illustrated in **Table 10.2**, groundwater impacted with fluoride was identified as a concern for on-site maintenance and construction employees. Fluoride concentrations in groundwater ranged between 0.22 and 43mg/L over two groundwater monitoring rounds, exceeding the ENVIRON (2013) site-specific preliminary screening criteria of 1.5mg/L for recreational use. As the screening criterion is for recreational use, a health risk assessment and derivation of site-specific criterion for fluoride for maintenance and construction employees is recommended.

10.3 Remediation

Based on the contamination identified during the 2012 Phase 2 ESA and the current investigations, ENVIRON recommends remediation of contamination at the AECs included in **Table 10.3**.

Based on the information presented in **Table 10.3**, a Remedial Action Plan should be developed for the AECs. The Remedial Action Plan should be prepared in accordance with NSW EPA (2011) Guidelines for Consultants Reporting on Contaminated Sites. As remediation is likely to occur following or during the demolition of the buildings on the Smelter Site, the RAP should consider impacts to surface soils that may occur during demolition. Validation sampling programs for each area should consider contamination identified in this Phase 2 ESA, as well as additional contamination impacts to surface soils that may occur through demolition.

Table 10.3: Recommended Remediation

No.	PAEC	Approximate Volume (m^3)	Media	Contaminants	Mechanism for Contamination	Remediation Required
1	Capped Waste Stockpile	NA	Soil and groundwater	The Capped Waste Stockpile has been assessed separately to this Phase 2 ESA.		
2	Anode Waste Pile	Approximately 1,300m^3	Soil	PAHs	Stockpiling of anodes	- Delineation of the hotspot following recycling of anode stockpile -Remediation of shallow fill material following delineation
4	Diesel Spray Area	Unknown	Soil	PAHs	Use of contaminated soils as fill material.	-Delineation of PAH contaminated fill material required prior to remediation
5	Drainage Lines	Approximately 200m^3	Sediment	PAHs	Accumulation of PAH contaminated sediments in the drainage lines around the Anode Waste Pile and the Capped Waste Stockpile.	-Remediation of PAH contaminated sediments
6	East Surge Pond	Approximately 2,500m^3	Sediment	PAHs	Accumulation of PAH contaminated sediments.	-Remediation of PAH contaminated sediments

Table 10.3: Recommended Remediation

No.	PAEC	Approximate Volume (m^3)	Media	Contaminants	Mechanism for Contamination	Remediation Required
8	Carbon Plant (western end only)	Approximately 1000m^3	Accessible soil	PAHs	Accumulation of PAHs associated with dust from the Carbon Plant.	-Remediation of PAH contaminated shallow soils in garden beds and grassed areas to the south of the western end of the Carbon Plant.
26	Bake Furnace Scrubber	Approximately 1,000m^3	Soil	PAHs	Accumulation of waste from the scrubber in surface soils.	- Delineation and remediation of the PAH hot spot at HA115 -Remediation of PAHs in surface soils in grassed areas beneath the scrubber duct work.
29	Area East of Playing Fields	Approximately 10,000m^3	Soil	PAHs	Burial of wastes in fill.	-Excavation and segregation of wastes for recycling and disposal to remove aesthetic impacts) -Validation of the removal of the PAH hot spot from test pit TP117
30	On-site groundwater	NA	Groundwater	Fluoride, aluminium, PAHs	Leaching of contaminants into groundwater	-Complete Health Risk Assessment to assess whether remediation is required

11 Conclusions and Recommendations

ENVIRON Australia Pty Limited (ENVIRON) was commissioned by Hydro Aluminium Kurri Kurri Limited (Hydro) to complete Stage 2 of a Phase 2 Environmental Site Assessment (ESA) at the Hydro Kurri Kurri Aluminium Smelter located of Hart Road, Loxford, New South Wales. The site incorporates 60ha of Smelter Site and 2,000ha of surrounding buffer land. The initial Stage 1 phase of work was completed in November 2012. The objective of the Stage 2 investigations was to build upon the results of the Stage 1 in assessing the presence of contamination at the Smelter site and to assess the suitability of the site for the purposes of General Industrial (IN1), Heavy Industrial (IN3) and Environmental Conservation (E2) landuse.

The scope of work for the Stage 2 investigations included the following:

- Review of previous investigations and identification of data gaps;
- Development of a Sampling, Analysis and Quality plan (SAQP);
- Soil sampling at five areas of environmental concern (AECs) identified from the Stage 1 investigations and five new potential areas of environmental concern (PAECs);
- The installation of seven new groundwater wells at three of the AECs;
- Groundwater sampling of the seven new and 17 existing wells;
- Laboratory analysis for soil and groundwater samples;
- Assessment of laboratory results against site criteria;
- Refinement of the conceptual site model (CSM);
- Identification of additional site investigation works to refine the CSM; and
- Assessment of areas requiring remediation.

The CSM assumed a future industrial site landuse, and considered off-site receptors in the down-hydraulic gradient area. The following complete source-pathway-receptor linkages were identified in the CSM:

- Inhalation of dust generated from surface soil impacts by current and future on-site industrial adult employees;
- Direct contact with impacted soil and groundwater by current and future on-site intrusive maintenance workers;
- Direct contact with impacted sediment by current and future on-site industrial employees.

In order to further refine the CSM, a number of targeted investigations are required to be performed at the West Surge Pond, the Sub-Stations and the Area East of the Clay Borrow Pit.

Based upon the source-pathway-receptor linkages identified in the refined CSM, surface soil and sediment remediation at the following AECs is required:

- Capped Waste Stockpile: This AEC has been assessed separately to this investigation;
- Anode Waste Pile: PAH contamination in surface soils to 0.2 bgs. Delineation and remediation of PAH hot spot at MW103;
- Diesel Spray Area: PAH contamination of fill material at 0.4m to 0.6m bgs. Delineation and remediation required;
- Drainage Lines: PAH contamination of sediments in drainage lines around the Capped Waste Stockpile and the Anode Waste Pile;
- East Surge Pond: PAH contamination of sediments;
- Carbon Plant: PAH contamination of shallow soils to 0.4m bgs in grassed areas and gardens beds at the western end of the Carbon Plant;
- Bake Furnace Scrubber: PAH contamination in shallow soils to 0.3m bgs in grassed areas below the scrubber duct work. Delineation of remediation of PAH hot spot at HA115; and
- Area east of the Playing Fields: Buried wastes to be remediated for aesthetic reasons. Delineation and remediation of PAH hot spot identified in south east corner at TP117.

Vertical delineation of the soil contamination at each AEC was completed as part of the Stage 2 investigations. The majority of the soil contamination identified is PAH (primarily benzo(a)pyrene) contamination in fill, which has not extended into the underlying alluvial sands and has not impacted groundwater. Lateral delineation of soil contamination has been completed to the extent practicable at this time given buildings, stockpiles, roads and services limit potential sampling locations. Lateral delineation of soil contamination and hot spots will be required at some AECs (e.g. Anode Waste Pile, Diesel Spray Area) prior to remediation.

ENVIRON recommends the preparation of a Remedial Action Plan (RAP) for the Smelter Site to develop remediation and validation plans for each of the seven AECs identified above. The Remediation Action Plan should be prepared in accordance with NSW EPA (2011) Guidelines for Consultants Reporting on Contaminated Sites. As remediation is likely to occur following or during the demolition of the buildings on the Smelter Site, the RAP should consider impacts to surface soils that may occur during demolition. Validation sampling programs for each area should consider contamination identified in this Phase 2 ESA, as well as additional contamination impacts to surface soils that may occur through demolition.

ENVIRON recommends a health risk assessment be completed to derive site-specific criterion for fluoride for maintenance and construction employees and assess the requirement for remediation of fluoride in groundwater beneath the Smelter Site.

Hydro has separately engaged an EPA-accredited Site Auditor to assess the appropriateness of the Remedial Action Plan and to assess if the site can be made suitable for the proposed landuse by implementation of the Remedial Action Plan. Following the completion of the remediation, the Site Auditor will provide a Site Audit Statement certifying that the site is suitable for the proposed use.

12 References

AECOM (2 June 2013) 'Hydro Aluminium – 2012 Annual Environmental Management Review'

ANZECC & ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Canadian Council of Ministries of the Environment (2010) Candian Soil Quality Guidelines, Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs) (Environmental and Human Health Effects) Scientific Criteria Document (revised)

ENVIRON (March 2012) 'Sampling, Analysis and Quality Plan, Kurri Kurri Aluminium Smelter' (2012a)

ENVIRON (1 November 2012) 'Phase 2 Environmental Site Assessment, Kurri Kurri Aluminium Smelter' (2012b)

ENVIRON (March 2013) 'Tier 2 Ecological Risk Assessment, Kurri Kurri Aluminium Smelter' (2013a)

ENVIRON (2 April 2013) 'Preliminary Health Screening Level, Health Risk Assessment for Fluoride and Aluminium, Part of the Kurri Kurri Aluminium Smelter, Hart Road, Loxford' (2013b)

ENVIRON (22 October 2013) 'Phase 1 ESA, Hydro Kurri Kurri Aluminium Smelter' (2013c)

ENVIRON (April 2014) 'Phase 2 Environmental Site Assessment, Parcel 9' (2014a)

ENVIRON (May 2014) 'Phase 2 Environmental Site Assessment, Parcel 2' (2014b)

ENVIRON (May 2014) 'Phase 2 Environmental Site Assessment, Parcel 5' (2014c)

ENVIRON (May 2014) 'Phase 2 Environmental Site Assessment, Parcel 17' (2014d)

ENVIRON (May 2014) 'Phase 2 Environmental Site Assessment, Parcel 18' (2014e)

ENVIRON (May 2014) 'Phase 2 Environmental Site Assessment, Parcel 7' (2014f)

ENVIRON (June 2014) 'Phase 2 Environmental Site Assessment, Parcel 3'(2014g)

ENVIRON (June 2014) 'Phase 2 Environmental Site Assessment, Parcel 6' (2014h)

ENVIRON (June 2014) 'Phase 2 Environmental Site Assessment, Parcel 8' (2014i)

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ENVIRON (June 2014) 'Hydro Aluminium Kurri Kurri, Sampling, Analysis and Quality Plan' (2041k)

ENVIRON (24 July 2014) Remedial Action Work Plan, Clay Borrow Pit Area, Kurri Kurri, NSW'

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National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM 2013)

National Health and Medical Research Council (2008) Guidelines for Managing Risks in Recreational Water

National Health and Medical Research Council (2011) Australian Drinking Water Guidelines

NSW DEC (2006) Guidelines for the NSW Site Auditor Scheme (Second Edition)

NSW DEC (2007) Guidelines for the Assessment and Management of Groundwater Contamination

NSW EPA (1994) Guidelines for Assessing Service Station Sites

Figures

Google Earth Pro: Licence valid till 5/2/15.

Approximate Location of land owned by Hydro

Approximate Location of Buffer Zone

Approximate Scale 1cm:4.5km

N

HYDRO AUSTRALIA PHASE 2 ESA

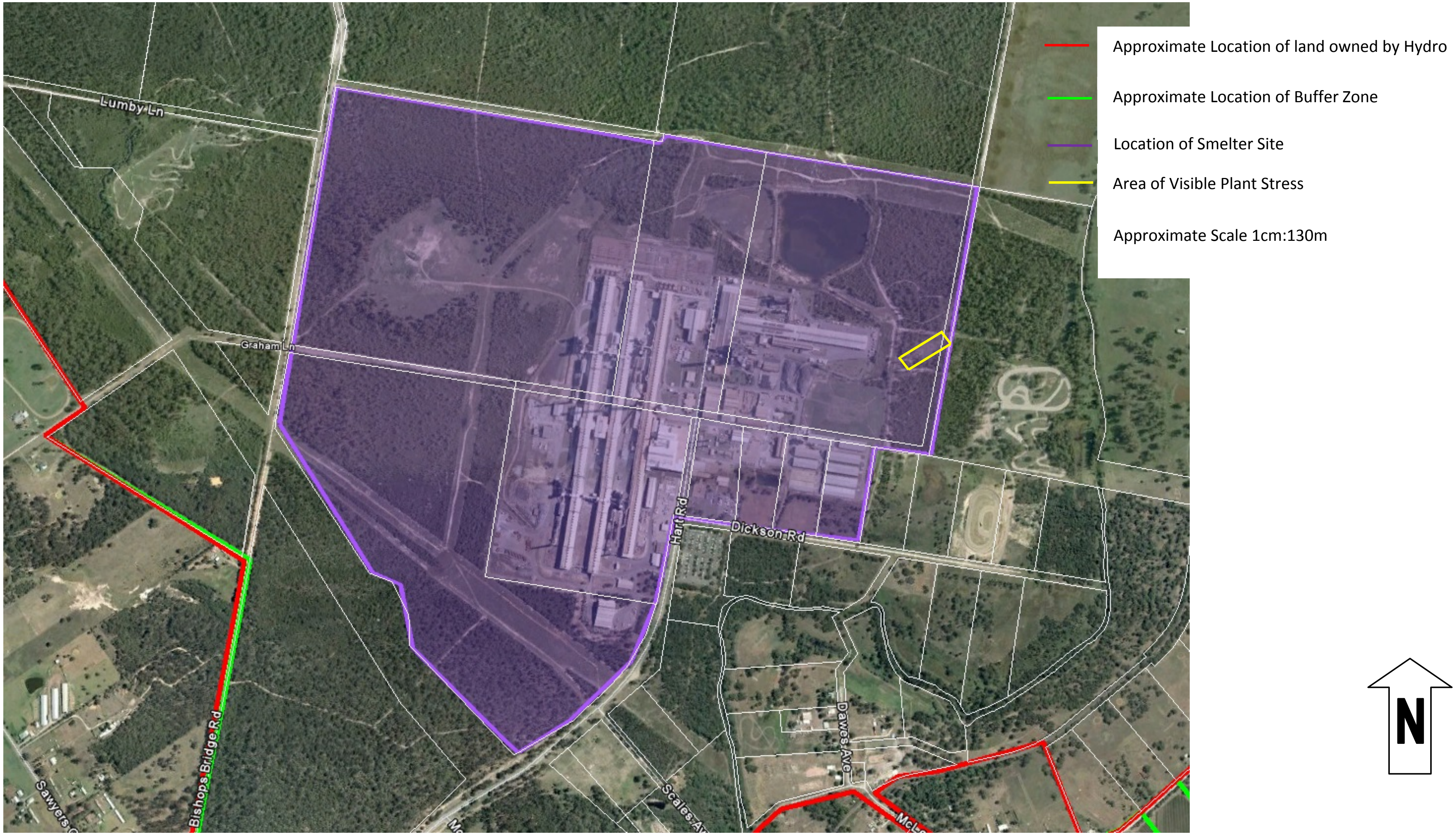
SITE LOCATION PLAN - SMELTER LOCATION

ENVIRON

JOB NO: AS130383

DATE: August 2014

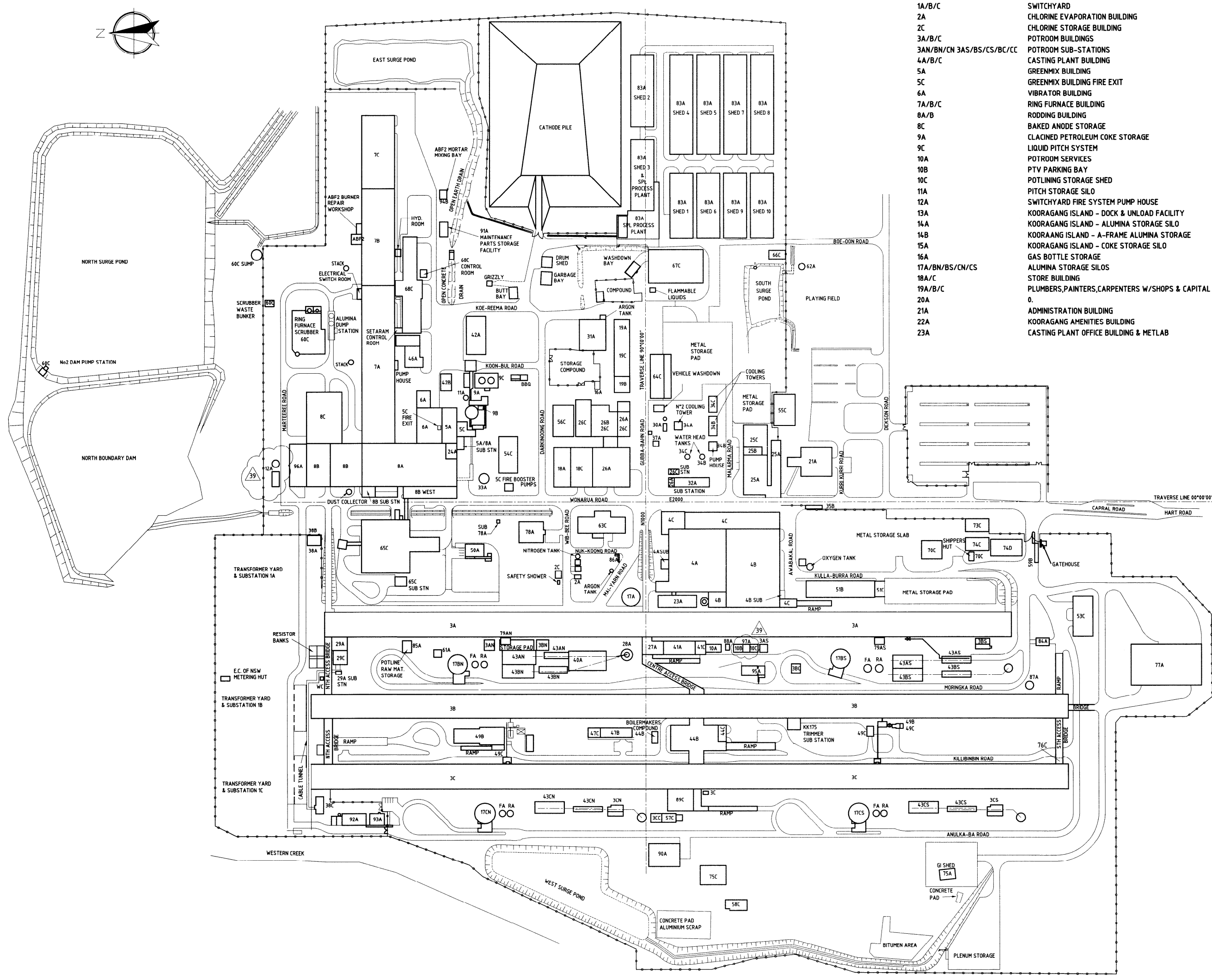
FIGURE 1



Google Earth Pro: Licence valid till 5/2/15.

HYDRO AUSTRALIA PHASE 2 ESA	SMELTER SITE BOUNDARY

ENVIRON JOB NO: AS130383 DATE: August 2014 FIGURE 2



LEGEND

1A/B/C	SWITCHYARD
2A	CHLORINE EVAPORATION BUILDING
2C	CHLORINE STORAGE BUILDING
3A/B/C	POTROOM BUILDINGS
3AN/BN/CN 3AS/BS/CS/BC/CC	POTROOM SUB-STATIONS
4A/B/C	CASTING PLANT BUILDING
5A	GREENMIX BUILDING
5C	GREENMIX BUILDING FIRE EXIT
6A	VIBRATOR BUILDING
7A/B/C	RING FURNACE BUILDING
8A/B	RODDING BUILDING
8C	BAKED ANODE STORAGE
9A	CLACINED PETROLEUM COKE STORAGE
9C	LIQUID PITCH SYSTEM
10A	POTROOM SERVICES
10B	PTV PARKING BAY
10C	POTLINING STORAGE SHED
11A	PITCH STORAGE SILO
12A	SWITCHYARD FIRE SYSTEM PUMP HOUSE
13A	KOORAGANG ISLAND - DOCK & UNLOAD FACILITY
14A	KOORAGANG ISLAND - ALUMINA STORAGE SILO
14B	KOORAANG ISLAND - A-FRAME ALUMINA STORAGE
15A	KOORAGANG ISLAND - COKE STORAGE SILO
16A	GAS BOTTLE STORAGE
17A/BN/BS/CN/CS	ALUMINA STORAGE SILOS
18A/C	STORE BUILDING
19A/B/C	PLUMBERS,PAINTERS,CARPENTERS W/SHOPS & CAPITAL STORE
20A	0.
21A	ADMINISTRATION BUILDING
22A	KOORAGANG AMENITIES BUILDING
23A	CASTING PLANT OFFICE BUILDING & METLAB
24A	CARBON PLANT OFFICE BUILDING
25A/B/C	GATEHOUSE,MEDICAL CENTRE,PERSONNEL & BATHHOUSE
26A/B/C	ENG. BLDG/APPRENTICE W/SHOP & MAINT W/SHOP,BOILERMAKERS SHOP
27A	POTROOM SERVICES WORKSHOP
28A	MAIN STACK & DUCTWORK
29A/C	POTROOM ELECTRICAL CONTROL BUILDINGS - SUBSTATION
29B	SWITCHYARD SWITCHROOM
30A	FUEL OIL SYSTEM
31A	DROSS STORAGE BUILDING
32A	COMPRESSOR HOUSE
33A	WATER STORAGE AND PUMPHOUSE
34A/B/C	COOLING TOWERS AND PUMPHOUSE
35B	WEIGHBRIDGE
36A	SWITCHYARD WORKSHOP - DEMOLISHED 2009
37A	SEWERAGE PUMPHOUSE
38A/B/C	11KV SWITCHROOMS
39A	SWITCHYARD COMPRESSOR ROOM - DEMOLISHED 2009
40A	CATHODE RODDING BUILDING
41A/B/C	POTROOM OFFICE BUILDING
42A/B	RODDING MIX STORAGE BUILDING
43A/AS/BN/BS/CN/CS	DRY SCRUBBER PLANTS
44B/C	PTA MAINTENANCE BUILDING & OFFICES
45A	SWITCHYARD STOREROOM - DEMOLISHED 2009
46A	CARBON PLANT WORKSHOP & OFFICE
47B/C	POTROOM LUNCHROOM & TOILET BLOCK
49B/C	BATH CRUSHING PLANT,CRUST FEED BATH DUMP
50A	SWITCHYARD UPGRADE PROJECT OFFICE
51B/C	CASTING PLANT SERVICES BUILDING
53C	POT REBUILD WORKSHOP
54C	CARBON PLANT AMENITIES & OFFICE BUILDING
55C	PERSONNEL TRAINING CENTRE
56C	MAINTENANCE OFFICE BUILDING & INSTRUMENT FITTERS WORKSHOP
57C	COMPRESSOR HOUSE - WEST
58C	REFRACTORY STORAGE
59B	WEIGHBRIDGE AND GATEHOUSE
60C	RING FURNACE SCRUBBER
61A	DRY SCRUBBER LUNCHROOM
62A	METEOROLOGICAL TOWER
63C	EOHS BUILDING
64C	MOBILE VEHICLE WORKSHOP
65C	BUTT CLEANING BUILDING - SUBSTATION
66C	NATURAL GAS METER STATION
67C	CATHODE DISPOSAL BUILDING
68C	GREEN & BAKED ANODE STORAGE BUILDING - SUBSTATION
70C	TRUCK LOADING SHELTER / SHIPPERS HUT
72A	SWITCHYARD AMENITIES BUILDING - DEMOLISHED 2009
73C	CASTING MAINTENANCE STORAGE SHED
74C	CASTING ALLOY STORAGE SHED
74D	CASTING ALLOY STORAGE SHED
75A	SLAB REPAIR SHED
75C	POTLINING BRICK STORAGE
76C	TIP CLEANING STATION
77A	POT REBUILD
78A	COMPUTER CENTRE
79AN	NORTH EQUIPMENT ROOM
79AS	SOUTH EQUIPMENT ROOM
81A	POTLINING CENTRE - NOT INSTALLED
82A	DELINING ROOM - NOT INSTALLED
83A	SPL STORAGE & PROCESS PLANT
84A	BROCHOT RAMMING MACHINE STORAGE BLDG
85A	POTLINE RAW MATERIAL STORAGE
86A	LPG GAS BOTTLE FILL STATION
87A	ELECTROLYTE TRUCK LOADING STATION
88A	POT SERVICES STORAGE SHED
89C	CRUCIBLE CLEANING FACILITY
90A	BULK BAG STORAGE FACILITY
91A	MAINTENANCE SPARES STORAGE FACILITY
92A	SWITCHYARD STORAGE/WORKSHOP
93A	SWITCHYARD OFFICE BUILDINGS
94A	(FUTURE) REFRACTORIES AMENITIES & OFFICE BUILDING
94B	(FUTURE) MORTAR MIXING BAY T.B.C (HOLD)
95A	VEHICLE WASHDOWN & PARKING STORAGE
96A	ANODE STORAGE BUILDING
97A	BATTERY EXCHANGE BAY

2014 groundwater well locations

2014 soil sampling locations

2012 groundwater well and soil sampling locations

MW103 Soil sampling locations with PAHs > guidelines

Approximate extent of soil contamination

Approximate Scale 1cm:5m

Google Earth Pro: Licence valid till 5/2/15.

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA	AEC 2 - Anode Waste Pile

ENVIRON JOB NO: AS130383 DATE: August 2014 FIGURE 4

2014 groundwater well locations

2012 groundwater well and soil sampling locations

2012 soil sampling locations

Approximate Scale is 1cm:2m

N

Google Earth Pro: Licence valid till 5/2/15.

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA	AEC 3 – Refuelling Area

ENVIRON JOB NO: AS130383 DATE: August 2014 FIGURE 5

Google Earth Pro: Licence valid till 5/2/15.

2014 soil sampling locations

2012 groundwater well locations

2012 soil sampling locations

MW19 Fill 1 — Soil sampling locations with PAHs > guidelines

Likely extent of soil contamination

Approximate Scale is 1cm:1.5m

N

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA		AEC 4 – Diesel Spray Area
ENVIRON JOB NO: AS130383	DATE: August 2014	FIGURE 6

2014 groundwater well locations

2014 soil sampling locations

2012 groundwater well locations

2012 soil sampling locations

HA111 Soil sampling locations with PAHs > guidelines

Areas of visible staining

Approximate extent of shallow soil contamination

Approximate Scale 1cm:12m

N

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA	AEC 8 – Carbon Plant

ENVIRON JOB NO: AS130383 DATE: August 2014 FIGURE 7

2014 soil sampling locations

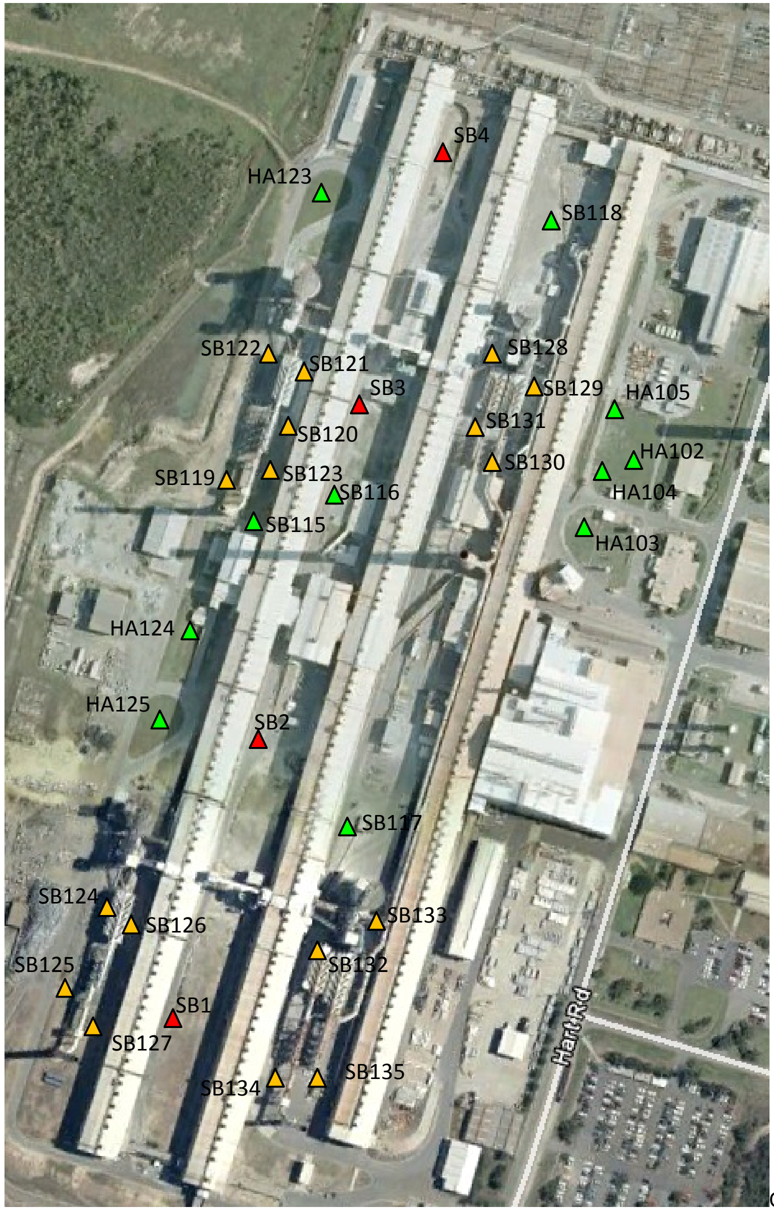
2012 sampling locations

Approximate Scale 1cm:1.5m

Google Earth Pro: Licence valid till 5/2/15.

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA	AEC 11 – Washdown Bay

ENVIRON JOB NO: AS130383 DATE: August 2014 FIGURE 8



2014 soil sampling locations – AEC 25

2014 soil sampling locations – AEC 12

2012 soil sampling locations

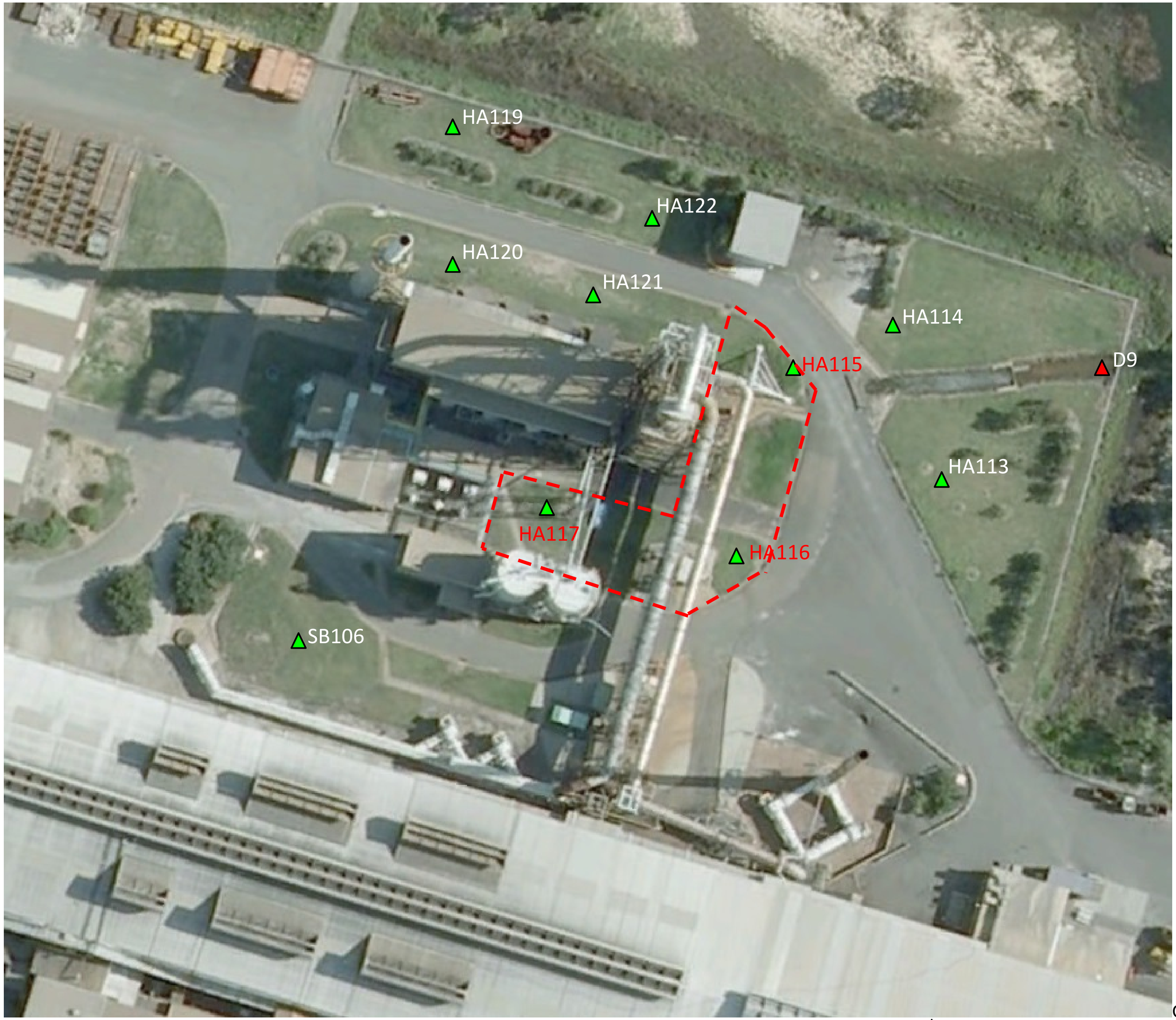
Approximate Scale 1cm:53m

N

Google Earth Pro: Licence valid till 5/2/15.

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA	AEC 12 – Pot Lines and PAEC 25 – Dry Scrubbers

ENVIRON JOB NO: AS130383 DATE: August 2014 FIGURE 9



2014 soil sampling locations

2012 soil sampling locations

HA116 Soil sampling locations with PAHs > guidelines

Approximate extent of shallow soil contamination

Approximate Scale 1cm:5m

N

Google Earth Pro: Licence valid till 5/2/15.

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA	PAEC 26 – Bake furnace Scrubber

ENVIRON JOB NO: AS130383 DATE: August 2014 FIGURE 10

2014 soil sampling locations   Approximate Scale 1cm:9m

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA	PAEC 28 – Playing Fields

ENVIRON   JOB NO: AS130383   DATE: August 2014   FIGURE 11

2014 soil sampling locations

TP117 Soil sampling location with PAHs > guidelines

Approximate Scale 1cm:9m

N

Google Earth Pro: Licence valid till 5/2/15.

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA	PAEC 29 – Area East of Playing Fields

ENVIRON JOB NO: AS130383 DATE: August 2014 FIGURE 12

2014 soil sampling locations

Approximate Scale 1cm:25m

N

Google Earth Pro: Licence valid till 5/2/15.

Hydro Aluminium Kurri Kurri Stage 2 Phase 2 ESA	PAEC 31 – Storage Area West of Pot Line 3

ENVIRON JOB NO: AS130383 DATE: August 2014 FIGURE 13

Tabulated Laboratory Results for Soil and Groundwater

TABLE LR1 Soil Analytical Results for AEC 2 Anode Waste Pile (mg/kg)

Sample Identification	PQL	HIL D[A]	EIL C/I[B]	ESL C/I	MW12	MW12	MW13	SB103	SB103	SB104	SB104	SB105	SB105	MW103	MW103	MW104	MW104
Sample Depth (m)					0-0.2	0.4-0.6	0.2-0.4	0-0.1	0.3-0.4	0-0.1	0.3-0.4	0-0.1	0.3-0.4	0-0.1	0.3-0.4	0-0.1	0.3-0.4
Date					17-Apr-12	17-Apr-12	17-Apr-12	30-Jun-14	30-Jun-14	30-Jun-14	30-Jun-14	30-Jun-14	30-Jun-14	30-Jun-14	30-Jun-14	30-Jun-14	30-Jun-14
Sample Profile					FILL	FILL	FILL	FILL	ESTUARINE	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL
PAEC Sampled					AWP	AWP	AWP	AWP	AWP	AWP	AWP	AWP	AWP	AWP	AWP	AWP	AWP
Sample collected by					KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG
Metals																	
Aluminium	50	NL*	-	-	55800	3260	36700	-	-	-	-	-	-	-	-	-	-
Arsenic	1	3000	160	-	10.1	1	10.5	-	-	-	-	-	-	-	-	-	-
Cadmium	0.1	900	-	-	1.4	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Chromium	1	3600	320**	-	46.8	4.4	10.9	-	-	-	-	-	-	-	-	-	-
Copper	2	240000	210**	-	41.1	0.3	6.7	-	-	-	-	-	-	-	-	-	-
Nickel	1	6000	140**	-	103	3.4	79.9	-	-	-	-	-	-	-	-	-	-
Lead	2	1500	1800	-	34.1	2.6	7.5	-	-	-	-	-	-	-	-	-	-
Zinc	5	400000	440**	-	304	1	21.3	-	-	-	-	-	-	-	-	-	-
Mercury (inorganic)	0.1	730	-	-	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-
Fluoride (soluble)	40	17000*	-	-	-	-	-	890	24	1077	270	970	110	410	430	64	45
Fluoride (total)	40	-	-	-	47100	1010	17700	-	-	-	-	-	-	-	-	-	-
Non Metallic Inorganics																	
Total Cyanide (free)	1	1500	-	-	<1	1	<1	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (PAH)																	
Naphthalene	0.5	-	370	-	<0.5	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.5	-	-	-	<0.5	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.5	-	-	-	1.4	<0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Fluorene	0.5	-	-	-	0.9	<0.5	<0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Phenanthrene	0.5	-	-	-	15.2	<0.5	5	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Anthracene	0.5	-	-	-	4.1	<0.5	1.1	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Fluoranthene	0.5	-	-	-	56.5	<0.5	20.4	13	13	13	13	13	13	13	13	13	13
Pyrene	0.5	-	-	-	52.2	<0.5	20.5	12	12	12	12	12	12	12	12	12	12
Benz(a)anthracene	0.5	-	-	-	52.6	<0.5	17.3	11	11	11	11	11	11	11	11	11	11
Chrysene	0.5	-	-	-	74.3	<0.5	17	11	11	11	11	11	11	11	11	11	11
Benzo(b)&(k)fluoranthene	1	-	-	-	88.6	<0.5	26.6	25	25	25	25	25	25	25	25	25	25
Benzo(k)fluoranthene	0.5	-	-	-	31.2	<0.5	11.8	-	-	-	-	-	-	-	-	-	-
Benzo(a) pyrene	0.5	-	-	72[C]	29.4	<0.5	16.1	15	<0.05	18	21	37	12	28	160	24	0.21
Indeno(1,2,3-c,d)pyrene	0.5	-	-	-	20.7	<0.5	11.4	14	<0.1	16	18	32	8.2	27	120	18	0.2
Dibenz(a,h)anthracene	0.5	-	-	-	7.2	<0.5	2.5	1.4	<0.1	2	1.7	5.2	0.9	4.1	22	2.7	<0.1
Benzo(g,h,i)perylene	0.5	-	-	-	24	<0.5	14.5	12	<0.1	13	16	27	6.6	21	100	15	0.2
Benzo(a) pyrene TEQ		40			56.9	<0.5	25.6	21	<0.5	26	30	55	16	42	250	34	<0.5
Sum of reported PAH	--	4000	--	--	458	<0.5	165	120	NIL (+)VE	140	180	300	85	210	1400	150	1.7

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[C] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hydrocarbons (PAHs) (Environmental and Human Health Effects)

Cells with '-' indicates testing was not completed or an appropriate screening criteria was not available

NL: indicates that the site-specific risk-based aluminium screening criteria for industrial soil is at a concentration greater than physically possible in soil, and therefore the criteria is defined as 'Non-Limiting' or NL.

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

Results shown in underline are in excess of the ecological criteria

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil criteria derived from 'Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium (ENVIRON 2013)'

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the March 2014 investigations

TABLE LR2 Soil Analytical Results for AEC 4 Diesel Spray Area (mg/kg)

Sample Identification	PQL	HIL D[A]	EIL C/I[B]	ESL C/I	SB17	SB18	MW19	MW19	SB111	SB111	SB112	SB112	SB112	SB113	SB113	SB114	SB114
Sample Depth (m)					0.3-0.4	0.5-0.6	FILL 1	FILL 2	0.0-0.1	0.4-0.5	0.0-0.1	0.4-0.5	0.8-0.9	0.0-0.1	0.4-0.5	0.0-0.1	0.4-0.5
Date					18-Apr-12	18-Apr-12	19-Apr-12	19-Apr-12	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14
Sample Profile					FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL
PAEC Sampled					DSA	DSA	DSA	DSA	DSA	DSA	DSA	DSA	DSA	DSA	DSA	DSA	DSA
Sample collected by					KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG
Polycyclic Aromatic Hydrocarbons (PAH)																	
Naphthalene	0.5	-	370	-	<0.5	<0.5	<4.0	<0.5	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.5	-	-	-	<0.5	<0.5	<4.0	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.5	-	-	-	<0.5	3.8	8.4	1.6	<0.1	<0.1	<0.1	2	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.5	-	-	-	<0.5	2.2	4.2	0.8	<0.1	<0.1	<0.1	0.9	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.5	-	-	-	<0.5	30.2	46.7	7.8	<0.1	0.4	<0.1	8.1	<0.1	0.2	<0.1	0.1	<0.1
Anthracene	0.5	-	-	-	<0.5	6.3	9.6	1.6	<0.1	<0.1	<0.1	1.7	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.5	-	-	-	<0.5	59.7	137	21.6	0.4	1.5	<0.1	30	<0.1	0.4	0.1	1	0.2
Pyrene	0.5	-	-	-	<0.5	59.1	133	21.7	0.5	1.6	<0.1	32	<0.1	0.4	0.1	1	0.2
Benz(a)anthracene	0.5	-	-	-	<0.5	46.7	103	24.3	0.3	1.2	<0.1	29	<0.1	0.3	<0.1	1.4	0.2
Chrysene	0.5	-	-	-	<0.5	45.6	97.3	23.5	1	1.1	<0.1	29	<0.1	0.6	0.1	2.7	0.2
Benzo(b)&(k)fluoranthene	1	-	-	-	<0.5	60.3	140	31	0.9	2.3	<0.2	64	<0.2	0.9	0.2	4.1	0.5
Benzo(k)fluoranthene	0.5	-	-	-	<0.5	21.2	47.7	10	-	-	-	-	-	-	-	-	-
Benzo(a) pyrene	0.5	-	-	72[C]	<0.5	43.4	101	19.2	0.48	1.5	0.06	38	<0.05	0.42	0.12	0.96	0.16
Indeno(1,2,3-c,d)pyrene	0.5	-	-	-	<0.5	41.6	57.5	17.5	0.3	1.1	<0.1	28	<0.1	0.3	<0.1	0.6	0.1
Dibenz(a,h)anthracene	0.5	-	-	-	<0.5	8.8	12.8	4.6	<0.1	0.1	<0.1	3.8	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(g,h,i)perylene	0.5	-	-	-	<0.5	46.1	65	19.9	0.4	1	<0.1	23	<0.1	0.3	<0.1	0.8	0.1
Benzo(a) pyrene TEQ		40	-	-	<0.5	70.1	150.2	31.6	1	2	<0.5	55	<0.5	1	<0.5	2	<0.5
Sum of reported PAH	-	4000	-	-	<0.5	475	963	205	4.3	12	0.06	290	NIL (+)VE	3.7	0.66	13	1.7

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[C] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hydrocarbons (PAHs) (Environmental and Human Health Effects)

Cells with '-' indicates testing was not completed or an appropriate screening criteria was not available

NL: indicates that the site-specific risk-based aluminium screening criteria for industrial soil is at a concentration greater than physically possible in soil, and therefore the criteria is defined as 'Non-Limiting' or NL.

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

Results shown in underline are in excess of the ecological criteria

<LOR or <value = Less than the laboratory Limit of Reporting

TABLE LR3 Soil Analytical Results for AEC 8 Carbon Plant

Sample Identification	PQL	HIL D[A]	EIL C/I[B]	ESL C/I	SB11	SB12	SB13	MW14	MW15	MW16	MW16	MW17	MW17	MW18	MW18	SB108	SB109	SB110	MW105	MW105
Sample Depth (m)					0.2-0.4	1.8-1.9	1.0-1.2	0-0.4	0.1-0.4	0.2-0.4	1.8-2.0	0.2-0.4	0.8-1.0	0-0.2	0.8-1.0	0-0.1	0-0.1	0-0.1	0.15-0.25	0.3-0.4
Date					17-Apr-12	18-Apr-12	18-Apr-12	19-Apr-12	19-Apr-12	18-Apr-12	18-Apr-12	18-Apr-12	18-Apr-12	19-Apr-12	19-Apr-12	30-Jun-14	01-Jul-14	01-Jul-14	30-Jun-14	30-Jun-14
Sample Profile					FILL	FILL	FILL	FILL	FILL	FILL	ESTUARINE	FILL	ESTUARINE	FILL	ESTUARINE	FILL	FILL	FILL	FILL	FILL
PAEC Sampled					Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant
Sample collected by					KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG
Metals																				
Aluminium	50	NL*	-	-	9550	10300	14200	14700	13800	7740	3180	6740	1310	32700	8210	-	-	-	-	-
Arsenic	1	3000	160	-	10.9	16.5	3.4	6.3	5.1	0.9	1.2	0.8	0.2	12	1.8	-	-	-	-	-
Cadmium	0.1	900	-	-	<0.1	<0.1	0.1	0.1	2.4	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	-	-	-	-	-
Chromium	1	3600	320**	-	7.3	7.9	52.1	25.5	18	5	3.2	5.3	1.4	26.9	6	-	-	-	-	-
Copper	2	240000	210**	-	13.6	14.2	16	15.6	44.5	7.8	0.2	4.2	0.3	21.9	0.3	-	-	-	-	-
Nickel	1	6000	140**	-	11	12.4	34.4	53	27.8	6.4	1.8	2	0.6	51.6	4.6	-	-	-	-	-
Lead	2	1500	1800	-	6.3	6.5	25.8	9.2	44.4	3.6	1.8	37	0.6	20.6	3.3	-	-	-	-	-
Zinc	5	400000	440**	-	51.6	53.4	178	70.4	115	18.8	0.6	43.4	0.5	288	1.4	-	-	-	-	-
Mercury	0.05	730	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-
Fluoride (soluble)	40	17000*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (total)	40	-	-	-	240	150	1960	2350	3950	700	60	200	80	7740	650	-	-	-	-	-
Non Metallic Inorganics																				
Total Cyanide	1	--	-	-	<1	<1	<1	<1	<1	3	<1	<1	<1	<1	<1	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (PAH)																				
Naphthalene	0.5	-	370	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.1	<0.1	4	0.2
Acenaphthylene	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	1.9	<0.5	0.1	0.1	<0.1	7.3	0.4
Fluorene	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.1	<0.1	<0.1	2.7	0.2
Phenanthrene	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	16.6	<0.5	1.3	0.7	<0.1	3.4	0.2
Anthracene	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.4	<0.5	0.3	0.3	<0.1	0.9	<0.1
Fluoranthene	0.5	-	-	-	<0.5	<0.5	<0.5	0.7	3.8	<0.5	<0.5	<0.5	<0.5	41.2	<0.5	6	2.2	<0.1	5.9	0.1
Pyrene	0.5	-	-	-	<0.5	<0.5	<0.5	0.7	3	<0.5	<0.5	<0.5	<0.5	38.3	<0.5	6	2	<0.1	4.6	0.1
Benz(a)anthracene	0.5	-	-	-	<0.5	<0.5	<0.5	0.7	5.3	<0.5	<0.5	<0.5	<0.5	47.1	<0.5	3.4	0.8	<0.1	0.8	<0.1
Chrysene	0.5	-	-	-	<0.5	<0.5	<0.5	0.8	8.1	<0.5	<0.5	<0.5	<0.5	50.3	<0.5	3.8	0.8	0.1	0.9	<0.1
Benzo(b)&(k)fluoranthene	1	-	-	-	<0.5	<0.5	<0.5	1.1	9.6	<0.5	<0.5	<0.5	<0.5	67.2	<0.5	10	1.5	<0.2	1.3	<0.2
Benzo(k)fluoranthene	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	2.1	<0.5	<0.5	<0.5	<0.5	20.4	<0.5	-	-	-	-	-
Benzo(a) pyrene	0.5	-	-	72[C]	<0.5	<0.5	<0.5	0.6	2.1	<0.5	<0.5	<0.5	<0.5	33.6	<0.5	4.9	0.88	<0.05	0.44	<0.05
Indeno(1,2,3-c,d)pyrene	0.5	-	-	-	<0.5	<0.5	<0.5	0.6	1.5	<0.5	<0.5	<0.5	<0.5	29.2	<0.5	4.7	0.6	<0.1	0.4	<0.1
Dibenz(a,h)anthracene	0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	7.7	<0.5	0.5	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	0.5	-	-	-	<0.5	<0.5	<0.5	0.6	1.8	<0.5	<0.5	<0.5	<0.5	28.8	<0.5	4.1	0.6	<0.1	0.3	<0.1
Benzo(a) pyrene TEQ		40	-	-	<0.5	<0.5	<0.5	1.87	4.5	<0.5	<0.5	<0.5	<0.5	58.5	<0.5	7	1	<0.5	1	<0.5
Sum of reported PAH	--	4000	-	-	<0.5	<0.5	<0.5	5.8	38.6	0.8	<0.5	<0.5	<0.5	387	<0.5	46	10	0.1	33	1.2

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[C] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hydrocarbons (PAHs) (Environmental and Human Health Effects)

Cells with '-' indicates testing was not completed or an appropriate screening criteria was not available

NL: indicates that the site-specific risk-based aluminium screening criteria for industrial soil is at a concentration greater than physically possible in soil, and therefore the criteria is defined as 'Non-Limiting' or NL.

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

Results shown in underline are in excess of the ecological criteria

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil criteria derived from 'Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium (ENVIRON 2013)'

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the March 2014 investigations

TABLE LR3 Soil Analytical Results for AEC 8 Carbon Plant

Sample Identification	PQL	HIL D[A]	EIL C/I[B]	ESL C/I	MW106	MW107	HA106	HA106	HA107	HA107	HA108	HA109	HA109	HA110	HA110	HA111	HA111	HA112
Sample Depth (m)					0.0-0.1	0.15-0.25	0.1	0.15	0.1	0.2	0-0.1	0-0.1	0.3-0.4	0-0.1	0.3-0.4	0-0.1	0.3-0.4	0.1
Date					30-Jun-14	30-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14
Sample Profile					FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL
PAEC Sampled					Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant
Sample collected by					KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG
Metals																		
Aluminium	50	NL*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	1	3000	160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.1	900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	1	3600	320**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	2	240000	210**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	1	6000	140**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	2	1500	1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	5	400000	440**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.05	730	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (soluble)	40	17000*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (total)	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non Metallic Inorganics																		
Total Cyanide	1	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons (PAH)																		
Naphthalene	0.5	-	370	-	<0.1	<0.1	<0.1	<0.1	1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.5	-	-	-	<0.1	<0.1	<0.1	<0.1	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.5	-	-	-	<0.1	<0.1	0.6	0.7	4.3	8.3	0.4	0.4	0.2	1.5	0.1	1.2	1.1	0.2
Fluorene	0.5	-	-	-	<0.1	<0.1	0.3	0.3	2.6	3.6	0.2	0.2	<0.1	1	<0.1	0.8	0.4	0.1
Phenanthrene	0.5	-	-	-	0.1	<0.1	5.5	6.3	24	68	3.5	3.4	1.5	15	1.8	12	12	2.4
Anthracene	0.5	-	-	-	<0.1	<0.1	1.2	1.3	5.7	11	0.8	0.9	0.4	3.8	0.5	3.1	3.7	0.6
Fluoranthene	0.5	-	-	-	0.6	<0.1	19	20	76	220	12	11	4.5	43	7.8	37	46	9.3
Pyrene	0.5	-	-	-	0.6	<0.1	19	19	72	220	12	10	4.5	40	7.8	35	46	9
Benz(a)anthracene	0.5	-	-	-	0.7	<0.1	18	14	70	150	9	10	2.6	40	5.5	36	34	9.3
Chrysene	0.5	-	-	-	0.9	<0.1	19	13	70	130	9.3	10	2.5	41	5.5	37	34	9.8
Benzo(b)&(k)fluoranthene	1	-	-	-	2.4	<0.2	46	30	170	290	22	25	5.6	96	13	86	76	25
Benzo(k)fluoranthene	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a) pyrene	0.5	-	-	72[C]	0.72	<0.05	25	18	98	180	13	14	3.7	55	8.1	50	47	14
Indeno(1,2,3-c,d)pyrene	0.5	-	-	-	0.7	<0.1	19	15	63	150	9.1	10	2.4	41	5.8	38	36	10
Dibenz(a,h)anthracene	0.5	-	-	-	0.1	<0.1	2.7	2	15	16	0.9	1.7	0.3	9.4	0.7	8.4	4.4	1.4
Benzo(g,h,i)perylene	0.5	-	-	-	0.7	<0.1	18	14	59	130	8.9	9.7	2.3	37	5.5	33	32	9.2
Benzo(a) pyrene TEQ		40	-	-	1	<0.5	36	26	140	260	18	21	5	82	11	75	67	20
Sum of reported PAH	--	4000	-	-	7.6	NIL (+)VE	190	150	730	1600	100	110	30	420	63	380	370	100

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[C] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinog

Cells with '-' indicates testing was not completed or an appropriate screening criteria was not available

NL: indicates that the site-specific risk-based aluminium screening criteria for industrial soil is at a con

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

Results shown in underline are in excess of the ecological criteria

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil criteria derived from 'Preliminary Screening Level Health Risk Asse

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collec

TABLE LR4 Soil Analytical Results for AEC 11 Washdown Bay

Sample Identification	PQL	Guideline		SB9	SB9	MW11	SB101	SB101
Sample Depth (m)		HIL D[A]	EIL C/I[B]	0.3-0.4	0.6-0.8	0-0.2	0.0-0.1	0.3-0.4
Date				16-Apr-12	16-Apr-12	16-Apr-12	30-Jun-14	30-Jun-14
Sample Profile				FILL	FILL	FILL	FILL	FILL
PAEC Sampled				Washbay	Washbay	Washbay	Washbay	Washbay
Sample collected by				KJG	KJG	KJG	KJG	KJG
Metals								
Aluminium	50	NL*	-	39800	12600	15000	-	-
Arsenic	1	3000	160	17.1	23.9	5.8	-	-
Cadmium	0.1	900	-	11.1	0.2	0.2	-	-
Chromium	1	3600	320**	59.5	18.8	23.7	-	-
Copper	2	240000	210**	82	62	36.3	-	-
Nickel	1	6000	140**	152	29.4	24.5	-	-
Lead	2	1500	1800	185	66.4	48	-	-
Zinc	5	400000	440**	578	621	420	-	-
Mercury	0.05	730	-	0.2	<0.1	<0.1	-	-
Fluoride (soluble)	40	17000*	-	-	-	-	94	73
Fluoride (total)	40	-	-	39000	1230	960	-	-
Non Metallic Inorganics								
Total Cyanide	1	1500	-	-	-	<1	-	-

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

Cells with '-' indicates testing was not completed or an appropriate screening criteria was not available

NL: indicates that the site-specific risk-based aluminium screening criteria for industrial soil is at a concentration greater than physically possible in soil, and therefore the criteria is defined as 'Non-Limiting' or NL.

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

Results shown in underline are in excess of the ecological criteria

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil criteria derived from 'Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium (ENVIRON 2013)'

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the March 2014 investigations

TABLE LR5 Soil Analytical Results for AEC 12 Pot Lines and PAEC 25 Dry Scrubbers

Sample Identification	PQL	HIL D[A]	EIL C/I[B]	SB1	SB2	SB3	SB4	SB115	SB116	SB116	SB117	SB117	SB118	SB118	SB119	SB119	SB120	SB121
Sample Depth (m)				0-0.05	0-0.05	0-0.05	0-0.05	0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1	0.1-0.2	0.0-0.1	0.2-0.3	0.0-0.1	0.3-0.4	0.0-0.1	0.0-0.1
Date				12/04/2012	12/04/2012	12/04/2012	12/04/2012	01-Jul-14	01-Jul-14	01-Jul-14	02-Jul-14	02-Jul-14	02-Jul-14	02-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14
Sample Profile				FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL
PAEC Sampled				Pot Lines	Pot Lines	Pot Lines	Pot Lines	Pot Lines	Pot Lines	Pot Lines	Pot Lines	Pot Lines	Pot Lines	Pot Lines	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers
Sample collected by				FR	FR	FR	FR	KG	KG	KG	KG	KG	KG	KG	KG	KG	KG	KG
Metals																		
Aluminium	50	NL*	-	53300	139000	138000	41700	-	-	-	-	-	-	-	-	-	-	-
Arsenic	1	3000	160	4.5	28.9	8.8	14.6	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.1	900	-	0.7	1.8	1.4	0.8	-	-	-	-	-	-	-	-	-	-	-
Chromium	1	3600	320**	26.8	35	14.8	36	-	-	-	-	-	-	-	-	-	-	-
Copper	2	240000	210**	21.1	280	18.9	89.8	-	-	-	-	-	-	-	-	-	-	-
Nickel	1	6000	140**	98	159	166	65.7	-	-	-	-	-	-	-	-	-	-	-
Lead	2	1500	1800	25	430	28.7	247	-	-	-	-	-	-	-	-	-	-	-
Zinc	5	400000	440**	229	5400	444	1210	-	-	-	-	-	-	-	-	-	-	-
Mercury (inorganic)	0.05	730	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-
Fluoride (soluble)	40	17000*	-	-	-	-	-	73	140	48	13	24	17	29	55	36	3.1	20
Fluoride (total)	40	-	-	13400	26400	41900	20900	-	-	-	-	-	-	-	-	-	-	-

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

Cells with '-' indicates testing was not completed or an appropriate screening criteria was not available

NL: indicates that the site-specific risk-based aluminium screening criteria for industrial soil is at a concentration greater than physically possible in soil, and therefore the criteria is defined as 'Non-Limiting' or NL.

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

Results shown in underline are in excess of the ecological criteria

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil criteria derived from 'Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium (ENVIRON 2013)'

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the March 2014 investigations

TABLE LR5 Soil Analytical Results for AEC 12 Pot Line

Sample Identification	PQL	HIL D[A]	EIL C/I[B]	SB121	SB122	SB123	SB123	SB124	SB125	SB126	SB127	SB127	SB127	SB128	SB129	SB129	SB129	SB131
Sample Depth (m)				0.1-0.2	0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.1-0.2	0.4-0.6	0.0-0.1	0.0-0.1	0.1-0.2	0.9-1.0	0.0-0.1
Date				01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	01-Jul-14	02-Jul-14	02-Jul-14	02-Jul-14	02-Jul-14	02-Jul-14
Sample Profile				FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	ALLUVIAL	FILL	FILL	FILL	FILL	FILL
PAEC Sampled				Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers
Sample collected by				KG	KG	KG	KG	KG	KG	KG	KG	KG	KG	KG	KG	KG	KG	KG
Metals																		
Aluminium	50	NL*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	1	3000	160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.1	900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	1	3600	320**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	2	240000	210**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	1	6000	140**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	2	1500	1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	5	400000	440**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (inorganic)	0.05	730	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (soluble)	40	17000*	-	7.8	44	87	140	87	210	250	7.5	14	0.6	23	23	16	2.7	10
Fluoride (total)	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

Cells with '-' indicates testing was not completed or an appropriate screening crite

NL: indicates that the site-specific risk-based aluminium screening criteria for ind

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

Results shown in underline are in excess of the ecological criteria

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil criteria derived from 'Preliminary Screening L

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and T

TABLE LR5 Soil Analytical Results for AEC 12 Pot Line

Sample Identification	PQL	HIL D[A]	EIL C/I[B]	SB131	SB132	SB133	SB133	SB134	SB135	SB135	HA101	HA101	HA101	HA102	HA102	HA102	HA103	HA103	HA104
Sample Depth (m)				0.3-0.4	0.0-0.1	0.2-0.3	0.3-0.4	0-0.1	0-0.1	0.3-0.4	Surface	0.1	0.2	Surface	0.1	0.15	Surface	0.1	Surface
Date				02-Jul-14	02-Jul-14	02-Jul-14	02-Jul-14	02-Jul-14	02-Jul-14	02-Jul-14	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014	26/06/2014
Sample Profile				ALLUVIAL	FILL	ALLUVIAL	ALLUVIAL	FILL	FILL	FILL									
PAEC Sampled				Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Dry Scrubbers	Pot Lines	Pot Lines	Pot Lines	Pot Lines	Pot Lines	Pot Lines	Pot Lines	Pot Lines	Pot Lines
Sample collected by				KG	KG	KG	KG	KG	KG	KG	KW	KW	KW	KW	KW	KW	KW	KW	KW
Metals																			
Aluminium	50	NL*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	1	3000	160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.1	900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	1	3600	320**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	2	240000	210**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	1	6000	140**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	2	1500	1800	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	5	400000	440**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (inorganic)	0.05	730	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoride (soluble)	40	17000*	-	52	2.3	5	27	2.3	22	36	28	180	62	53	78	120	140	180	90
Fluoride (total)	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

Cells with '-' indicates testing was not completed or an appropriate screening crite

NL: indicates that the site-specific risk-based aluminium screening criteria for ind

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

<u>Results shown in underline are in excess of the ecological criteria</u>

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil criteria derived from 'Preliminary Screening L

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and T

TABLE LR5 Soil Analytical Results for AEC 12 Pot Line

Sample Identification	PQL	HIL D[A]	EIL C/I[B]	HA104	HA105	HA105	HA105
Sample Depth (m)				0.1	Surface	0.1	0.2
Date				26/06/2014	26/06/2014	26/06/2014	26/06/2014
Sample Profile							
PAEC Sampled				Pot Lines	Pot Lines	Pot Lines	Pot Lines
Sample collected by				KW	KW	KW	KW
Metals							
Aluminium	50	NL*	-	-	-	-	-
Arsenic	1	3000	160	-	-	-	-
Cadmium	0.1	900	-	-	-	-	-
Chromium	1	3600	320**	-	-	-	-
Copper	2	240000	210**	-	-	-	-
Nickel	1	6000	140**	-	-	-	-
Lead	2	1500	1800	-	-	-	-
Zinc	5	400000	440**	-	-	-	-
Mercury (inorganic)	0.05	730	-	-	-	-	-
Fluoride (soluble)	40	17000*	-	82	100	120	67
Fluoride (total)	40	-	-	-	-	-	-

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

Cells with '-' indicates testing was not completed or an appropriate screening crite

NL: indicates that the site-specific risk-based aluminium screening criteria for ind

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

Results shown in underline are in excess of the ecological criteria

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil criteria derived from 'Preliminary Screening L

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and T

TABLE LR6 Soil Analytical Results for PAEC 26 Ring furnace Scrubber

Sample Identification	PQL	HIL D[A]	EIL C/I[B]	ESL C/I	HA113	HA113	HA114	HA115	HA115	HA116	HA116	HA117	HA117	HA119	HA119	HA120	HA121	HA122	HA122	SB106
Sample Depth (m)					0-0.1	0.3-0.4	0-0.1	0-0.1	0.2-0.3	0-0.1	0.3-0.4	0-0.1	0.25-0.35	0-0.1	0.3-0.4	0-0.1	0-0.1	0-0.1	0.3-0.4	0.0-0.1
Date					27-Jun-14	27-Jun-14	27-Jun-14	27-Jun-14	27-Jun-14	27-Jun-14	27-Jun-14	27-Jun-14	27-Jun-14	27-Jun-14	27-Jun-14	27-Jun-14	27-Jun-14	27-Jun-14	27-Jun-14	30-Jun-14
Sample Profile					FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL	FIILL
PAEC Sampled					27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014	27/06/2014	30/06/2014
Sample collected by					KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KG
Metals																				
Fluoride (soluble)	40	17000*		-	40	130	29	7.9	-	28	-	13	-	76	130	13	17	39	68	38
Polycyclic Aromatic Hydrocarbons (PAH)																				
Naphthalene	0.1	-	370	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	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
Acenaphthene	0.1	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.9	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	-	-	-	2.7	0.9	0.4	16	2.2	4.2	0.2	4	<0.1	5.6	1.5	1.4	0.1	0.4	0.7	<0.1
Anthracene	0.1	-	-	-	0.7	0.3	<0.1	3.5	0.6	0.8	<0.1	1.3	<0.1	1	0.4	0.4	<0.1	<0.1	0.2	<0.1
Fluoranthene	0.1	-	-	-	15	3.2	3.1	210	40	41	3.4	38	0.3	17	5.8	12	1.2	2.4	2.6	0.2
Pyrene	0.1	-	-	-	14	3.1	3	240	50	41	3.4	38	0.3	16	5.6	11	1.2	2.3	2.5	0.3
Benz(a)anthracene	0.1	-	-	-	9.5	1.5	4.4	300	61	57	3.1	52	0.2	16	3.2	14	1.5	2.4	1.4	0.3
Chrysene	0.1	-	-	-	12	1.6	8.1	490	110	110	5.8	110	0.3	21	3.3	26	2.8	4.2	1.7	0.3
Benzo(b)&(k)fluoranthene	0.2	-	-	-	28	3.6	18	990	230	240	12	300	0.8	53	7.4	69	7.4	8.8	3.8	0.7
Benzo(a) pyrene	0.05	-	-	72[C]	8.6	1.9	3.7	230	44	42	1.7	47	0.26	19	4.3	12	1.4	2.2	1.7	0.3
Indeno(1,2,3-c,d)pyrene	0.1	-	-	-	7.4	1.3	3.1	190	44	48	2.9	76	0.3	17	3.1	20	2.2	2.1	1.2	0.3
Dibenz(a,h)anthracene	0.1	-	-	-	1.4	0.2	0.8	60	15	12	0.7	25	<0.1	3	0.3	4.9	0.5	0.4	0.2	<0.1
Benzo(g,h,i)perylene	0.1	-	-	-	7.5	1.2	3.3	190	42	53	2.9	81	0.3	16	2.9	21	2.4	2.1	1.3	0.3
Benzo(a) pyrene TEQ	0.5	40	-	-	15	3	7	440	94	90	4	120	<0.5	31	6	28	3	4	3	<0.5
Sum of reported PAH	--	4000	-	-	110	19	47	2900	640	640	37	770	2.8	190	38	190	21	27	17	2.7

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[C] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hydrocarbons (PAHs) (Environmental and Human Health Effects)

Cells with '-' indicates testing was not completed or an appropriate screening criteria was not available

NL: indicates that the site-specific risk-based aluminium screening criteria for industrial soil is at a concentration greater than physically possible in soil, and therefore the criteria is defined as 'Non-Limiting' or NL.

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

Results shown in underline are in excess of the ecological criteria

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil criteria derived from 'Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium (ENVIRON 2013)'

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the March 2014 investigations

TABLE LR7 Soil Analytical Results for PAEC 28 Playing Fields

Sample Identification	PQL	HIL D[A]	HSL D[B]	EIL C/I[C]	Management Limits[D]	ESL C/I[E]	TP101	TP104	TP107	TP111	TP113	TP115	TP116
Sample Depth (m)							0.2	0-0.2	0.5	0-0.3	0.4-0.5	0.4-0.5	0.1-0.3
Date							23-Jun-14	23-Jun-14	23-Jun-14	23-Jun-14	23-Jun-14	23-Jun-14	23-Jun-14
Sample Profile							Estuarine	Estuarine	Estuarine	Fiill	Estuarine	Estuarine	Fill
PAEC Sampled							Playing Fields	Playing Fields	Playing Fields	Playing Fields	Playing Fields	Playing Fields	Playing Fields
Sample collected by							KW	KW	KW	KW	KW	KW	KW
Metals													
Arsenic	4	3000		160			<4	<4	<4	<4	<4	<4	63
Cadmium	0.4	900		-			<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.5
Chromium	1	3600		320**			3	12	<1	23	17	11	12
Copper	1	240,000		210**			2	2	<1	2	<1	<1	590
Lead	1	1500		1800			5	10	1	12	24	4	1600
Mercury	0.1	730		-			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	1	6000		140**			8	5	1	6	3	1	5
Zinc	1	400,000		440**			32	36	3	35	5	2	5600
Fluoride (soluble)	0.5	17000*		-			45	16	19	22	<0.5	2.1	31
Polycyclic Aromatic Hydrocarbons (PAH)													
Naphthalene	0.1			370			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1						0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1						0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)&(k)fluoranthene	0.2						<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a) pyrene	0.05					72[F]	0.07	0.12	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a) pyrene TEQ	0.5	40					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of reported PAH	--	4000					0.35	0.69	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Total Petroleum Hydrocarbons (TPH)													
TRH C6-C10	25				800		<25	<25	<25	<25	<25	<25	<25
TRH >C10-C16	50				1000	170	<50	<50	<50	<50	<50	<50	<50
TRH >C16-C34	100				5000	2500	<100	<100	<100	<100	<100	<100	<100
TRH >C34-C40	100				10000	6600	<100	<100	<100	<100	<100	<100	<100
TRH C6-C10 - BTEX (F1)	25		260			215	<25	<25	<25	<25	<25	<25	<25
TRH >C10-C36 - Naph (F2)	50		NL				<50	<50	<50	<50	<50	<50	<50
Benzene, Toluene, Ethyl benene, Xylene (BTEX)													
Benzene	0.2		3			75	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	0.5		NL			135	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	2		NL			165	<2	<2	<2	<2	<2	<2	<2
Xylenes	1		230			180	<1	<1	<1	<1	<1	<1	<1

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Soil Health Screening Level for Vapour Intrusion 'D' Commercial/ Industrial

[C] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[D] NEPM (2013) Management Limits for TPH Fractions F1 to F4 in soil

[E] NEPM (2013) Ecological Screening Level for Commercial/ Industrial

[F] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hydrocarbons (PAHs) (Environmental and Human Health Effects)

Cells with '-' indicates testing was not completed or an appropriate screening criteria was not available

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

Results shown in underline are in excess of the ecological criteria

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil criteria derived from 'Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium (ENVIRON 2013)'

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the March 2014 investigations

NL: If the derived soil HSL exceeds the soil saturation concentration the HSL is shown as 'not limiting' or 'NL'.

TABLE LR8 Soil Analytical Results for PAEC 29 Area East of Playing Fields

Sample Identification	PQL	HIL D[A]	HSL D[B]	EIL C/I[C]	Management Limits[D]	ESL C/I[E]	TP117	TP118	TP119	TP120	TP122	TP123	TP124	TP125	TP126	TP127
Sample Depth (m)							0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Date							25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14
Sample Profile							FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL
PAEC Sampled							EPF	EPF	EPF	EPF	EPF	EPF	EPF	EPF	EPF	EPF
Sample collected by							KW	KW	KW	KW	KW	KW	KW	KW	KW	KW
Metals																
Arsenic	4	3000		160			<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Cadmium	0.4	900		-			<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	1	3600		320**			11	5	3	3	5	7	7	7	5	6
Copper	1	240,000		210**			17	4	3	2	1	2	3	2	5	3
Lead	1	1500		1800			23	7	8	18	6	9	7	8	6	6
Mercury	0.1	730		-			0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	1	6000		140**			18	6	4	4	3	7	5	6	4	4
Zinc	1	400,000		440**			51	41	20	22	14	26	12	57	23	13
Fluoride (soluble)	40	17000*		-			340	22	28	17	26	23	17	27	15	19
Polycyclic Aromatic Hydrocarbons (PAH)																
Naphthalene	0.1			370			1.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1						7.6	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.1						2.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1						130	0.2	0.1	<0.1	0.1	0.2	<0.1	0.1	0.1	0.2
Anthracene	0.1						33	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	0.1						390	0.5	0.5	0.2	0.5	0.7	0.1	0.4	0.4	0.6
Pyrene	0.1						380	0.4	0.5	0.2	0.5	0.7	<0.1	0.4	0.4	0.5
Benz(a)anthracene	0.1						180	0.2	0.4	0.1	0.3	0.4	<0.1	0.3	0.2	0.2
Chrysene	0.1						170	0.2	0.4	0.1	0.4	0.4	<0.1	0.3	0.2	0.2
Benzo(b)&(k)fluoranthene	0.2						320	0.4	1.2	0.2	0.8	1	<0.2	0.8	0.4	0.3
Benzo(a) pyrene	0.05					72[F]	220	0.23	0.58	0.13	0.47	0.56	0.06	0.41	0.21	0.17
Indeno(1,2,3-c,d)pyrene	0.1						120	0.2	0.5	0.1	0.4	0.5	<0.1	0.4	0.2	0.1
Dibenz(a,h)anthracene	0.1						26	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	0.1						120	0.2	0.4	0.1	0.4	0.4	<0.1	0.3	0.1	0.1
Benzo(a) pyrene TEQ	0.5	40					310	<0.5	1	<0.5	1	1	<0.5	1	<0.5	<0.5
Sum of reported PAH	--	4000					2100	2.5	4.8	1	4	4.8	0.18	3.5	2.3	2.2
Total Petroleum Hydrocarbons (TPH)																
TRH C6-C10	25				800		<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
TRH >C10-C16	50				1000	170	<50	<50	<50	<50	<50	61	<50	<50	<50	<50
TRH >C16-C34	100				5000	2500	5100	<100	<100	<100	<100	150	<100	<100	<100	<100
TRH >C34-C40	100				10000	6600	1000	<100	<100	<100	<100	<100	<100	<100	<100	<100
TRH C6-C10 - BTEX (F1)	25		260			215	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
TRH >C10-C36 - Naph (F2)	50		NL				<50	<50	<50	<50	<50	61	<50	<50	<50	<50
Benzene, Toluene, Ethyl benene, Xylene (BTEX)																
Benzene	0.2		3			75	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	0.5		NL			135	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	2		NL			165	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylenes	1		230			180	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Soil Health Screening Level for Vapour Intrusion 'D' Commercial/ Industrial

[C] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[D] NEPM (2013) Management Limits for TPH Fractions F1 to F4 in soil

[E] NEPM (2013) Ecological Screening Level for Commercial/ Industrial

[F] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hydrocarbons (PAHs) (Environmental and Human Health Effects)

Cells with '-' indicates testing was not completed or an appropriate screening criteria was not available

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

Results shown in underline are in excess of the ecological criteria

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil crite

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the March 2014 investigations

NL: If the derived soil HSL exceeds the soil saturation concentration the HSL is shown as ‘not limiting’ or ‘NL’.

TABLE LR9 Soil Analytical Results for PAEC 31 Storage Area west of Pot Line 3

Sample Identification	PQL	HIL D[A]	HSL D[B]	EIL C/I[C]	Management Limits[D]	ESL C/I[E]	TP128	TP128	TP129	TP130	TP130	TP131	TP132	TP132	TP133	TP134	TP135	TP135	TP136	TP137	TP137
Sample Depth (m)							0.1	0.2	0-0.3	0-0.3	0.6-0.7	0.1-0.3	0.1	0.4	0.1-0.2	0.2	0.1	0.4	0.1	0.1	0.4
Date							25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14	25-Jun-14
Sample Profile							FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL
PAEC Sampled							SAPL3	SAPL3	SAPL3	SAPL3	SAPL3	SAPL3	SAPL3	SAPL3	SAPL3	SAPL3	SAPL3	SAPL3	SAPL3	SAPL3	SAPL3
Sample collected by							KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW
Metals																					
Arsenic	4	3000		160			30	6	6	<4	<4	7	20	<4	8	7	9	6	6	<4	5
Cadmium	0.4	900		-			<0.4	<0.4	<0.4	<0.4	<0.4	4.3	<0.4	<0.4	<0.4	0.4	0.6	<0.4	<0.4	<0.4	<0.4
Chromium	1	3600		320**			17	8	15	9	29	29	33	15	11	10	19	13	6	20	18
Copper	1	240,000		210**			94	12	8	12	1	48	44	2	22	28	140	12	10	24	<1
Lead	1	1500		1800			120	8	9	11	8	23	13	10	21	47	38	16	7	29	17
Mercury	0.1	730		-			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	1	6000		140**			18	14	47	54	8	130	27	3	16	21	17	6	10	12	4
Zinc	1	400,000		440**			510	48	47	86	15	240	130	8	140	220	210	47	42	76	22
Fluoride (soluble)	40	17000*		-			220	800	200	1463	120	87	58	0.9	1.1	110	110	4.6	13	2.2	7
Polycyclic Aromatic Hydrocarbons (PAH)																					
Naphthalene	0.1			370			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	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
Acenaphthene	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
Fluorene	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
Phenanthrene	0.1						<0.1	<0.1	0.4	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	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
Fluoranthene	0.1						<0.1	<0.1	1	1	<0.1	0.2	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	0.1						<0.1	<0.1	0.9	1	<0.1	0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	0.1						<0.1	<0.1	0.5	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	0.1						<0.1	<0.1	0.5	0.6	<0.1	0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)&(k)fluoranthene	0.2						<0.2	<0.2	1.1	1	<0.2	0.2	<0.2	<0.2	0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a) pyrene	0.05					72[F]	0.08	<0.05	0.64	0.56	<0.05	0.11	0.06	<0.05	0.11	<0.05	0.05	<0.05	<0.05	0.08	<0.05
Indeno(1,2,3-c,d)pyrene	0.1						<0.1	<0.1	0.5	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a,h)anthracene	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
Benzo(g,h,i)perylene	0.1						<0.1	<0.1	0.5	0.4	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(a) pyrene TEQ	0.5	40					<0.5	<0.5	1	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of reported PAH	--	4000					0.08	NIL (+)VE	6.2	5.7	NIL (+)VE	0.76	0.06	0.13	0.84	NIL (+)VE	0.05	NIL (+)VE	NIL (+)VE	0.18	NIL (+)VE
Total Petroleum Hydrocarbons (TPH)																					
TRH C6-C10	25				800		<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
TRH >C10-C16	50				1000	170	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TRH >C16-C34	100				5000	2500	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	590	<100
TRH >C34-C40	100				10000	6600	<100	<100	<100	<100	<100	<100	<100	<100	120	<100	<100	<100	<100	<100	<100
TRH C6-C10 - BTEX (F1)	25		260			215	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
TRH >C10-C36 - Naph (F2)	50		NL				<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
benzene, Toluene, Ethyl benzene, Xylene (BTEX)																					
Benzene	0.2		3			75	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	0.5		NL			135	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	2		NL			165	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylenes	1		230			180	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Soil Health Screening Level for Vapour Intrusion 'D' Commercial/ Industrial

[C] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[D] NEPM (2013) Management Limits for TPH Fractions F1 to F4 in soil

[E] NEPM (2013) Ecological Screening Level for Commercial/ Industrial

[F] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hydrocarbons (PAHs) (Environmental and Human Health Effects)

Cells with '-' indicates testing was not completed or an appropriate screening criteria was not available

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

<u>Results shown in underline are in excess of the ecological criteria</u>

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil criteria derived from 'Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium (ENVIRON 2013)'

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the March 2014 investigations

NL: If the derived soil HSL exceeds the soil saturation concentration the HSL is shown as 'not limiting' or 'NL'.

TABLE LR9 Soil Analytical Results for PAEC 31 Storage Area west of Pot Line 3

Sample Identification	PQL	HIL D[A]	HSL D[B]	EIL C/I[C]	Management Limits[D]	ESL C/I[E]	TP138	TP139	TP140
Sample Depth (m)							0.2	0.1	0.1
Date							25-Jun-14	25-Jun-14	25-Jun-14
Sample Profile							FILL	FILL	FILL
PAEC Sampled							SAPL3	SAPL3	SAPL3
Sample collected by							KW	KW	KW
Metals									
Arsenic	4	3000		160			<4	4	<4
Cadmium	0.4	900		-			<0.4	<0.4	<0.4
Chromium	1	3600		320**			7	17	7
Copper	1	240,000		210**			<1	26	1
Lead	1	1500		1800			8	33	13
Mercury	0.1	730		-			<0.1	<0.1	<0.1
Nickel	1	6000		140**			3	15	5
Zinc	1	400,000		440**			41	280	7
Fluoride (soluble)	40	17000*		-			5.5	79	50
Polycyclic Aromatic Hydrocarbons (PAH)									
Naphthalene	0.1			370			<0.1	0.4	<0.1
Acenaphthylene	0.1						<0.1	<0.1	<0.1
Acenaphthene	0.1						<0.1	0.6	<0.1
Fluorene	0.1						<0.1	0.6	<0.1
Phenanthrene	0.1						<0.1	2.3	<0.1
Anthracene	0.1						<0.1	0.3	<0.1
Fluoranthene	0.1						<0.1	3.8	<0.1
Pyrene	0.1						<0.1	3.4	<0.1
Benz(a)anthracene	0.1						<0.1	2.4	<0.1
Chrysene	0.1						<0.1	2.7	<0.1
Benzo(b)&(k)fluoranthene	0.2						<0.2	5.6	<0.2
Benzo(a) pyrene	0.05					72[F]	<0.05	2.9	<0.05
Indeno(1,2,3-c,d)pyrene	0.1						<0.1	2.1	<0.1
Dibenz(a,h)anthracene	0.1						<0.1	0.3	<0.1
Benzo(g,h,i)perylene	0.1						<0.1	1.9	<0.1
Benzo(a) pyrene TEQ	0.5	40					<0.5	4	<0.5
Sum of reported PAH	--	4000					NIL (+)VE	29	NIL (+)VE
Total Petroleum Hydrocarbons (TPH)									
TRH C6-C10	25				800		<25	<25	<25
TRH >C10-C16	50				1000	170	<50	<50	<50
TRH >C16-C34	100				5000	2500	<100	<100	<100
TRH >C34-C40	100				10000	6600	<100	<100	<100
TRH C6-C10 - BTEX (F1)	25		260			215	<25	<25	<25
TRH >C10-C36 - Naph (F2)	50		NL				<50	<50	<50
benzene, Toluene, Ethyl benzene, Xylene (BTEX)									
Benzene	0.2		3			75	<0.2	<0.2	<0.2
Toluene	0.5		NL			135	<0.5	<0.5	<0.5
Ethylbenzene	2		NL			165	<2	<2	<2
Xylenes	1		230			180	<1	<1	<1

All results are in units of mg/kg.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Soil Health Screening Level for Vapour Intrusion 'D' Commercial/ Industrial

[C] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[D] NEPM (2013) Management Limits for TPH Fractions F1 to F4 in soil

[E] NEPM (2013) Ecological Screening Level for Commercial/ Industrial

[F] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hydrocar

Cells with '-' indicates testing was not completed or an appropriate screening criteria was not available

PQL = Practical Quantitation Limit.

Results shown in shading are in excess of the human health criteria

<u>Results shown in underline are in excess of the ecological criteria</u>

<LOR or <value = Less than the laboratory Limit of Reporting

* Site-specific fluoride (soluble) soil criteria derived from 'Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium (ENVIR

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the March 2

NL: If the derived soil HSL exceeds the soil saturation concentration the HSL is shown as 'not limiting' or 'NL'.

TABLE LR10 Groundwater Analytical Results (µg/L)

Sample Identification	PQL	Guideline				MW06	MW06	MW101	MW102	MW07	MW07	MW08	MW08	MW09	MW09	MW10	MW10	MW11	MW11	MW12	MW12	MW13	MW13	MW103	MW104
Date		95% Fresh [A]	Recreational	Irrigation	Stock	2/5/12	10/7/14	9/7/14	9/7/14	1/5/12	9/7/14	1/5/12	9/7/14	30/4/12	9/7/14	30/4/12	9/7/14	1/5/12	9/7/14	30/4/12	9/7/14	1/5/12	9/7/14	9/7/14	9/7/14
PAEC Sampled						Background	Background	Refuelling	Refuelling	Refuelling	Refuelling	Refuelling	Refuelling	FLS	FLS	FLS	FLS	Washbay	Washbay	AWP	AWP	AWP	AWP	AWP	AWP
Sample Appearance						Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Cloudy	Clear	Turbid	Clear	Milky	Clear	Brown	Clear	Cloudy	Brown	Clear	Clear
Sample collected by						KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG
Metals																									
Aluminium pH>6.5	10	55	9000	5000	5000	10	180	<10	<10	30	<10	150	1200	10	30	<10	2900	380	390	13,600	<10	2,150	2,500	7,700	1,300
Arsenic	1	24	100	100	500	<10	1	2	1	13	6	3	<1	3	2	2	3	18	1	16	<1	4	<1	1	2
Cadmium	0.1	2*	20	10	10	<1	<0.1	<0.1	<0.1	0.2	<0.1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	2.1	<0.1	<0.1	<0.1	0.2	<0.1
Chromium	1	27*	500	100	1000	<10	<1	<1	<1	<10	<1	2	1	<1	<1	<1	3	2	<1	29	<1	4	6	<1	6
Copper	1	12*	20,000	200	500	<10	1	4	2	10	<1	<1	<1	2	1	1	<1	2	<1	88	<1	1	<1	<1	3
Nickel	1	97*	200	200	1000	22	20	9	2	30	2	2	<1	16	14	19	24	5	6	110	15	2	<1	18	5
Lead	1	87*	100	2000	100	<10	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	133	<1	<1	<1	<1	<1
Zinc	5	70*	30,000	2000	20,000	78	16	10	4	28	3	12	<1	9	1	10	9	28	2	699	8	25	2	92	8
Mercury	0.1	0.6	10	2	2	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.1	<0.05	<0.1	<0.05	<0.1	<0.05	<0.1	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05
Fluoride	100		1500	1000	2000	1000	220	460	3200	1300	1400	4900	6700	1000	560	1200	2100	3900	8300	1700	220	43000	40000	12000	13000
Non Metallic Inorganics																									
Free Cyanide	4	7	800			<4								<8		<4		<4		<8		7			
Total Cyanide	4	NA				<4								<8		<4		13		<8		40			
Total Petroleum Hydrocarbons (TPH)																									
TPH C6-C9	20							<10	18	<20	<10	<20	<10												
TPH C10-C14	50							<50	<50	<50	<50	<50	<50												
TPH C15-C28	100							<100	<100	<100	<100	330	<100												
TPH C29-C36	100							<100	<100	<50	<100	<50	<100												
TPH C6-C36		LOR		LOR	LOR			<100	18	<50	<100	330	<100												
Polycyclic Aromatic Hydrocarbons (PAH)																									
Naphthalene	0.1	16				<0.1				<0.1		<0.1		<0.1		<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.1					<0.1				<0.1		<0.1		<0.1		<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.1					<0.1				<0.1		<0.1		<0.1		<0.1		<0.1		<0.1	<0.1	0.2	<0.1	<0.1	<0.1
Fluorene	0.1					<0.1				<0.1		<0.1		<0.1		<0.1		<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	0.1	*2*				<0.1				<0.1		<0.1		<0.1		<0.1		<0.1		<0.1	<0.1	0.9	<0.1	<0.1	<0.1
Anthracene	0.1	*0.4*				<0.1				<0.1		<0.1		<0.1		<0.1		<0.1		<0.1	<0.1	0.2	<0.1	<0.1	<0.1
Fluoranthene	0.1	*1.4*				<0.1				<0.1		<0.1		0.2		<0.1		<0.1		0.3	<0.1	4.8	<0.1	<0.1	0.1
Pyrene	0.1					<0.1				<0.1		<0.1		0.2		<0.1		<0.1		0.3	<0.1	5	<0.1	<0.1	0.2
Benz(a)anthracene	0.1					<0.1				<0.1		<0.1		0.3		<0.1		<0.1		0.3	<0.1	4	<0.1	<0.1	<0.1
Chrysene	0.1					<0.1				<0.1		<0.1		0.6		<0.1		<0.1		0.2	<0.1	3.6	<0.1	<0.1	0.1
Benzo(b)&(k)fluoranthene	0.2					<0.2				<0.2		<0.2		1.8		<0.2		<0.2		0.8	<0.2	10.8	<0.2	<0.2	<0.2
Benzo(a) pyrene	0.05	*0.2*				<0.05				<0.05		<0.05		<0.05		<0.05		<0.05		0.4	<0.05	6.46	<0.05	<0.05	0.1
Indeno(1,2,3-c,d)pyrene	0.1					<0.1				<0.1		<0.1		0.2		<0.1		<0.1		0.2	<0.1	3	<0.1	<0.1	0.1
Dibenz(a,h)anthracene	0.1					<0.1				<0.1		<0.1		0.1		<0.1		<0.1		<0.1	<0.1	1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	0.1					<0.1				<0.1		<0.1		0.4		<0.1		<0.1		0.2	<0.1	2.6	<0.1	<0.1	0.1
Semivolatile Organic Compounds (SVOCs)																									
Organochlorine Pesticides (OCP)																									
alpha-BHC	2					<2								<2		<2									
HCB	2					<2								<2		<2									
delta-BHC	2					<2								<2		<2									
Heptachlor	2	0.09				<2								<2		<2									
Aldrin	2	*0.001*				<2								<2		<2									
Heptachlor epoxide	2					<2								<2		<2									
Chlordane	2	0.08				<2								<2		<2									
Endosulfan	2	0.2				<2								<2		<2									
Dieldrin	2	*0.01*				<2								<2		<2									
DDE	2	*0.03*				<2								<2		<2									
Endrin	2	0.02				<2								<2		<2									
DDD	2					<2								<2		<2									
Endrin aldehyde	2					<2								<2		<2									
Endosulfan sulfate	2					<2								<2		<2									
DDT	4	0.01				<4								<4		<4									
Organophosphorous Pesticides (OPP)																									
Dichlorvos	2					<2								<2		<2									
Dimethoate	2	0.15				<2								<2		<2									
Diazinon	2	0.01				<2								<2		<2									
Chlorpyrifos-methyl	2					<2								<2		<2									
Malathion	2	0.05				<2								<2		<2									
Fenthion	2	0.2				<2								<2		<2									
Chlorpyrifos	2					<2								<2		<2									
Bromophos-ethyl	2					<2								<2		<2									
Chlorfenvinphos	2					<2								<2		<2									
Prothiofos	2					<2								<2		<2									
Ethion	2					<2								<2		<2									
Phenols																									
Total Phenolics	4	320				<4								<4		<4									
Phthalate Esthers																									
Dimethylphthalate	2	3700				<2								<2		<2									
Diethylephthalate	2	1000				<2								<2		<2									
Nitrosamines																									
Total Nitrosamines	2					<2								<2		<2									
Nitroaromatics and Ketones																									
Total Nitroaromatics and Ketones	2					<2								<2		<2									
Haloethers																									
Total Haloethers	2					<2								<2		<2									
Chlorinated Hydrocarbons																									
Total Chlorinated Hydrocarbons	2					<2								<2		<2									
Anilines and Benzidines																									
Total Anilines and Benzidines	2					<2								<2		<2									
Miscellaneous Compounds																									
Total Misscellaneous Compounds	2					<2								<2		<2									

All results in ug/L

PQL = Practical Quantitation Limit.

[A] ANZECC 2000 95% Protection Level for Receiving Water Type

Guidelines in *italics* are low level reliability guidelines

[B] NHMRC Australian Drinking Water Guidelines, 2011

* Hardness Modified Trigger Values for Cd, Cr (III), Cu, Ni, Pb, Zn

NHMRC arsenic guidelines are based on total arsenic

NHMRC guidelines for chromium are based on Cr (VI)

Total Phenolics guideline based on Phenol

ANZECC guidelines for mercury are based on inorganic mercury.

NHMRC guidelines for mercury are based on total mercury.

NHMRC guidelines for total cyanide are based on cyanogen chloride (as cyanide).

Results for TRH have been compared to TPH guidelines.

Results shaded grey are in excess of the primary acceptance criteria: ANZECC 95%, NHMRC (2011)

TABLE LR10 Groundwater Analytical Results (µg/L)

Sample Identification	PQL	Guideline: 95% Fresh [A]	Recreational	Irrigation	Stock	MW14	MW14	MW15	MW15	MW16	MW16	MW17	MW17	MW18	MW18	MW105	MW106	MW107	S3A	S3A	S3B	S3B	SUMP	MW19	MW19	MW20	MW20	MW21
Date						1/5/12	9/7/14	3/5/12	11/7/14	3/5/12	10/7/14	3/5/12	10/7/14	3/5/12	10/7/14	10/7/14	10/7/14	11/7/14	3/5/12	10/7/14	3/5/12	10/7/14	3/5/12	1/5/12	10/7/14	3/5/12	10/7/14	2/5/12
PAEC Sampled						Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	DSA	DSA	DSA	DSA	PRA
Sample Appearance						Yellow	Clear	Yellow	Clear	Clear	Clear	Cloudy	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Milky	Clear	Cloudy	Clear	Clear
Sample collected by						KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG
Metals																												
Aluminium pH>6.5	10	55	9000	5000	5000	110	<10	200	180	100	<10	3,260	3,800	3,120	750	20	50	5,000	50	630	270	1400	40	-	8	-	1500	20
Arsenic	1	24	100	100	500	2	2	<1	2	4	<1	12	12	2	<1	1	2	<1	5	1	2	5	4	-	<0.1	-	2	<1
Cadmium	0.1	2*	20	10	10	0.3	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.2	<1	0.2	3	-	1	-	<0.1	<0.1
Chromium	1	27*	500	100	1000	<1	<1	<1	<1	1	<1	<1	4	3	<1	2	5	2	<1	1	1	2	<1	-	<1	-	2	<10
Copper	1	12*	20,000	200	500	7	3	2	<1	4	2	10	1	2	<1	1	<1	<1	4	<1	2	3	5	-	<1	-	<1	<10
Nickel	1	97*	200	200	1000	10	7	7	9	6	<1	14	8	3	<1	4	2	3	6	2	1	7	8	-	7	-	4	62
Lead	1	87*	100	2000	100	<1	<1	<1	<1	<1	<1	34	1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	-	<1	-	<1	<10
Zinc	5	70*	30,000	2000	20,000	32	7	37	2	57	1	40	6	50	4	4	15	7	31	64	24	13	38	-	2	-	6	70
Mercury	0.1	0.6	10	2	2	<0.1	<0.05	<0.1	<0.05	<0.1	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.1	<0.05	<0.1	-	<0.05	-	<0.05	<0.1
Fluoride	100		1500	1000	2000	3600	850	4500	2700	1500	2300	800	1100	35000	17000	1100	7400	10000	12000	8200	14000	12000	4400	-	370	-	670	3000
Non Metallic Inorganics																												
Free Cyanide	4	7	800			<4		<4		<8		<8		<4					<4		<4		<4					
Total Cyanide	4	NA				4		<4		<8		<8		<4					<4		<4		<4					
Total Petroleum Hydrocarbons (TPH)																												
TPH C6-C9	20										<10					240								<20		<20		
TPH C10-C14	50										<50					180								<50		<50		
TPH C15-C28	100										<100					1400								<100		<100		
TPH C29-C36	100										<100					<100								<50		<50		
TPH C6-C36		LOR		LOR	LOR						<100					1820								<50		<50		
Polycyclic Aromatic Hydrocarbons (PAH)																												
Naphthalene	0.1	16				<0.1		<0.1		5.2	<0.1	0.2	<0.1	<0.1	<0.1		<0.1		<0.1		<0.1		<0.1	<0.1		<0.1		
Acenaphthylene	0.1					<0.1		<0.1		<0.1	<0.1	22.9	<0.1	<0.1	<0.1		<0.1		<0.1		<0.1		<0.1	<0.1		<0.1		
Acenaphthene	0.1					<0.1		<0.1		9.4	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1		<0.1		<0.1		<0.1	<0.1		<0.1		
Fluorene	0.1					<0.1		<0.1		1.1	<0.1	2	<0.1	<0.1	<0.1		<0.1		<0.1		<0.1		<0.1	<0.1		<0.1		
Phenanthrene	0.1	*2*				<0.1		<0.1		0.6	<0.1	0.4	<0.1	<0.1	<0.1		<0.1		<0.1		<0.1		<0.1	<0.1		<0.1		
Anthracene	0.1	*0.4*				<0.1		<0.1		0.6	<0.1	0.1	<0.1	<0.1	<0.1		<0.1		<0.1		<0.1		<0.1	<0.1		<0.1		
Fluoranthene	0.1	*1.4*				0.1		<0.1		1	<0.1	0.2	<0.1	<0.1	<0.1		<0.1		<0.1		<0.1		<0.1	<0.1		<0.1		
Pyrene	0.1					0.1		<0.1		0.7	<0.1	0.1	<0.1	<0.1	<0.1		<0.1		<0.1		<0.1		<0.1	<0.1		<0.1		
Benz(a)anthracene	0.1					<0.1		<0.1		0.2	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1		<0.1		<0.1		<0.1	<0.1		<0.1		
Chrysene	0.1					<0.1		<0.1		0.2	<0.1	<0.1	<0.1	<0.1	<0.1		<0.1		<0.1		<0.1		<0.1	<0.1		<0.1		
Benzo(b)&(k)fluoranthene	0.2					0.1		<0.2		0.3	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2		0.2		<0.2		<0.2	<0.2		<0.2		
Benzo(a) pyrene	0.05	*0.2*				0.06		<0.05		0.22	<0.05	<0.05	<0.05	0.06	<0.05		<0.05		0.14		0.08		<0.05	<0.05		<0.05		
Indeno(1,2,3-c,d)pyrene	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		
Dibenz(a,h)anthracene	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		
Benzo(g,h,i)perylene	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		
Semivolatile Organic Compounds (SVOCs)																												
Organochlorine Pesticides (OCP)																												
alpha-BHC	2																											<2
HCB	2																											<2
delta-BHC	2																											<2
Heptachlor	2	0.09																										<2
Aldrin	2	*0.001*																										<2
Heptachlor epoxide	2																											<2
Chlordane	2	0.08																										<2
Endosulfan	2	0.2																										<2
Dieldrin	2	*0.01*																										<2
DDE	2	*0.03*																										<2
Endrin	2	0.02																										<2
DDD	2																											<2
Endrin aldehyde	2																											<2
Endosulfan sulfate	2																											<2
DDT	4	0.01																										<4
Organophosphorous Pesticides (OPP)																												
Dichlorvos	2																											<2
Dimethoate	2	0.15																										<2
Diazinon	2	0.01																										<2
Chlorpyrifos-methyl	2																											<2
Malathion	2	0.05																										<2
Fenthion	2	0.2																										<2
Chlorpyrifos	2																											<2
Bromophos-ethyl	2																											<2
Chlorfenvinphos	2																											<2
Prothiofos	2																											<2
Ethion	2																											<2
Phenols																												
Total Phenolics	4	320																										<4
Phthalate Esthers																												
Dimethylphthalate	2	3700																										<2
Diethylephthalate	2	1000																										<2
Nitrosamines																												
Total Nitrosamines	2																											<2
Nitroaromatics and Ketones																												
Total Nitroaromatics and Ketones	2																											<2
Haloethers																												
Total Haloethers	2																											<2
Chlorinated Hydrocarbons																												
Total Chlorinated Hydrocarbons	2																											<2
Anilines and Benzidines																												
Total Anilines and Benzidines	2																											<2
Miscellaneous Compounds																												
Total Misscellaneous Compounds	2																											<2

All results in ug/L
PQL = Practical Quantitation Limit.
[A] ANZECC 2000 95% Protection Level for Receiving Water Type
Guidelines in *italics* are low level reliability guidelines
[B] NHMRC Australian Drinking Water Guidelines, 2011
* Hardness Modified Trigger Values for Cd, Cr (III), Cu, Ni, Pb, Zn
NHMRC arsenic guidelines are based on total arsenic
NHMRC guidelines for chromium are based on Cr (VI)
Total Phenolics guideline based on Phenol
ANZECC guidelines for mercury are based on inorganic mercury.
NHMRC guidelines for mercury are based on total mercury.
NHMRC guidelines for total cyanide are based on cyanogen chloride (as cyanide).
Results for TRH have been compared to TPH guidelines.
Results shaded grey are in excess of the primary acceptance criteria: ANZECC 95%, NHMRC (2011)

TABLE LR11 Groundwater Analytical Results for VOCs and SVOCs

Sample Identification	PQL	Guideline			MW06	MW09	MW10	MW105	MW107	MW21
Date		95% Fresh [A]	Irrigation	Stock	2/5/12	30/4/12	30/4/12	10/7/14	11/7/14	2/5/12
PAEC Sampled					Background	FLS	FLS	Carbon Plant	Carbon Plant	PRA
Sample Appearance					Clear	Cloudy	Turbid	Cloudy	Clear	Clear
Sample collected by					KJG	KJG	KJG	KJG	KJG	KJG
Volatile Organic Compounds (VOCs) and Semivolatile Organic Compounds (SVOCs)										
Monocyclic Aromatics										
Benzene					<2	<2	<2	1	<2	<2
Other Monocyclic Aromatics					<2	<2	<2	<2	<2	<2
Chlorinated Hydrocarbons										
Cis-1, 2-dichloroethane					<1	<1	<1	1	<1	<1
Chloroform					<1	<1	<1	5	<1	<1
Chlorobenzene					<1	<1	<1	150	<1	<1
1,4-dichlorobenzene					<1	<1	<1	9	<1	<1
Organochlorine Pesticides (OCP)										
All OCPs	2				<2	<2	<2	<2	<2	<2
Organophosphorous Pesticides (OPP)										
All OPPs	2				<2	<2	<2	<2	<2	<2
Sulfonated Compounds										
Carbon Disulfide	4	320			<4	<4	<4	<4	<4	<4
Fumigants										
Total Fumigants	4	320			<4	<4	<4	<4	<4	<4
Oxygenated Compounds										
Total Oxygenated Compounds	4	320			<4	<4	<4	<4	<4	<4
Phenols										
Total Phenolics	4	320			<4	<4	<4	<4	<4	<4
Phthalate Esthers										
Dimethylphthalate	2	3700			<2	<2	<2	<2	<2	<2
Diethylephthalate	2	1000			<2	<2	<2	<2	<2	<2
Nitrosamines										
Total Nitrosamines	2				<2	<2	<2	<2	<2	<2
Nitroaromatics and Ketones										
Total Nitroaromatics and Ketones	2				<2	<2	<2	<2	<2	<2
Haloethers										
Total Haloethers	2				<2	<2	<2	<2	<2	<2
Anilines and Benzidines										
Total Anilines and Benzidines	2				<2	<2	<2	<2	<2	<2
Miscellaneous Compounds										
Total Misscellaneous Compounds	2				<2	<2	<2	<2	<2	<2

All results in µg/L
PQL = Practical Quantitation Limit.
[A] ANZECC 2000 95% Protection Level for Receiving Water Type
Guidelines in *italics* are low level reliability guidelines
[B] NHMRC Australian Drinking Water Guidelines, 20110
Results shaded grey are in excess of the primary acceptance criteria: ANZECC 95%, NHMRC

FLS - Flammable Liquids Store
PRA - Pot Rebuild Area

TABLE LR12 Soil Quality Assurance/ Quality Control Results

Sample Identification	SB101	DUP A	RPD %	SB108	DUP B	RPD %	SB112	DUP C	RPD %	SB119	DUP D	RPD %	SB127	DUP E	RPD %	SB127	DUP E1	RPD %	SB116	DUP F	RPD %	SB131	DUP G	RPD %
Sample Depth (m)	0.3-0.4			0-0.1						0.3-0.4			0.4-0.6			0.4-0.6			0-0.1			0.3-0.4		
Duplicate Type	Intralaboratory			Intralaboratory			Intralaboratory			Intralaboratory			Intralaboratory			Interlaboratory			Intralaboratory			Intralaboratory		
Sample Profile	FILL			FILL			ESTUARINE			FILL			ESTUARINE			ESTUARINE			FILL			ESTUARINE		
Sample collected by	KG			KG			KG			KG			KG			KG			KG			KG		
Metals																								
Arsenic																								
Cadmium																								
Chromium																								
Copper																								
Lead																								
Mercury																								
Nickel																								
Zinc																								
Fluoride	73	36	102.8							36	48	25.0	0.6	0.25	140.0	0.6	0.5	20.0	140	130	7.7	52	37	40.5
Polycyclic Aromatic Hydrocarbons (PAH)																								
Naphthalene				0.50	0.50	0.0	0.50	0.50	0.0															
Acenaphthylene				0.50	0.50	0.0	0.50	0.50	0.0															
Acenaphthene				0.10	0.10	0.0	0.50	0.50	0.0															
Fluorene				0.50	0.50	0.0	0.50	0.50	0.0															
Phenanthrene				1.30	1.3	0.0	0.50	0.50	0.0															
Anthracene				0.30	0.3	0.0	0.50	0.50	0.0															
Fluoranthene				6.00	5.0	20.0	0.50	0.50	0.0															
Pyrene				6.00	5.0	20.0	0.50	0.50	0.0															
Benz(a)anthracene				3.4	4.3	20.9	0.50	0.50	0.0															
Chrysene				3.8	5.5	30.9	0.50	0.50	0.0															
Benzo(b)&(k)fluoranthene				10	14	28.6	0.10	0.10	0.0															
Benzo(a) pyrene				4.90	6	18.3	0.025	0.025	0.0															
Indeno(1,2,3-c,d)pyrene				4.70	5.2	9.6	0.50	0.50	0.0															
Dibenz(a,h)anthracene				0.50	0.6	16.7	0.50	0.50	0.0															
Benzo(g,h,i)perylene				4.1	4.6	10.9	0.50	0.50	0.0															
Total Petroleum Hydrocarbons (TPH)																								
TRH C6-C9																								
TRH >C10-C14																								
TRH >C15-C28																								
TRH >C29-C36																								
Benzene																								
Toluene																								
Ethylbenzene																								
Xylenes																								

Note all units in mg/kg

Results underlined were not detected and are reported as half the detection limit for statistical purpose.

BOLD identifies where RPD results

intralaboratory	interlaboratory	
>50	>60	where both sample results exceed ten x PQL
>75	>85	where both sample results are within 5 to 10 x PQL
>100	>100	where both sample results are within 2 to 5 x PQL
AD>2.5 * PQL		where one or both sample results are <2 x PQL

BOLD identified where blanks >0

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

TABLE LR12 Soil Quality As

Sample Identification	SB133	DUP H	RPD %	SB133	DUP H1	RPD %	TP115	QA1	RPD %	TP129	QA1A	RPD %	TP136	QA2A	RPD %	HA110	QA3A	RPD %
Sample Depth (m)	0.3-0.4			0.3-0.4			0.4-0.5			0-0.3			0.10-0.2			0.3-0.4		
Duplicate Type	Intralaboratory			Interlaboratory			Intralaboratory			Intralaboratory			Intralaboratory			Intralaboratory		
Sample Profile	ESTUARINE			ESTUARINE			ESTUARINE			FILL			FILL			FILL		
Sample collected by	KG			KG			KW			KW			KW			KW		
Metals																		
Arsenic							2	2	0.0	6	20	70.0	6	10	40.0			
Cadmium							0.2	0.2	0.0	0.2	0.2	0.0	0.2	0.2	0.0			
Chromium							11	12	8.3	15	15	0.0	6	8	25.0			
Copper							0.5	0.5	0.0	8	11	27.3	10	13	23.1			
Lead							4	5	20.0	9	9	0.0	7	8	12.5			
Mercury							0.05	0.05	0.0	0.05	0.05	0.0	0.05	0.05	0.0			
Nickel							1	1	0.0	47	65	27.7	10	13	23.1			
Zinc							2	2	0.0	47	50	6.0	42	41	2.4			
Fluoride	27	25	8.0	27	27.0	0.0	2.1	1.6	31.3	200	1098	**81.8**	13	6	**116.7**			
Polycyclic Aromatic Hydrocarbo																		
Naphthalene							0.50	0.50	0.0	0.5	0.50	0.0	0.50	0.50	0.0	0.05	0.05	0.0
Acenaphthylene							0.50	0.50	0.0	0.5	0.50	0.0	0.50	0.50	0.0	0.05	0.05	0.0
Acenaphthene							0.50	0.50	0.0	0.1	0.50	80.0	0.50	0.50	0.0	0.1	0.2	50.0
Fluorene							0.50	0.50	0.0	0.5	0.50	0.0	0.50	0.50	0.0	0.05	0.1	50.0
Phenanthrene							0.50	0.50	0.0	0.4	0.20	100.0	0.50	0.50	0.0	1.8	3.1	41.9
Anthracene							0.50	0.50	0.0	0.1	0.50	80.0	0.50	0.50	0.0	0.5	0.8	37.5
Fluoranthene							0.50	0.50	0.0	1	0.5	100.0	0.50	0.50	0.0	7.8	14	44.3
Pyrene							0.50	0.50	0.0	0.9	0.4	**125.0**	0.50	0.50	0.0	7.8	14	44.3
Benz(a)anthracene							0.50	0.50	0.0	0.5	0.2	150.0	0.50	0.50	0.0	5.5	8.3	33.7
Chrysene							0.50	0.50	0.0	0.5	0.2	150.0	0.50	0.50	0.0	5.5	8.2	32.9
Benzo(b)&(k)fluoranthene							0.10	0.10	0.0	1.1	1	10.0	0.10	0.10	0.0	13	20	35.0
Benzo(a) pyrene							0.025	0.025	0.0	0.64	0.23	**178.3**	0.025	0.025	0.0	8.1	13	37.7
Indeno(1,2,3-c,d)pyrene							0.50	0.50	0.0	0.5	0.2	150.0	0.50	0.50	0.0	5.8	10	42.0
Dibenz(a,h)anthracene							0.50	0.50	0.0	0.5	0.5	0.0	0.50	0.50	0.0	0.7	1	30.0
Benzo(g,h,i)perylene							0.50	0.50	0.0	0.5	0.20	**150.0**	0.50	0.50	0.0	5.5	9.3	40.9
Total Petroleum Hydrocarbons (																		
TRH C6-C9							12.5	12.5	0.0	12.5	12.5	0.0	12.5	12.5	0.0			
TRH >C10-C14							25	25	0.0	25	25	0.0	25	25	0.0			
TRH >C15-C28							50	50	0.0	50	50	0.0	50	50	0.0			
TRH >C29-C36							50	50	0.0	50	50	0.0	50	50	0.0			
Benzene							0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0			
Toluene							1	1	0.0	1	1	0.0	1	1	0.0			
Ethylbenzene							0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0			
Xylenes							0.5	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0			

Note all units in mg/kg

Results underlined were not detected and are reported as half the detection limit for statistical purpose.

BOLD identifies where RPD results

intralaboratory	interlaboratory	
>50	>60	where both sample results exceed ten x PQL
>75	>85	where both sample results are within 5 to 10 x PQL
>100	>100	where both sample results are within 2 to 5 x PQL
AD>2.5 * PQL		where one or both sample results are <2 x PQL

BOLD identified where blanks >0

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

TABLE LR13 Groundwater Quality Assurance/ Quality Control Results

Sample Identification	MW102	DUP A	RPD %	MW104	DUP B	RPD %	MW104	DUP B1	RPD %
Duplicate Type	Intralaboratory			Intralaboratoy			Triplicate		
Date	9/07/2014			9/07/2014			9/07/2014		
Metals									
Aluminium	5	8900	**99.9**	1300	1300	0.0			
Arsenic	1	3	66.7	2	1	100.0			
Cadmium	0.05	0.05	0.0	0.05	0.05	0.0			
Chromium	0.5	11	**95.5**	6	6	0.0			
Copper	2	3	33.3	3	3	0.0			
Nickel	2	6	**66.7**	5	5	0.0			
Lead	0.5	4	**87.5**	0.5	0.5	0.0			
Zinc	4	14	**71.4**	8	8	0.0			
Mercury	0.025	0.025	0.0	0.025	0.025	0.0			
Fluoride	3200	3400	5.9	13000	14000	7.1			
Total Petroleum Hydrocarbons (TPH)									
TPH C6-C9	18	22	18.2						
TPH C10-C14	25	25	0.0						
TPH C15-C28	50	50	0.0						
TPH C29-C36	50	50	0.0						
Polycyclic Aromatic Hydrocarbons (PAH)									
Naphthalene				0.05	0.05	0.0	0.05	0.1	50.0
Acenaphthylene				0.05	0.05	0.0	0.05	0.1	50.0
Acenaphthene				0.05	0.05	0.0	0.05	0.1	50.0
Fluorene				0.05	0.05	0.0	0.05	0.1	50.0
Phenanthrene				0.05	0.05	0.0	0.05	0.1	50.0
Anthracene				0.05	0.05	0.0	0.05	0.1	50.0
Fluoranthene				0.1	0.1	0.0	0.1	0.1	0.0
Pyrene				0.2	0.2	0.0	0.2	0.1	100.0
Benz(a)anthracene				0.05	0.05	0.0	0.05	0.1	50.0
Chrysene				0.1	0.05	100.0	0.1	0.1	0.0
Benzo(b)&(k)fluoranthene				0.1	0.3	66.7	0.1	0.1	0.0
Benzo(a) pyrene				0.1	0.1	0.0	0.1	0.1	0.0
Indeno(1,2,3-c,d)pyrene				0.1	0.1	0.0	0.1	0.1	0.0
Dibenz(a,h)anthracene				0.05	0.05	0.0	0.05	0.1	50.0
Benzo(g,h,i)perylene				0.1	0.1	0.0	0.1	0.1	0.0

Note all units in mg/kg

Results underlined were not detected and are reported as half the detection limit for statistical purpose.

BOLD identifies where RPD results

intralaboratory	interlaboratory	
>50	>60	where both sample results exceed ten x PQL
>75	>85	where both sample results are within 5 to 10 x PQL
>100	>100	where both sample results are within 2 to 5 x PQL
AD>2.5 * PQL		where one or both sample results are <2 x PQL

BOLD identified where blanks >0

Where results are within two of the above ranges the most conservative criteria have been used to assess duplicate performance

Appendix A

2012 Soil Investigation Results

TABLE LR1 Soil Analytical Results for the Site

Sample Identification	PQL	Guideline					MW06	MW06	SB11	SB12	SB13	MW14	MW15	MW16	MW16	MW17	MW17	MW18	MW18
Sample Depth (m)		HIL D[A]	HSL D[B]	EIL C/I[C]	Management Limits[D]	ESL C/I[E]	0-0.1	0.5-0.6	0.2-0.4	1.8-1.9	1.0-1.2	0-0.4	0.1-0.4	0.2-0.4	1.8-2.0	0.2-0.4	0.8-1.0	0-0.2	0.8-1.0
Date							13/04/2012	13/04/2012	17/04/2012	18/04/2012	18/04/2012	19/04/2012	19/04/2012	18/04/2012	18/04/2012	18/04/2012	18/04/2012	19/04/2012	19/04/2012
Sample Profile							ALLUVIAL	RESIDUAL	FILL	FILL	FILL	FILL	FILL	FILL	ESTUARINE	FILL	ESTUARINE	FILL	ESTUARINE
PAEC Sampled							Background	Background	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant	Carbon Plant
Sample collected by							KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG
Metals																			
Aluminium	50	NL*	-	-	-	-	2270	10700	9550	10300	14200	14700	13800	7740	3180	6740	1310	32700	8210
Arsenic	1	3000	-	160	-	-	0.9	3.4	10.9	16.5	3.4	6.3	5.1	0.9	1.2	0.8	0.2	12	1.8
Cadmium	0.1	900	-	-	-	-	<0.1	<0.1	<0.1	<0.1	0.1	0.1	2.4	<0.1	<0.1	<0.1	<0.1	0.4	<0.1
Chromium (VI)	1	3600	-	320**	-	-	2.5	15.1	7.3	7.9	52.1	25.5	18	5	3.2	5.3	1.4	26.9	6
Copper	2	240,000	-	210**	-	-	0.4	0.6	13.6	14.2	16	15.6	44.5	7.8	0.2	4.2	0.3	21.9	0.3
Nickel	1	6000	-	140**	-	-	1.3	2	11	12.4	34.4	53	27.8	6.4	1.8	2	0.6	51.6	4.6
Lead	2	1500	-	1800	-	-	2.3	8.1	6.3	6.5	25.8	9.2	44.4	3.6	1.8	37	0.6	20.6	3.3
Zinc	5	400,000	-	440**	-	-	5.3	2.9	51.6	53.4	178	70.4	115	18.8	0.6	43.4	0.5	288	1.4
Mercury (inorganic)	0.05	730	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoride	40	17000*	-	-	-	-	150	140	240	150	1960	2350	3950	700	60	200	80	7740	650
Non Metallic Inorganics																			
Total Cyanide	1	1500	-	-	-	-	<1	<1	<1	<1	<1	<1	<1	3	<1	<1	<1	<1	<1
Polycyclic Aromatic Hydrocarbons (PAH)																			
Naphthalene	0.5	-	-	370	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	1.9	<0.5
Fluorene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5
Phenanthrene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	16.6	<0.5
Anthracene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.4	<0.5
Fluoranthene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	3.8	<0.5	<0.5	<0.5	<0.5	41.2	<0.5
Pyrene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	3	<0.5	<0.5	<0.5	<0.5	38.3	<0.5
Benz(a)anthracene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	5.3	<0.5	<0.5	<0.5	<0.5	47.1	<0.5
Chrysene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	8.1	<0.5	<0.5	<0.5	<0.5	50.3	<0.5
Benzo(b)&(k)fluoranthene	1	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	9.6	<0.5	<0.5	<0.5	<0.5	67.2	<0.5
Benzo(k)fluoranthene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.1	<0.5	<0.5	<0.5	<0.5	20.4	<0.5
Benzo(a) pyrene	0.5	-	-	-	-	72[F]	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	2.1	<0.5	<0.5	<0.5	<0.5	33.6	<0.5
Indeno(1,2,3-c,d)pyrene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.5	<0.5	<0.5	<0.5	<0.5	29.2	<0.5
Dibenz(a,h)anthracene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	7.7	<0.5
Benzo(g,h,i)perylene	0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.8	<0.5	<0.5	<0.5	<0.5	28.8	<0.5
Benzo(a)pyrene TEQ		40	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.87	4.5	<0.5	<0.5	<0.5	<0.5	58.5	<0.5
Sum of reported PAH	--	4000	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	5.8	38.6	0.8	<0.5	<0.5	<0.5	387	<0.5
Total Petroleum Hydrocarbons (TPH)																			
TPH C6-C9	10	-	260	-	800	-													
TPH C10-C14	50	-	NL	-	1000	170													
TPH C15-C28	100	-	-	-	5000	1700													
TPH C29-C36	100	-	-	-	10,000	3300													
TPH C10-C36	--	-	-	-	-	-													
Polychlorinated Biphenyls																			
Total PCBs	1	-	-	-	-	-													
Semi Volatile Organic Compounds																			
Total PAHs	1	4000	-	-	-	-													
Total Phenols	1	240,000	-	-	-	-													
Phthalate Esters	5	-	-	-	-	-													
Nitrosamines	1	-	-	-	-	-													
Nitroaromatics and Ketones	1	-	-	-	-	-													
Haloethers	0.5	-	-	-	-	-													
Chlorinated Hydrocarbons	1	-	-	-	-	-													
Anilines and Benzidines	1	-	-	-	-	-													
Organochlorine Pesticides	1	-	-	-	-	-													
Organophosphorus Pesticides	0.5	-	-	-	-	-													
Miscellaneous Compounds	0.5	-	-	-	-	-													
Volatile Organic Compounds																			
Monocyclic Aromatic Hydrocarbons	5	-	-	-	-	-													
Oxygenated Compounds	0.5	-	-	-	-	-													
Sulfonated Compounds	1	-	-	-	-	-													
Fumigants	0.5	-	-	-	-	-													
Halogenated Aliphatic Compounds	5	-	-	-	-	-													
Halogenated Aromatic Compounds	0.5	-	-	-	-	-													
Trihalomethanes	0.5	-	-	-	-	-													

Sample Identification	SB15	SB15	SB16	SB16	MW07	MW07	MW08	MW08	SB17	SB18	MW19	MW19
Sample Depth (m)	0.3-0.5	1-1.2	0.2-0.4	1-1.2	0-0.2	0.8-1.0	0.15-0.3	0.4-0.6	0.3-0.4	0.5-0.6	FILL 1	FILL 2
Date	16/04/2012	16/04/2012	16/04/2012	16/04/2012	16/04/2012	16/04/2012	16/04/2012	16/04/2012	18/04/2012	18/04/2012	19/04/2012	19/04/2012
Sample Profile	ESTUARINE	ESTUARINE	ESTUARINE	ESTUARINE	TOPSOIL	ESTUARINE	FILL	ESTUARINE	FILL	FILL	FILL	FILL
PAEC Sampled	Refuelling	Refuelling	Refuelling	Refuelling	Refuelling	Refuelling	Refuelling	Refuelling	DSA	DSA	DSA	DSA
Sample collected by	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG
Metals												
Aluminium	620	12500	3410	1720	7710	5720	690	4280				
Arsenic	0.2	1.2	0.8	0.3	4.4	1.8	<0.1	0.2				
Cadmium	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.2	<0.1				
Chromium (VI)	1.9	26.6	3.9	5.7	10.5	21.2	3.9	3.6				
Copper	0.8	5.8	0.5	0.6	32.8	2.2	4.1	0.4				
Nickel	1.1	11.2	3.3	2.6	8.1	11.9	2.7	5.8				
Lead	2.5	12.8	4.8	1.2	49.4	4.6	3.6	1.4				
Zinc	2.6	32.6	2.8	1.3	384	7	59.9	12.1				
Mercury (inorganic)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Fluoride	830	100	60	280	3240	90	90	130				
Non Metallic Inorganics												
Total Cyanide												
Polycyclic Aromatic Hydrocarbons (PAH)												
Naphthalene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<4.0	<0.5
Acenaphthylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<4.0	<0.5
Acenaphthene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.8	8.4	1.6
Fluorene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.2	4.2	0.8
Phenanthrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	30.2	46.7	7.8
Anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	6.3	9.6	1.6
Fluoranthene	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.6	<0.5	<0.5	59.7	137	21.6
Pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.6	<0.5	<0.5	59.1	133	21.7
Benz(a)anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.5	<0.5	<0.5	46.7	103	24.3
Chrysene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	45.6	97.3	23.5
Benzo(b)&(k)fluoranthene	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.9	<0.5	<0.5	60.3	140	31
Benzo(k)fluoranthene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	21.2	47.7	10
Benzo(a) pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	43.4	101	19.2
Indeno(1,2,3-c,d)pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	41.6	57.5	17.5
Dibenz(a,h)anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8.8	12.8	4.6
Benzo(g,h,i)perylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	46.1	65	19.9
Benzo(a)pyrene TEQ	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	70.1	150.2	31.6
Sum of reported PAH	<0.5	<0.5	<0.5	<0.5	<0.5	2.2	3.2	<0.5	<0.5	475	963	205
Total Petroleum Hydrocarbons (TPH)												
TPH C6-C9	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
TPH C10-C14	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
TPH C15-C28	<100	<100	<100	<100	<100	<100	1400	<100	<100	980	1870	400
TPH C29-C36	<100	<100	<100	<100	120	<100	1960	<100	<100	1040	1890	470
TPH C10-C36	<50	<50	<50	<50	120	<50	3360	<50	<50	2020	3760	870
Polychlorinated Biphenyls												
Total PCBs												
Semi Volatile Organic Compounds												
Total PAHs	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR						
Total Phenols	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR						
Phthalate Esters	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR						
Nitrosamines	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR						
Nitroaromatics and Ketones	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR						
Haloethers	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR						
Chlorinated Hydrocarbons	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR						
Anilines and Benzidines	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR						
Organochlorine Pesticides	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR						
Organophosphorus Pesticides	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR						
Miscellaneous Compounds	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR						
Volatile Organic Compounds												
Monocyclic Aromatic Hydrocarbons												
Oxygenated Compounds												
Sulfonated Compounds												
Fumigants												
Halogenated Aliphatic Compounds												
Halogenated Aromatic Compounds												
Trihalomethanes												

All results are in units of mg/kg.

Blank Cell indicates testing was not completed

PQL = Practical Quantitation Limit.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Soil Health Screening Level for Vapour Intrusion 'D' Commercial/ Industrial

[C] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[D] NEPM (2013) Management Limits for TPH Fractions F1 to F4 in soil - note that the F1 to F4 fractions are different to the fractions reported here

[E] NEPM (2013) Ecological Screening Level for Commercial/ Industrial

[F] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hydrocarbons (PAHs) (Environmental and Human Health Effects)

* Fluoride (soluble) and aluminium Preliminary Screening Criteria from ENVIRON (2013) 'Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium'

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the March 2014 investigations

Results shown in shading are in excess of the primary health acceptance criteria

Results showin in underline are in excess of the primary ecological acceptance criteria

<LOR = Less than the Limit of Reporting

PAECs

CBP	Clay Borrow Pit
FLS	Flammable Liquids Store
AWP	Anode Waste Pile
DSA	Diesel Spray Area
CBWB	Cathode Bay Washdown Bay
PRA	Pot Rebuild Area

TABLE LR1 Soil Analytical Results for the Site

Sample Identification	PQL	Guideline					SB1	SB2	SB3	SB4	SB5	SB6	SB7	SB8
Sample Depth (m)		HIL D[A]	HSL D[B]	EIL C/I[C]	Management Limits[D]	ESL C/I[E]	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
Date							12/04/2012	12/04/2012	12/04/2012	12/04/2012	12/04/2012	12/04/2012	12/04/2012	12/04/2012
Sample Profile							FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL
PAEC Sampled							Pot Lines	Pot Lines	Pot Lines	Pot Lines	SPL Sheds	SPL Sheds	SPL Sheds	SPL Sheds
Sample collected by							FR	FR	FR	FR	FR	FR	FR	FR
Metals														
Aluminium	50	NL*	-	-	-	-	53300	139000	138000	41700	26900	23700	11800	11000
Arsenic	1	3000	-	160	-	-	4.5	28.9	8.8	14.6	5.1	3.4	2.4	1.9
Cadmium	0.1	900	-	-	-	-	0.7	1.8	1.4	0.8	0.2	0.2	0.1	0.1
Chromium (VI)	1	3600	-	320**	-	-	26.8	35	14.8	36	39.6	36.5	21.9	14.2
Copper	2	240,000	-	210**	-	-	21.1	280	18.9	89.8	33.7	28	12.4	11.6
Nickel	1	6000	-	140**	-	-	98	159	166	65.7	49	39.3	24.1	18.6
Lead	2	1500	-	1800	-	-	25	430	28.7	247	18.3	39.7	8.6	10.1
Zinc	5	400,000	-	440**	-	-	229	5400	444	1210	232	179	65.3	362
Mercury (inorganic)	0.05	730	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoride	40	17000*	-	-	-	-	13400	26400	41900	20900	1470	680	520	1440
Non Metallic Inorganics														
Total Cyanide	1	1500	-	-	-	-								
Polycyclic Aromatic Hydrocarbons (PAH)														
Naphthalene	0.5	-	-	370	-	-								
Acenaphthylene	0.5	-	-	-	-	-								
Acenaphthene	0.5	-	-	-	-	-								
Fluorene	0.5	-	-	-	-	-								
Phenanthrene	0.5	-	-	-	-	-								
Anthracene	0.5	-	-	-	-	-								
Fluoranthene	0.5	-	-	-	-	-								
Pyrene	0.5	-	-	-	-	-								
Benz(a)anthracene	0.5	-	-	-	-	-								
Chrysene	0.5	-	-	-	-	-								
Benzo(b)&(k)fluoranthene	1	-	-	-	-	-								
Benzo(k)fluoranthene	0.5	-	-	-	-	-								
Benzo(a) pyrene	0.5	-	-	-	-	72[F]								
Indeno(1,2,3-c,d)pyrene	0.5	-	-	-	-	-								
Dibenz(a,h)anthracene	0.5	-	-	-	-	-								
Benzo(g,h,i)perylene	0.5	-	-	-	-	-								
Benzo(a)pyrene TEQ		40	-	-	-	-								
Sum of reported PAH	--	4000	-	-	-	-								
Total Petroleum Hydrocarbons (TPH)														
TPH C6-C9	10	-	260	-	800	-								
TPH C10-C14	50	-	NL	-	1000	170								
TPH C15-C28	100	-	-	-	5000	1700								
TPH C29-C36	100	-	-	-	10,000	3300								
TPH C10-C36	--	-	-	-	-	-								
Polychlorinated Biphenyls														
Total PCBs	1	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01				
Semi Volatile Organic Compounds														
Total PAHs	1	4000	-	-	-	-								
Total Phenols	1	240,000	-	-	-	-								
Phthalate Esters	5	-	-	-	-	-								
Nitrosamines	1	-	-	-	-	-								
Nitroaromatics and Ketones	1	-	-	-	-	-								
Haloethers	0.5	-	-	-	-	-								
Chlorinated Hydrocarbons	1	-	-	-	-	-								
Anilines and Benzidines	1	-	-	-	-	-								
Organochlorine Pesticides	1	-	-	-	-	-								
Organophosphorus Pesticides	0.5	-	-	-	-	-								
Miscellaneous Compounds	0.5	-	-	-	-	-								
Volatile Organic Compounds														
Monocyclic Aromatic Hydrocarbons	5	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01				
Oxygenated Compounds	0.5	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01				
Sulfonated Compounds	1	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01				
Fumigants	0.5	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01				
Halogenated Aliphatic Compounds	5	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01				
Halogenated Aromatic Compounds	0.5	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01				
Trihalomethanes	0.5	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01				

Sample Identification	SB14	SB14	MW09	MW10	SB9	SB9	MW11	SB10	SB10	MW12	MW12	MW13	SB20 (i)	MW01	MW02	MW03A	MW05	MW21
Sample Depth (m)	0-0.4	0.6-0.8	0.1-0.3	0.2-0.4	0.3-0.4	0.6-0.8	0-0.2	0.5-0.6	1-1.2	0-0.2	0.4-0.6	0.2-0.4	0-0.05	0.3-0.4	0-0.05	0.4-0.5	1.8-2.0	0.2-0.4
Date	18/04/2012	18/04/2012	17/04/2012	16/04/2012	16/04/2012	16/04/2012	16/04/2012	17/04/2012	17/04/2012	17/04/2012	17/04/2012	17/04/2012	13/04/2012	11/04/2012	11/04/2012	12/04/2012	12/04/2012	16/04/2012
Sample Profile	FILL	ESTUARINE	FILL	FILL	FILL	FILL	FILL	FILL	TOPSOIL	FILL	FILL	FILL	TOPSOIL	FILL	FILL	FILL	FILL	FILL
PAEC Sampled	Maintenance	Maintenance	FLS	FLS	Washbay	Washbay	Washbay	CBWB	CBWB	AWP	AWP	AWP	Switchyard	CBP	CBP	CBP	CBP	PRA
Sample collected by	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	KJG	FR	KJG	KJG	KJG	KJG	KJG
Metals																		
Aluminium	11600	2820	5460	20500	39800	12600	15000	60800	4640	55800	3260	36700		10400	14400	17600	9510	15800
Arsenic	3.6	0.9	6.4	16.4	17.1	23.9	5.8	10.8	1.4	10.1	1	10.5		4.9	7.9	4.1	4.9	1.3
Cadmium	<0.1	<0.1	0.1	0.8	11.1	0.2	0.2	4	<0.1	1.4	<0.1	<0.1		<0.1	<0.1	1	0.1	<0.1
Chromium (VI)	22.4	3.5	12.8	13.2	59.5	18.8	23.7	51.2	8.7	46.8	4.4	10.9		14.6	22.4	27.9	16.3	44
Copper	17.8	0.4	21.9	71.4	82	62	36.3	55.2	1.7	41.1	0.3	6.7		7.9	1.8	12.4	11.1	34.6
Nickel	69.9	1.9	59.9	14.7	152	29.4	24.5	77.4	6.5	103	3.4	79.9		13.3	4.9	35.4	15.8	27.6
Lead	8.8	1.9	18	107	185	66.4	48	58	3.3	34.1	2.6	7.5		8.4	11.1	26.2	15	2.8
Zinc	90.7	1.1	260	1380	578	621	420	425	4.9	304	1	21.3		31.6	15.4	75.5	76.7	59.2
Mercury (inorganic)	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Fluoride	970	70	700	16200	39000	1230	960	10600	190	47100	1010	17700		310	190	2120	1030	190
Non Metallic Inorganics																		
Total Cyanide			<1	<1			<1	4	<1	<1	1	<1						
Polycyclic Aromatic Hydrocarbons (PAH)																		
Naphthalene			<0.5	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	
Acenaphthylene			<0.5	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	
Acenaphthene			<0.5	<0.5			<0.5	<0.5	<0.5	1.4	<0.5	0.6		<0.5	<0.5	<0.5	<0.5	
Fluorene			<0.5	<0.5			<0.5	<0.5	<0.5	0.9	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	
Phenanthrene			<0.5	<0.5			0.6	1.8	<0.5	15.2	<0.5	5		<0.5	<0.5	<0.5	<0.5	
Anthracene			<0.5	<0.5			<0.5	0.6	<0.5	4.1	<0.5	1.1		<0.5	<0.5	0.8	<0.5	
Fluoranthene			<0.5	1.1			2	10.6	<0.5	56.5	<0.5	20.4		<0.5	<0.5	0.7	<0.5	
Pyrene			<0.5	1			1.9	9.4	<0.5	52.2	<0.5	20.5		<0.5	<0.5	<0.5	<0.5	
Benz(a)anthracene			<0.5	0.5			1.8	13.8	<0.5	52.6	<0.5	17.3		<0.5	<0.5	0.9	0.6	
Chrysene			0.6	0.5			2	24.3	<0.5	74.3	<0.5	17		<0.5	<0.5	2.2	1.4	
Benzo(b)&(k)fluoranthene			1.1	0.8			3.3	39	<0.5	88.6	<0.5	26.6		1	<1	3	3	
Benzo(k)fluoranthene			<0.5	<0.5			1.2	10.8	<0.5	31.2	<0.5	11.8		<0.5	<0.5	<0.5	<0.5	
Benzo(a) pyrene			<0.5	<0.5			1.7	8.9	<0.5	29.4	<0.5	16.1		0.7	<0.5	1.2	1	
Indeno(1,2,3-c,d)pyrene			<0.5	<0.5			1.2	10.3	<0.5	20.7	<0.5	11.4		<0.5	<0.5	<0.5	<0.5	
Dibenz(a,h)anthracene			<0.5	<0.5			<0.5	3.1	<0.5	7.2	<0.5	2.5		<0.5	<0.5	0.5	<0.5	
Benzo(g,h,i)perylene			<0.5	<0.5			1.5	16	<0.5	24	<0.5	14.5		<0.5	<0.5	<0.5	<0.5	
Benzo(a)pyrene TEQ			<0.5	<0.5			2.98	19.79	<0.5	56.9	<0.5	25.6		<0.5	<0.5	1.52	1.34	
Sum of reported PAH			1.7	3.9			17.2	149	<0.5	458	<0.5	165		0.5	<0.5	0.7	<0.5	
Total Petroleum Hydrocarbons (TPH)																		
TPH C6-C9																		
TPH C10-C14																		
TPH C15-C28																		
TPH C29-C36																		
TPH C10-C36																		
Polychlorinated Biphenyls																		
Total PCBs													<0.1					
Semi Volatile Organic Compounds																		
Total PAHs	<LOR	<LOR	<LOR	<LOR										<LOR	<LOR	<LOR	<LOR	<LOR
Total Phenols	<LOR	<LOR	<LOR	<LOR										<LOR	<LOR	<LOR	<LOR	<LOR
Phthalate Esters	<LOR	<LOR	<LOR	<LOR										<LOR	<LOR	<LOR	<LOR	<LOR
Nitrosamines	<LOR	<LOR	<LOR	<LOR										<LOR	<LOR	<LOR	<LOR	<LOR
Nitroaromatics and Ketones	<LOR	<LOR	<LOR	<LOR										<LOR	<LOR	<LOR	<LOR	<LOR
Haloethers	<LOR	<LOR	<LOR	<LOR										<LOR	<LOR	<LOR	<LOR	<LOR
Chlorinated Hydrocarbons	<LOR	<LOR	<LOR	<LOR										<LOR	<LOR	<LOR	<LOR	<LOR
Anilines and Benzidines	<LOR	<LOR	<LOR	<LOR										<LOR	<LOR	<LOR	<LOR	<LOR
Organochlorine Pesticides	<LOR	<LOR	<LOR	<LOR										<LOR	<LOR	<LOR	<LOR	<LOR
Organophosphorus Pesticides	<LOR	<LOR	<LOR	<LOR										<LOR	<LOR	<LOR	<LOR	<LOR
Miscellaneous Compounds	<LOR	<LOR	<LOR	<LOR										<LOR	<LOR	<LOR	<LOR	<LOR
Volatile Organic Compounds																		
Monocyclic Aromatic Hydrocarbons													<LOR					
Oxygenated Compounds													<LOR					
Sulfonated Compounds													<LOR					
Fumigants													<LOR					
Halogenated Aliphatic Compounds													<LOR					
Halogenated Aromatic Compounds													<LOR					
Trihalomethanes																		

All results are in units of mg/kg.

Blank Cell indicates testing was not completed

PQL = Practical Quantitation Limit.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Soil Health Screening Level for Vapour Intrusion 'D' Commercial/ Industrial

[C] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[D] NEPM (2013) Management Limits for TPH Fractions F1 to F4 in soil - note that the F1 to F4 fractions are different to the fractions reported here

[E] NEPM (2013) Ecological Screening Level for Commercial/ Industrial

[F] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hydrocarbons (PAHs) (Enviro

* Fluoride (soluble) and aluminium Preliminary Screening Criteria from ENVIRON (2013) 'Preliminary Screening Level Health Risk Assessment for Fluoride and Alumin

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the March 2014 investigations

Results shown in shading are in excess of the primary health acceptance criteria

Results showin in underline are in excess of the primary ecological acceptance criteria

<LOR = Less than the Limit of Reporting

PAECs

CBP	Clay Borrow Pit
FLS	Flammable Liquids Store
AWP	Anode Waste Pile
DSA	Diesel Spray Area
CBWB	Cathode Bay Washdown Bay
PRA	Pot Rebuild Area

TABLE LR2 Soil Analytical Results for Drainage Lines and Dams

Sample Identification	PQL	HIL D[A]	HSL D[B]	EIL C/I[C]	Management Limits[D]	ESL C/I[E]	D1	D2	D3	D5	D6	D7	D8	D8-BASE	D9	D10	D11	D11-1	D12	D12-1
Sample Depth (m)							0-0.3	0-0.2	0-0.2	0-0.2	0-0.05	0-0.3	0-0.1	0.1-0.35	0-0.2	0-0.05	0-0.2	0.2-0.4	0-0.2	0.3-0.4
Date							13/04/2012	13/04/2012	13/04/2012	13/04/2012	13/04/2012	13/04/2012	13/04/2012	13/04/2012	13/04/2012	13/04/2012	13/04/2012	13/04/2012	13/04/2012	13/04/2012
Sample Profile							SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	CLAY	RESIDUAL	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	CLAY
PAECs Sampled							Western Dam	Western Dam	Southern Dam	Drain at SPL Sheds	Drain at AWP	Drain at AWP	Drain at Alcan Mound	Drain at Alcan Mound	Drain near Carbon Plant	Drain near DSA	East Surge Dam	East Surge Dam	East Surge Dam	East Surge Dam
Sample collected by							FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR	FR
Metals																				
Aluminium	50	NL*	-	-	-	-	166000	31900	14200	25100	26800	39200	40900	15100	10900	23900	12800	13500	56000	5030
Arsenic	1	3000	-	160	-	-	14.1	9.3	5.9	5.7	9.2	17	16.1	3.2	6.7	4	5.7	3	16	0.6
Cadmium	0.1	900	-	-	-	-	2.6	0.6	0.2	0.6	3	2	4.4	<0.1	<0.1	1.1	1.2	0.3	4.5	<0.1
Chromium	1	3600	-	320**	-	-	25.8	23.2	23.2	27.8	41.4	35.9	49.5	18.8	13.5	15.5	16	13.7	55.4	6.4
Copper	2	240,000	-	210**	-	-	43.6	10.7	12.9	10	40.8	31.4	45.7	3.7	5.4	11.6	3.7	2	35.9	1
Nickel	1	6000	-	140**	-	-	173	78	21.1	22.2	118	87	119	10.7	9	49.6	10.9	6.9	103	3.7
Lead	2	1500	-	1800	-	-	49.9	17.9	24.3	24.7	52.1	71.4	79.6	11.4	12.2	31.8	12.7	7.7	63.2	3.8
Zinc	5	400,000	-	440**	-	-	1290	328	122	132	707	599	955	43	110	197	72.4	28.4	671	5.9
Mercury	0.05	730	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
Fluoride	40	17000*	-	-	-	-	38500	5850	150	1110	3810	7350	3790	520	750	3330	1480	3010	2510	210
Non Metallic Inorganics																				
Total Cyanide	1	1500	-	-	-	-	2	<1	<1	<1	1	2	24	2	<1		2	2	86	4
Polycyclic Aromatic Hydrocarbons (PAH)																				
Naphthalene	0.5	-	-	370	-	-	<0.5	<0.5	<0.8	<0.8	<8.0	<0.5	<0.8	<0.5	<0.5	<0.5	<4.0	<0.5	<0.8	<0.5
Acenaphthylene	0.5	-	-	-	-	-	<0.5	<0.5	<0.8	<0.8	<8.0	<0.5	<0.8	<0.5	<0.5	<0.5	<4.0	<0.5	<0.8	<0.5
Acenaphthene	0.5	-	-	-	-	-	1.4	<0.5	<0.8	<0.8	<8.0	2.8	2.5	<0.5	<0.5	<0.5	<4.0	<0.5	<0.8	<0.5
Fluorene	0.5	-	-	-	-	-	1.2	<0.5	<0.8	<0.8	<8.0	2.2	1.5	<0.5	<0.5	<0.5	<4.0	<0.5	<0.8	<0.5
Phenanthrene	0.5	-	-	-	-	-	3.4	<0.5	<0.8	<0.8	38.3	20	18.1	1.7	<0.5	0.7	<4.0	<0.5	2.3	<0.5
Anthracene	0.5	-	-	-	-	-	0.7	<0.5	<0.8	<0.8	14.1	5.1	4.6	0.5	<0.5	<0.5	<4.0	<0.5	<0.8	<0.5
Fluoranthene	0.5	-	-	-	-	-	5.5	0.6	2.4	0.9	107	86.4	65.4	7.9	<0.5	3.7	33.1	0.7	12.9	<0.5
Pyrene	0.5	-	-	-	-	-	4.3	0.5	2.1	0.8	102	79.9	60.4	7.9	<0.5	3.6	31.3	0.8	12.5	<0.5
Benz(a)anthracene	0.5	-	-	-	-	-	3.4	0.6	2.6	1.1	109	73.3	63.4	8.5	<0.5	4.4	46.2	1.3	17.8	<0.5
Chrysene	0.5	-	-	-	-	-	3.8	0.8	4.6	1.3	116	84.8	64.9	11.2	<0.5	6.8	91	2.1	23.4	<0.5
Benzo(b)&(k)fluoranthene	1	-	-	-	-	-	6.1	1.6	8.6	2.4	224	145	151	30.1	0.6	11.5	172	3.9	46.5	<0.5
Benzo(k)fluoranthene	0.5	-	-	-	-	-	1.5	<0.5	2	<0.8	61.7	46.2	35.9	7.7	<0.5	3	37.2	0.9	11	<0.5
Benzo(a) pyrene	0.5	-	-	-	-	72[F]	2.4	0.6	2.1	0.8	85.6	57.1	58.8	15.1	<0.5	3.4	21.7	0.9	16	<0.5
Indeno(1,2,3-c,d)pyrene	0.5	-	-	-	-	-	1.4	<0.5	1.5	<0.8	54.6	32.2	46.3	13	<0.5	2.8	16.2	0.6	10.9	<0.5
Dibenz(a,h)anthracene	0.5	-	-	-	-	-	<0.5	<0.5	<0.8	<0.8	17.2	8.3	12.3	3	<0.5	0.9	6.2	<0.5	3.1	<0.5
Benzo(g,h,i)perylene	0.5	-	-	-	-	-	1.9	0.6	2.2	<0.8	66.9	38.2	59.9	16.6	<0.5	3.7	20.4	0.9	14.2	<0.5
Benzo(a)pyrene TEQ		40	-	-	-	-	3.9	1.1	4.0	1.6	149.6	96.3	102.0	24.3	<0.5	6.6	56.2	1.9	28.1	<0.5
Sum of reported PAH	--	4000	-	-	-	-	37	5.3	28.1	7.3	996	682	645	123	0.6	44.5	475	12.1	171	<0.5

All results are in units of mg/kg.

Blank Cell indicates testing was not completed

PQL = Practical Quantitation Limit.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Soil Health Screening Level for Vapour Intrusion 'D' Commercial/ Industrial

[C] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[D] NEPM (2013) Management Limits for TPH Fractions F1 to F4 in soil - note that the F1 to F4 fractions are different to the fractions reported here

[E] NEPM (2013) Ecological Screening Level for Commercial/ Industrial

[F] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hydrocarbons (PAHs) (Environmental and Human Health Effects)

* Fluoride (soluble) and aluminium Preliminary Screening Criteria from ENVIRON (2013) 'Preliminary Screening Level Health Risk Assessment for Fluoride and Aluminium'

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the March 2014 investigations

Results shown in shading are in excess of the primary health acceptance criteria

Results showin in underline are in excess of the primary ecological acceptance criteria

<LOR = Less than the Limit of Reporting

TABLE LR2 Soil Analytical Results for Drainage Lines and Dams

Sample Identification	PQL	HIL D[A]	HSL D[B]	EIL C/I[C]	Management Limits[D]	ESL C/I[E]	COMPOSITE 1	COMPOSITE 2	COMPOSITE 3	COMPOSITE 4	ND4-BASE	ND7-BASE
Sample Depth (m)											0.25-0.35	0.1-0.15
Date							13/04/2012	13/04/2012	13/04/2012	13/04/2012	13/04/2012	13/04/2012
Sample Profile							SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	CLAY	CLAY
PAECs Sampled							North Dam	North Dam	North Dam	North Dam	North Dam	North Dam
Sample collected by							FR	FR	FR	FR	FR	FR
Metals												
Aluminium	50	NL*	-	-	-	-	26300	24300	22800	8940	10300	15600
Arsenic	1	3000	-	160	-	-	7	6.4	5	2.9	3	4.6
Cadmium	0.1	900	-	-	-	-	5.4	3.7	1.6	0.5	<0.1	0.1
Chromium	1	3600	-	320**	-	-	24.9	19.3	16.4	8.9	13.6	21.2
Copper	2	240,000	-	210**	-	-	7.7	10.2	6.8	4.4	0.7	1.5
Nickel	1	6000	-	140**	-	-	27.4	41.3	70.3	28.6	4.2	7.6
Lead	2	1500	-	1800	-	-	23.8	19.2	10.8	6.2	5.8	9.2
Zinc	5	400,000	-	440**	-	-	308	677	840	184	6.8	46
Mercury	0.05	730	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoride	40	17000*	-	-	-	-	1390	1580	1880	860	340	7350
Non Metallic Inorganics												
Total Cyanide	1	1500	-	-	-	-	<1	<1	<1	<1	<1	<1
Polycyclic Aromatic Hydrocarbons (PAH)												
Naphthalene	0.5	-	-	370	-	-	<0.8	<0.8	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	0.5	-	-	-	-	-	<0.8	<0.8	<0.5	<0.5	<0.5	<0.5
Acenaphthene	0.5	-	-	-	-	-	<0.8	<0.8	<0.5	<0.5	<0.5	<0.5
Fluorene	0.5	-	-	-	-	-	<0.8	<0.8	<0.5	<0.5	<0.5	<0.5
Phenanthrene	0.5	-	-	-	-	-	<0.8	<0.8	<0.5	<0.5	<0.5	<0.5
Anthracene	0.5	-	-	-	-	-	<0.8	<0.8	<0.5	<0.5	<0.5	<0.5
Fluoranthene	0.5	-	-	-	-	-	7.4	<0.8	<0.5	<0.5	<0.5	<0.5
Pyrene	0.5	-	-	-	-	-	6.9	<0.8	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	0.5	-	-	-	-	-	11.4	<0.8	<0.5	<0.5	<0.5	<0.5
Chrysene	0.5	-	-	-	-	-	24	<0.8	0.7	<0.5	<0.5	<0.5
Benzo(b)&(k)fluoranthene	1	-	-	-	-	-	36.9	0.8	1.2	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	0.5	-	-	-	-	-	9.8	<0.8	<0.5	<0.5	<0.5	<0.5
Benzo(a) pyrene	0.5	-	-	-	-	72[F]	7.4	<0.8	<0.5	<0.5	<0.5	<0.5
Indeno(1,2,3-c,d)pyrene	0.5	-	-	-	-	-	6.9	<0.8	<0.5	<0.5	<0.5	<0.5
Dibenz(a,h)anthracene	0.5	-	-	-	-	-	2.6	<0.8	<0.5	<0.5	<0.5	<0.5
Benzo(g,h,i)perylene	0.5	-	-	-	-	-	9.1	<0.8	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ		40	-	-	-	-	16.8	<0.8	<0.5	<0.5	<0.5	<0.5
Sum of reported PAH	--	4000	-	-	-	-	122	0.8	1.9	<0.5	<0.5	<0.5

All results are in units of mg/kg.

Blank Cell indicates testing was not completed

PQL = Practical Quantitation Limit.

[A] NEPM (2013) Health Investigation Level 'D' (Industrial/ Commercial)

[B] NEPM (2013) Soil Health Screening Level for Vapour Intrusion 'D' Commercial/ Industrial

[C] NEPM (2013) Ecological Investigation Levels for Commercial/ Industrial

[D] NEPM (2013) Management Limits for TPH Fractions F1 to F4 in soil - note that the F1 to F4 fractions are different to the fractions reported

[E] NEPM (2013) Ecological Screening Level for Commercial/ Industrial

[F] Canadian Council of Ministries of the Environment (2010) Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hy

* Fluoride (soluble) and aluminium Preliminary Screening Criteria from ENVIRON (2013) 'Preliminary Screening Level Health Risk Assessm

** EIL values calculated using site-specific CEC (7.26 meq/100g), pH (5.5) and TOC (1.3%) data collected from the Buffer Zone during the

Results shown in shading are in excess of the primary health acceptance criteria

<u>Results showin in underline are in excess of the primary ecological acceptance criteria</u>

<LOR = Less than the Limit of Reporting

Appendix B

Sampling, Analysis and Quality Plan



Hydro Aluminium Kurri Kurri Smelter, Sampling Analysis and Quality Plan

Prepared for:
Hydro Aluminium Kurri Kurri Pty Ltd

Prepared by:
ENVIRON Australia Pty Ltd

Date:
June 2014

Project Number:
AS130328

ENVIRON

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Contents

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Acronyms and Abbreviations

ACM	Asbestos Containing Materials
AHD	Australian Height Datum
ALS	Australian Laboratory Services
ANZECC	Australian and New Zealand Environment and Conservation Council
B(a)P	Benzo(a)pyrene
BGL	Below Ground Level
BTEX	Benzene, Toluene, Ethylbenzene & Xylenes (Monocyclic aromatic Hydrocarbons)
CT	Certificate of Title
DEC	NSW Department of Environment and Conservation, now EPA
DP	Deposited Plan
DQI	Data Quality Indicator
DQO	Data Quality Objective
EIL	Ecological Investigation Level
EPA	NSW Environment Protection Authority
ESA	Environmental Site Assessment
F	Fluoride
GMU	Groundwater Management Unit
GPS	Global Positioning System
Ha	Hectare
HIL	Health Investigation Level
HSL	Health Screening Level
HRA	Health Risk Assessment
km	Kilometres
LOR	Limit of Reporting
m	Metres
Mercury	Inorganic mercury unless noted otherwise
Metals	As: Arsenic, Cd: Cadmium, Cr: Chromium, Cu: Copper, Fe: Iron, Ni: Nickel, Pb: Lead, Zn: Zinc, Hg: Mercury, Se: Selenium
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Litre
m AHD	Metres relative to the Australian Height Datum
m BGL	Metres below ground level
m TOC	Metres below top of casing
ML	Megalitre, one million litres
mg/L	Micrograms per Litre
NATA	National Association of Testing Authorities
NC	Not Calculated
ND	Not Detected
NEHF	National Environmental Health Forum
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NSW	New South Wales
n	Number of Samples
OH&S	Occupational Health & Safety
PAH	Polycyclic Aromatic Hydrocarbons
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percent Difference
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit
US EPA	United States Environment Protection Authority
µg/L	Micrograms per Litre
VENM	virgin excavated natural material
-	On tables is "not calculated", "no criteria" or "not applicable"

1 Introduction

1.1 Background

This report presents a Sampling, Analysis and Quality Plan (SAQP) for the second stage of a Phase 2 Environmental Site Assessment (ESA) to be completed at the Hydro Aluminium Kurri Kurri Smelter, located off Hart Road, Loxford, New South Wales, Australia, hereinafter referred to as 'the Site'.

1.2 Objectives and Scope of Work

The objective of the second stage of the Phase 2 ESA is to build upon the results of the first stage in understanding the potential for soil and groundwater contamination at the site that could impact on the use of the Site for commercial/ industrial landuse or cause impact to human health and the environment off-site.

The SAQP includes the following

- A summary of the first stage of the Phase 2 ESA;
- A conceptual site model, including sources of contamination, receptors and pathways between the sources and receptors;
- A data gap analysis;
- Development of Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs);
- Assessment criteria;
- Reporting requirements.

1.3 Project Background

In 2012, Hydro suspended operations at the Kurri Kurri Smelter and it remains on care and maintenance mode. In preparation for possible closure, environmental investigation are being undertaken to understand remediation requirements at the Site and the potential for land divestment.

The Kurri Kurri Smelter used to produce 170,000 tonnes of aluminium metal per annum. The smelter commenced production in 1969 with a single potline. A second potline was commissioned in 1979, and a third added in 1985. In 2002, Hydro undertook an upgrade program, which increased production capacity to 170,000 tonnes. The smelter is surrounded by a 2,500ha buffer zone, part of which is used for agricultural purposes.

2 ENVIRON Investigations

Environ has completed a number of investigations at the Kurri Kurri Smelter since operations were suspended in 2012. The investigations relevant to the second stage of the Phase 2 ESA are outlined below.

2.1 Stage 1 of the Phase 2 ESA

ENVIRON completed Stage 1 of the staged Phase 2 ESA in 2012. Stage 1 included the following documents:

- ENVIRON (March 2012) 'Sampling, Analysis and Quality Plan, Kurri Kurri Aluminium Smelter'
- ENVIRON (1 November 2012) 'Phase 2 Environmental Site Assessment, Kurri Kurri Aluminium Smelter

Stage 1 involved the following tasks:

- A desktop study, including a review of historical and background data and a site walkover;
- The identification of 20 areas of concern and five contaminants of concern relating to the production of aluminium and ancillary operations;
- The development of a SAQP to assess the potential areas and chemicals of concern;
- Field investigations, including the drilling of 31 boreholes, installation of 21 groundwater monitoring wells, collection of 45 surface soil samples, 14 sediment samples and 28 groundwater samples;
- Analysis of soil, groundwater and sediment samples for a range of potential contaminants of concern;
- The development of a conceptual site model including sources of contamination, receptors and pathways between the sources and receptors;
- Recommendations for further investigations.

The Phase 2 ESA identified nine areas of concern that require further evaluation, including the Capped Waste Stockpile (formerly known as the Alcan Mound), Anode Waste Pile, East Surge Pond and associated drainage line, Diesel Spray Area, Carbon Plant, Glen Ayr Drift, Clay Borrow Pit, fluoride in soil and groundwater and aluminium in groundwater.

Other areas of concern located within the smelter site were also identified, including the Refuelling Area, Washdown Bay, West Surge Pond, North Dams 1 and 2, Cathode Bar Washdown Area, Pot Rebuild Area, Irrigation Area and General Buffer Zone.

Following the Phase 2 ESA, some of the identified areas of concern including the Capped Waste Stockpile, Glen Ayr Drift and the General Buffer Zone, were assessed separately.

2.2 Capped Waste Stockpile

Following the Phase 2 ESA, the Capped Waste Stockpile was notified as potentially contaminated land to the New South Wales Environment Protection Authority (EPA) under Section 60 of the Contaminated Land Management Act 1997. In response, the EPA requested further information regarding the contamination status of the notified area. ENVIRON completed an Environmental Site Assessment on the notified area in 2013, which included the following tasks:

- Review and collation of relevant historical information pertaining to the Capped Waste Stockpile and the surrounding leachate impact area;
- Field sampling of 14 wells;
- Completion of a pumping test to assess aquifer behaviour;
- Water quality sampling of 14 wells following pumping to assess variations in response to changes in the aquifer;
- Completion of a report identifying known information, data gaps and recommendations for further investigations to address the data gaps.

The recommended further investigations were undertaken, including a site-specific toxicological assessment to identify guidelines for fluoride in soil and waste at the site for human health and for the environment, delineation of the plume using a combination of existing data and further field investigations and a 3 monthly monitoring regime to monitor the leachate plume.

The following documents were produced for the Capped Waste Stockpile, noting the groundwater monitoring is on-going:

- ENVIRON (12 August 2012) 'Section 60 Notification Supporting Information'
- ENVIRON (13 December 2012) 'Environmental Site Assessment, Alcan Mound, Kurri Kurri Aluminium Smelter'
- ENVIRN (March 2013) 'Tier 2 Ecological Risk Assessment, Kurri Kurri Aluminium Smelter'
- ENVIRON (2 April 2013) Preliminary Screening Level, Health Risk Assessment for Fluoride and Aluminium, Part of the Kurri Kurri Aluminium Smelter, Hart Road, Loxford'
- ENVIRON (11 October 2013) 'Plume Delineation Report, Alcan Mound'

2.3 General Buffer Zone and Glen Ayr Drift

In preparation for possible closure, environmental investigations were undertaken across the buffer zone to understand remediation requirements and the potential for land divestment. This work was undertaken in conjunction with the development of a Preliminary Masterplan (dated December 2012) which identified possible end land use scenarios. The Preliminary Masterplan identified 18 land parcels in the buffer zone. A separate environmental investigation was completed for each land parcel. The reporting of these investigations is currently on-going.

The Glen Ayr Drift is a former underground coal mine located within the buffer zone. Assessment of land filling at the Glen Ayr Drift was undertaken as part of investigations of buffer zone land parcels for potential divestment. This assessment was reported in:

- ENVIRON (November 2013) ‘Phase 2 Environmental Site Assessment, Residential Parcel 1’

3 Conceptual Site Model

Following field investigations and an assessment of the laboratory results, ENVIRON completed a conceptual site model in Stage 1 of the Phase 2 ESA. The conceptual site model is provided below. The location of the site is shown in Figure 1.

The site is situated at the foot of a low residual hill and within a low-lying estuarine swamp environment. The original landform was filled to provide a level, raised platform for construction. Fill material comprised sands, refractory brick waste and carbon waste. The fill material was placed over estuarine sands and high plasticity clay. The site is capped with concrete or bitumen surfacing with soil access points around garden beds and limited grassed areas.

Groundwater at the site was identified at shallow depths within the estuarine sands, between 1m and 5m bgs and flowing north to north east across the site. The presence of the deep ring furnace construction, which extends to bedrock, affects groundwater flow directions in this area, causing diversion of groundwater around the structure and localized groundwater mounding to the south of the structure. A shallow sand aquifer extending from the surface to depths of up to 2.0m is presented to the east of Alcan Mound. Groundwater seepage has been observed down-gradient of this area towards the north east. Groundwater flows within the estuarine sands of up to 14m/year have been estimated. Groundwater with the estuarine sands is not used at the site and is not considered a suitable aquifer for use down-gradient of the site.

The buffer zone includes low residual hills to the west and south and a low-lying swampy area to the north and east. The low-lying swampy area contains numerous dams and water courses which are accessible to livestock. A shallow aquifer is present within these estuarine sands and movement of groundwater from the site is expected to occur through the sand lenses to the north and north east. Discharge of groundwater to the surface water bodies is expected to occur. A separate confined aquifer at a higher elevation was identified in the western portion of the buffer zone within residual clays. The estuarine aquifers on site appear isolated from the underlying and surrounding residual clay and bedrock aquifers. A conceptual drawing of the site hydrogeology and geology is shown in Figure 2.

Activities undertaken within the buffer zone comprise cattle grazing, poultry farming, motor sports, residential use and irrigation of storm-water from the site. The remaining buffer zone is undeveloped and comprises bush land, easements and fire trails.

The site model has identified that the populations potentially exposed to site contaminants comprise humans, livestock and flora and fauna within the buffer zone. Exposure to contaminants on site is limited by site capping and restrictions to groundwater access under the current site use. Re-evaluation of this risk may be required in the event of a change of site use.

4 Data Quality Objectives

To ensure that reliable data of adequate type is collected and assessed for the Stage 2 Phase 2 ESA, the seven-step Data Quality Objective (DQO) approach, endorsed in NSW DEC (2006) Guidelines for the NSW Site Auditor Scheme 2nd Edition, will be adopted. The DQOs set quality assurance and quality control parameters for the field and laboratory programs to ensure data of appropriate reliability will be used to assess the environmental condition at the Site.

ENVIRON has developed DQOs in accordance with the seven-step process, which is presented below.

Step 1 – State the Problem

The Site comprises a former aluminium smelter that began operating in 1969 and ceased in 2012. A Phase 2 ESA completed in 2012 identified a number of areas of concern requiring further investigation. The Phase 2 ESA was completed when the smelter was operational and not all areas of the Site could be assessed. As such, uncertainties remain over the soil and groundwater contamination at the Site. These uncertainties need to be reduced to assist with remediation planning.

Step 2 – Identification of the Goals (Decisions) of the Study

The following decisions are to be made from this study:

- New national guidelines for the assessment of site contamination were introduced in 2013 (National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)). Does assessment of areas of concern identified for further evaluation in the Phase 2 ESA under the new guidelines change the outcome for any of these areas?

- Subsequent to the Phase 2 ESA, ENVIRON completed a Health Risk Assessment to determine preliminary screening levels for fluoride in soil for a range of landuses including commercial/ industrial land use. Does assessment of areas of concern identified for further evaluation in the Phase 2 ESA under the preliminary screening criterion change the outcome for any of these areas?

- The smelter has ceased operating. Now that the Site is fully accessible, can other areas of concern be identified that were inaccessible during the previous Phase 2 ESA?

- What is the extent of the impacts to soil and groundwater at specific areas of concern identified during the previous Phase 2 ESA and in the data gap analysis of previously inaccessible areas?

- Are further investigations required at specific areas of concern to further delineate areas requiring remediation?

Step 3 – Identify Information Inputs to the Decision or Goal of the Study

The inputs required to make the above decisions are listed below:

- Comparison of previous Phase 2ESA investigation analytical results against the new guidelines to identify which areas of concern may or may not require further investigation;
- The identification of areas of concern that were previously inaccessible;
- Results of soil and/ or groundwater investigations at each area of concern;
- Proposed land use;
- Appropriate NSW contamination guidelines.

Step 4 – Define the Study Boundaries

Spatial boundaries – The study boundaries have been defined as the spatial boundary of the smelter, as shown in Figure 1.

Vertical boundaries – The study boundary extends a depth of 3m in soil, as this is the depth to which the new guidelines apply. Where groundwater investigations are required, the study boundary extends to beneath the groundwater table.

Temporal boundaries – The temporal boundary is limited to the data collected during the investigation works.

Constraints within the study boundaries – Investigations within the study boundary may be limited by accessibility issues, including the location of underground services and overhead services and the height of buildings and awnings.

Step 5 – Develop a Decision Rule

The decision rules for this investigation are as follows:

- If it is determined that the data generated through this investigation is reliable for use in producing a conceptual site model and delineating the lateral and vertical extent of soil and/ or groundwater contamination at each area of concern, then this information will be used in remediation planning;
- If it is determined that the data generated through this investigation is not suitable, comprehensive or reliable for use in producing a conceptual site model and delineating the lateral and vertical extent of soil and/ or groundwater contamination at each area of concern, then further investigations may be recommended to further reduce uncertainties for remediation planning.

Step 6 – Specify Performance or Acceptance Criteria that the Data need to Achieve

Acceptable limits on decision error have been developed based on the Data Quality Indicators (DQIs) of precision, accuracy, representativeness, comparability and completeness. The DQIs for this investigation are outlined below.

The potential for significant decision errors were minimised by:

- Completion of a quality assurance/ quality control (QA/QC) assessed of the investigation data to assess if the data satisfies the DQIs;
- Assessment of whether appropriate sampling and analytical densities were completed for the purposes of the investigation; and
- Ensuring that the criteria set for the investigation were appropriate for the proposed use of the Site.

Step 7 – Optimisation of the Design for Collection of Data

The collection of data will be optimised via the use of targeted and systematic sampling of soil and groundwater at the site. The data collection design (or sampling plan) is outlined in Section 5.

5 Sampling Plan

The sampling plan for this Stage 2 Phase 2 ESA is outlined below and the following steps have been undertaken:

- Step 1: Identify areas of concern from the Phase 2 ESA requiring additional investigations. Assessment of the Phase 2 ESA results against the updated soil and groundwater criteria provided in NEPM (2013) is required as part of this step (Section 5.1);
- Step 2: Complete a data gap analysis to identify potential areas of concern that were not assessed in the Phase 2 ESA as the smelter was operational at the time of that investigation (Section 5.2);
- Step 3: The areas of concern identified in the data gap analysis generally comprise buildings used in smelter operations. Complete a walkover of these buildings to assess potential for contamination to soil and/ or groundwater (Section 5.3).
- Step 4: Based on the results of Steps 1, 2 and 3, identify areas of concern requiring assessment in this Stage 2 Phase 2 ESA including any limitations for sampling.
- Step 5: For each area of concern, stipulate the following:
    - Media to be sampled (soil, groundwater or both);
    - Type of sampling (judgemental, grid-based or combination of both)
    - Number of samples to be collected;
    - Targeted depth of sampling;
    - Chemicals for laboratory analysis;

5.1 Assessment of Phase 2 ESA Results against NEPM (2013)

An assessment of areas of concern against relevant guidelines was completed as part of the Phase 2 ESA. Table 8.3 of ENVIRON (2012) detailed identified soil and groundwater contamination. As updated guidelines were introduced in 2013, the identified soil and groundwater contamination have been re-assessed against NEPM (2013) in Table 5.1.

In addition, ENVIRON completed a Health Risk Assessment for fluoride in 2013, which developed a preliminary screening criteria for fluoride in soil for a range of landuses, including a preliminary screening criteria of 17,000mg/kg for commercial/ industrial landuse. Fluoride contamination in soil has been re-assessed using the preliminary screening criterion of 17,000mg/kg.

Table 5.1 does not include a re-assessment of groundwater contamination, as the guidelines for groundwater under NEPM (2013) have not changed from NEPM (1999). Note that Table 5.1 does not include areas of concern identified in the Phase 2 ESA that have been assessed further separately (see Section 2).

Table 5.1: Re-assessment of Identified Contamination from the Phase 2 ESA

No.	Area of Concern	Previously Identified Soil Contamination	Soil Contamination Identified under NEPM (2013)	Additional Investigations Required?
2	Anode Waste Pile	Benzo(a)pyrene (16-29mg/kg at 0-0.4m depth) and Total PAHs (165-458mg/kg) in shallow fill material beneath the Anode Waste Pile above guidelines of 5mg/kg and 100mg/kg respectively. Fluoride concentrations in fill samples range between 1010mg/kg and 47100mg/kg to a depth of 0.6m.	One of three soil samples has benzo(a)pyrene in shallow fill that exceeds NEPM (2013) Toxicity Equivalent Factor (TEQ) of 40mg/kg for commercial/ industrial landuse. Total PAHs are less than NEPM (2013) HIL D criterion of 4000mg/kg. Two of three soil samples have fluoride in shallow fill that exceeds the preliminary screening criteria of 17,000mg/kg.	Yes, for fluoride and PAHs in shallow soil.
3	Refuelling Area	TPH concentrations of 3360mg/kg at 0.15-0.3m depth in shallow soil elevated above the adopted guideline of 1000mg/kg. Fluoride concentrations in fill samples range between 90mg/kg and 3240mg/kg in soils between 0m and 0.3m depth. Fluoride concentrations in underlying natural soils of 60mg/kg to 830mg/kg.	The volatile TPH fraction C6-C10 is below the laboratory practical quantitation limit (PQL) then therefore below NEPM (2013) soil health screening levels for vapour intrusion for commercial/ industrial landuse. Heavy fraction TPH >C10-C16 soil health screening levels for commercial/ industrial landuse are non limiting (NL), indicating no potential vapour intrusion issues with the underground storage tanks. The heavy fraction TPH C15-C28 and C29-C36 concentrations are below Management Limits concentrations. The fluoride concentrations are below the preliminary screening criteria of	No, as TPH and fluoride concentrations do not exceed revised criteria.

Table 5.1: Re-assessment of Identified Contamination from the Phase 2 ESA

No.	Area of Concern	Previously Identified Soil Contamination	Soil Contamination Identified under NEPM (2013)	Additional Investigations Required?
			17,000mg/kg.	
4	Diesel Spray Area	Elevated TPH concentrations ranging between 2020mg/kg and 3760mg/kg above the adopted guideline of 1000mg/kg. Elevated BaP concentrations ranging between 19.2mg/kg and 101mg/kg and Total PAH concentrations of 205mg/kg and 963mg/kg in shallow fill material above the site guidelines of 5mg/kg and 100mg/kg respectively.	The volatile TPH fraction C6-C10 is below the laboratory practical quantitation limit (PQL) then therefore below NEPM (2013) soil health screening levels for vapour intrusion for commercial/ industrial landuse. Heavy fraction TPH >C10-C16 soil health screening levels for commercial/ industrial landuse are non limiting (NL), indicating no potential vapour intrusion issues with the diesel spray area. The heavy fraction TPH C15-C28 and C29-C36 concentrations are below Management Limits concentrations. BaP concentrations in shallow soil exceed the NEPM (2013) TEQ of 40mg/kg for commercial/ industrial landuse. Total PAHs are less than NEPM (2013) HIL D criterion of 4000mg/kg.	Yes, for PAHs in shallow soil.
5	Drainage Lines	Elevated BaP concentrations ranging between 15.1mg/kg and 85.6mg/kg and Total PAH concentrations ranging between 123mg/kg and 996mg/kg in sediment in drainage lines adjacent to Anode Waste Pile above the site	BaP concentrations in sediment in drainage lines associated with the Anode Waste Pile and the Alcan Mound exceed the NEPM (2013) TEQ of 40mg/kg for commercial/ industrial landuse. Total PAHs are less than	No, based on current sampling results all sediments in drain near the Anode Waste Pile and Alcan Mound are assumed to contain elevated

Table 5.1: Re-assessment of Identified Contamination from the Phase 2 ESA

No.	Area of Concern	Previously Identified Soil Contamination	Soil Contamination Identified under NEPM (2013)	Additional Investigations Required?
		guidelines. Fluoride concentrations in sediment ranging between 520mg/kg and 7350mg/kg.	NEPM (2013) HIL D criterion of 4000mg/kg. Fluoride concentrations are below the preliminary screening criteria of 17,000mg/kg.	concentrations of PAHs and require remediation.
6	East Surge Pond	Elevated BaP ranging between 16mg/kg and 21.7mg/kg and Total PAH concentration ranging between 171mg/kg and 475mg/kg in sediments above the site guidelines. Fluoride concentrations in sediment ranging between 210mg/kg and 3010mg/kg. Fluoride concentrations in natural soil of 210mg/kg.	BaP concentrations in one sediment sample exceed the NEPM (2013) TEQ of 40mg/kg for commercial/ industrial landuse. Total PAHs are less than NEPM (2013) HIL D criterion of 4000mg/kg. Fluoride concentrations are below the preliminary screening criteria of 17,000mg/kg.	Yes, for PAHs in dam sediments.
7	Northern Dams 1 and 2	Elevated concentrations of BaP (7.4mg/kg) and PAH (122mg/kg) in one composite sample. Average concentrations indicate acceptable concentrations present. Fluoride concentrations in sediment ranging between 860mg/kg and 1880mg/kg. Fluoride concentrations in natural soils ranging between 340mg/kg and 7350mg/kg.	BaP and Total PAH concentrations are below NEPM (2013) HIL D guidelines. Fluoride concentrations are below the preliminary screening criteria of 17,000mg/kg.	No, PAH and fluoride concentrations do not exceed revised criteria.

Table 5.1: Re-assessment of Identified Contamination from the Phase 2 ESA

No.	Area of Concern	Previously Identified Soil Contamination	Soil Contamination Identified under NEPM (2013)	Additional Investigations Required?
8	Carbon Plant	Elevated concentrations of BaP (33.6mg/kg) and Total PAHs (387mg/kg) in shallow fill material adjacent to the green mix plant above the site guidelines. Fluoride concentrations in shallow fill ranging between 150mg/kg and 7740mg/kg. Fluoride concentrations in natural soil ranging between 60mg/kg and 650mg/kg.	BaP concentration in one shallow soil sample at the western end of the Carbon Plant exceeds the NEPM (2013) TEQ of 40mg/kg for commercial/ industrial landuse. Total PAHs are less than NEPM (2013) HIL D criterion of 4000mg/kg. Fluoride concentrations are below the preliminary screening criteria of 17,000mg/kg.	Yes, for PAHs in shallow accessible soil in garden beds and grassed areas at the western end of the Carbon Plant. Soils below concrete/ bitumen are not impacted.
9	Cathode Bar Washdown Area	Elevated concentrations of BaP (8.9mg/kg) and Total PAHs (149mg/kg) in shallow fill material above the site guidelines. Fluoride concentrations in shallow fill of 10600mg/kg. Fluoride concentrations in underlying topsoil of 190mg/kg.	BaP and Total PAH concentrations are below NEPM (2013) HIL D guidelines. Fluoride concentrations are below the preliminary screening criteria of 17,000mg/kg.	No, as PAH and fluoride concentrations are below revised criteria.
10	Flammable Liquids Store	Fluoride concentrations in shallow fill ranging between 700mg/kg and 16200mg/kg from 0.1m to 0.4m depth.	Fluoride concentrations are below the preliminary screening criteria of 17,000mg/kg.	No, as fluoride concentrations are below revised criteria.
11	Washdown Bay	Fluoride concentrations in shallow fill ranging between 960mg/kg and 39000mg/kg from 0m to 0.8m depth.	Fluoride concentrations in one shallow soil sample exceed the preliminary screening criteria of 17,000mg/kg.	Yes, for fluoride in shallow soil.

Table 5.1: Re-assessment of Identified Contamination from the Phase 2 ESA

No.	Area of Concern	Previously Identified Soil Contamination	Soil Contamination Identified under NEPM (2013)	Additional Investigations Required?
12	Pot Lines 2 and 3	Fluoride concentrations in shallow fill ranging from 13400mg/kg and 41900mg/kg from 0m to 0.05m depth.	Fluoride concentrations in three of four shallow soil samples exceed the preliminary screening criteria of 17,000mg/kg.	Yes, for fluoride in shallow soil.
15	West Surge Pond	Fluoride concentrations in sediment ranging from 5850mg/kg to 38500mg/kg.	Fluoride concentrations in one of two sediment samples exceed the preliminary screening criteria of 17,000mg/kg.	Yes, for fluoride in sediment.
18	Pot Rebuild Area	None identified. Fluoride concentrations of 190mg/kg in shallow fill.	Fluoride concentrations are below the preliminary screening criteria of 17,000mg/kg.	No, fluoride concentrations are below revised criteria.
19	Clay Borrow Pit	None identified. Fluoride concentrations ranging between 190mg/kg and 2120mg/kg in shallow fill.	Fluoride concentrations are below the preliminary screening criteria of 17,000mg/kg.	No, fluoride concentrations are below revised criteria.
21	Irrigation Area	Elevated BaP concentration of 1.2mg/kg in shallow soil above the residential guideline of 1mg/kg. Elevated zinc concentration of 26mg/kg in shallow soil above the phytotoxicity-based guideline (EIL) of 200mg/kg. Fluoride concentrations in surface soils ranging between 200mg/kg and 510mg/kg.	BaP and Total PAH concentrations are below NEPM (2013) HIL D guidelines. Fluoride concentrations are below the preliminary screening criteria of 17,000mg/kg.	No, fluoride and PAH concentrations are below revised criteria.

The re-assessment completed in Table 5.1 indicates that soil contamination issues relating to PAHs and fluoride are no longer an issue at Northern Dams 1 and 2, Cathode Bar Washdown Area, Flammable Liquids Store, Pot Rebuild Area, the Clay Borrow Pit and the Irrigation Area. No further investigations shall be undertaken at these areas.

5.2 Data Gap Analysis

At the time of the Phase 2 ESA, some areas of the site were not accessible for investigation as the smelter was in operation. Now that the smelter is in a care and maintenance mode, previously inaccessible areas of the site may require assessment as part of the Stage 2 Phase 2 ESA. Review of the smelter operations has identified the following potential areas of concern that require assessment:

- The Carbon Plant, including the Greenmix Building, the Rodding Building, Ring Furnace Building and Green & Baked Anode Storage Building;
- Casting Plant Building;
- Ring Furnace Scrubber;
- Metal Storage Pads;
- Maintenance Workshop and Boilermakers shop;
- Petroleum Coke Storage;
- Potroom Services Workshop;
- Potline Raw Material Storage;
- Bath Crushing Plant;
- Dross Storage Building;
- Butt Cleaning Building;
- Casting Alloy Storage Shed;
- Anode Storage Building;
- Playing Fields, area east of playing fields and area east of Clay Borrow Pit (filled areas);
- Areas of accessible soil (i.e. garden beds).

A site visit was completed on 7 May 2014 to assess the condition of the buildings identified above, including the floor material, condition of the floor, location of pits, sumps or other underground structures and an assessment of the potential for soil and/ or groundwater contamination associated with each building. The results of the site visit are documented in Table 5.2.

Table 5.2: Assessment of Previously Inaccessible Buildings at the Smelter

Building No.	Building Name	Use	Floor Material	Condition of Floor Material	Potential for Soil or Groundwater Contamination
-	Metal Storage Pads (South and East)	Storage of aluminium billet	Bitumen	Good	Low
73C	Casting Maintenance Storage Sheds	Storage of materials used in aluminium casting	Concrete	Fair, one larger crack in eastern shed	Low
74C	Casting Alloy Storage Sheds	Storage of metals (iron, copper, chrome) used in aluminium casting	Concrete	Fair, small cracks	Low
3A/B/C	Potroom Buildings	Smelting of aluminium	Concrete	Fair	Low
3AN/BN/CN, 3AS/BS/CS/BC/CC, 29A/C, 65C, 68C	Substations	Substation buildings	Gravel for earthing	Fair	Medium, oils containing PCBs have been replaced but remnant oil likely
43BS	Dry Scrubber Plant	Scrub aluminium gases from pot lines	Bitumen	Poor	High, alumina dust (fluoride) observed settled on ground surface
95A	Washdown Bay	Wash down and parking of pot line vehicles	Bitumen	Fair	Low, as built in last 5 years
40A	Cathode Rodding Building	Storage of cathodes	Thick concrete	Good	Low

Table 5.2: Assessment of Previously Inaccessible Buildings at the Smelter

Building No.	Building Name	Use	Floor Material	Condition of Floor Material	Potential for Soil or Groundwater Contamination
44B	Pot Line Maintenance	Oil storage	Thick Concrete	Good	Low
4A/B/C	Cast House	Casting aluminium metal	Thick concrete	Good	Low
64C	Mobile Vehicle Workshop	Vehicle maintenance	Concrete	Good	Medium due to mechanics pit with sump
26A/B/C	Engineering Building and Workshops	Maintenance workshop for fitters, boilermakers and components repair	Concrete	Good	Low
46A	Carbon Plant Maintenance Workshop	Maintenance of carbon plant equipment	Thick concrete	Good	Low
5A	Greenmix Plant	Forming anodes, includes delivery of liquid pitch, agitation and pouring into moulds	Concrete	Good	High for PAHs in accessible soil otherwise low
8A/B	Rodding Building	Adding rods to anodes	Thick concrete	Good	Medium due to below ground butt crushing plant, oily residue on floor
8C	Baked Anode	Storage of baked	Concrete	Good	Low

Table 5.2: Assessment of Previously Inaccessible Buildings at the Smelter

Building No.	Building Name	Use	Floor Material	Condition of Floor Material	Potential for Soil or Groundwater Contamination
	Storage	anodes			
7A/B/C	Carbon Plant	Baking anodes	Concrete	Good	Low
60C	Ring Furnace Scrubber	Dry scrubbing of gases from the ring furnace, scrubber waste bunker	Concrete	Good	High for fluoride and PAHs in accessible soil
65C	Butt Cleaning Building	Cleaning anode butts prior to crushing	Concrete	Not seen, currently used for anode storage	Low
1A/B/C	Switchyard	To step down high voltage electricity	Concrete	Good	Low

5.3 Potential Areas of Environmental Concern

Table 5.3 outlines the Potential Areas of Environmental Concern (PAEC) identified at the site during the previous Phase 2 ESA and from the data gap analysis. Table 5.3 includes the area of each PAEC, the buildings, type of ground surface and limitations for sampling.

It is noted that the main limitation for sampling is overhead and underground services. The location of these services may mean that planned sampling locations have to be moved during the field investigations.

Table 5.3: Potential Areas of Environmental Concern Requiring Investigation

No.	PAEC	Area (m^2)	Buildings	Ground Surface	Limitations for Sampling
2	Anode Waste Pile	6,400	None	Gravel	The ground surface beneath the Anode Waste Pile cannot be sampled until the pile is removed.
3	Refuelling Area	600	Low roofed canopy structure.	Bitumen. There is a garden bed immediately to the west.	The UST and associated infrastructure remains in the ground. There is a low roofed canopy over the refuelling area that will prevent the drill rig from raising its mast.
4	Diesel Spray Area	200	Low roofed canopy	Fill soils and bitumen	There is a low roofed canopy structure over the area that will prevent the drill rig from raising its mast. There are services within the vicinity that were an issue in the Phase 2 ESA.
6	East Surge Pond	4,400	None	Sediment	None
8	Carbon Plant (western end only)	96,000	Ring Furnace Building, Rodding Building, Green & Baked Anode Storage Building, Greenmix Building, Workshops and Control Rooms	Concrete/ bitumen	Underground and overhead services, sampling will be limited to accessible soils only

Table 5.3: Potential Areas of Environmental Concern Requiring Investigation

No.	PAEC	Area (m^2)	Buildings	Ground Surface	Limitations for Sampling
11	Washdown Bay	900	None	Concrete	Underground services
12	Pot Lines 1, 2 and 3	180,950	Three pot lines	Bitumen and fill soils	Sampling within the pot lines is not required. Sampling will be limited to accessible soil between the pot lines.
15	West Surge Pond	4,875	None	Sediment	None
25	Dry Scrubbers (6 separate locations between pot lines)	3,450 per location	Overhead infrastructure	Mix of bitumen and grass	Underground/ overhead services
26	Ring Furnace Scrubber	6,550	Overhead infrastructure	Mix of concrete and grass	Underground/ overhead services
27	Substations	Approx. 50 per substation	Each generally includes a building	Gravel	Underground/ overhead services
28	Playing Fields (two adjacent)	8,100 per oval	None	Grass/ fill soils	None
29	Area East of Playing Fields	9,900	None	Grass/ fill soils	None
30	Area east of Clay Borrow Pit	31,900	None	Grass/ fill soils	None
31	Storage Area west of	44,000	None	Mix of compacted fill and	Underground/ overhead services

Table 5.3: Potential Areas of Environmental Concern Requiring Investigation

No.	PAEC	Area (m^2)	Buildings	Ground Surface	Limitations for Sampling
	Pot Lines			hardstand	
32	Garden beds	NA	None	Fill soils	Underground/ overhead services

5.4 Sampling Program

Table 5.3 outlines the Potential Areas of Environmental Concern (PAEC) identified at the site during the previous Phase 2 ESA and from the data gap analysis. The location of each PAEC and planned sampling locations are shown in Figures 2 to 12.

It is noted that aside from the seven new wells planned in Table 5.3, a round of groundwater sampling will be completed on the existing wells installed during the Phase 2 ESA.

Table 5.4: Sampling Program for PAECs

No.	PAEC	Area (m^2)	Media to be Sampled	Type of Sampling	No. of Sample Locations	Targeted Depth/ Sample Depths	Laboratory Analysis
2	Anode Waste Pile	6,400	Soil	Stratified sampling around outside of stockpile for delineation of contamination	8	Surface soils to 0.5m, samples collected from 0-0.1m and 0.3-0.4m.	Fluoride, PAHs
			Groundwater	Judgemental down gradient sampling	2 wells		PAHs
3	Refuelling Area	600	Groundwater	Down gradient sampling	3 wells		TPH, PAHs
4	Diesel Spray Area	200	Soil	Stratified sampling to delineate contamination	8	Soils to 1m, samples collected from 0-0.1m, 0.4-0.5m, 0.8-0.9m	PAHs
6	East Surge Pond	4,400	Sediment	Due to sampling difficulties encountered during the Phase 2ESA, ENVIRON recommend sampling of sediments from the East Surge Pond once the sediments have been excavated and stockpiled.			
8	Carbon Plant (western end only)	96,000	Accessible soil	Grid-based sampling of accessible soils to delineate contamination	15	Surface soils to 0.5m, samples collected from 0-0.1m and 0.3-0.4m	PAHs
			Groundwater	Sampling within former rodding building	3 wells		PAHs

Table 5.4: Sampling Program for PAECs

No.	PAEC	Area (m^2)	Media to be Sampled	Type of Sampling	No. of Sample Locations	Targeted Depth/ Sample Depths	Laboratory Analysis
11	Washdown Bay	900	Soil	Grid-based sampling to assess contamination	4	Surface soils to 0.5m, samples collected from 0-0.1m and 0.3-0.4m	Fluoride
12	Pot Lines 1, 2 and 3	180,950	Accessible soil	Stratified sampling where accessible to delineate contamination	10	Surface soils to 0.5m, samples collected from surface, 0.1m, 0.15m and 0.2m	Fluoride
15	West Surge Pond	4,875	Sediment	Due to sampling difficulties encountered during the Phase 2ESA, ENVIRON recommend sampling of sediments from the West Surge Pond once the sediments have been excavated and stockpiled.			
25	Dry Scrubbers (6 separate locations between pot lines)	3,450 per location	Soil	Judgemental sampling to assess contamination	24, 4 per location	Surface soils to 0.5m, samples collected from 0-0.1m, 0.1-0.2m and 0.3-0.4m	Fluoride
26	Ring Furnace Scrubber	6,550	Soil	Grid-based sampling to assess contamination	10	Surface soils to 0.5m, samples collected from 0-0.1m and 0.3-0.4m	Fluoride, PAHs
27	Substations	50 per substation	Soil	Due to health and safety issues with sampling in a live substation, ENVIRON recommends assessment of each substation following decommissioning.			

Table 5.4: Sampling Program for PAECs

No.	PAEC	Area (m^2)	Media to be Sampled	Type of Sampling	No. of Sample Locations	Targeted Depth/ Sample Depths	Laboratory Analysis
28	Playing Fields (two adjacent)	8,100 per oval	Soil	Grid-based sampling to assess contamination	10 locations per field	Full depth of fill, samples to be collected within fill	Heavy Metals, PTH, BTEX, PAHs, fluoride
29	Area East of Playing Fields	9,900	Soil	Grid-based sampling to assess contamination	10	Full depth of fill, samples to be collected within fill	Heavy Metals, PTH, BTEX, PAHs, fluoride
30	Area east of Clay Borrow Pit	28,500	Soil	Grid-based sampling to assess contamination	10	Full depth of fill, samples to be collected within fill	Heavy Metals, PTH, BTEX, PAHs, fluoride
31	Storage Area west of Pot Lines	44,000	Soil	Grid-based sampling to assess contamination	14	Surface soils to 0.5m, samples collected from surface, 0.1m, 0.15m and 0.2m and 0.4m	Heavy Metals, PTH, BTEX, PAHs, fluoride
32	Garden beds	NA	Soil	Grid-based sampling to assess contamination	1 per garden bed not included in other PAECs, estimate of 20	Surface soils to 0.5m, samples collected from 0-0.1m and 0.3-0.4m	Fluoride, PAHs

5.5 Sampling

5.5.1 Soil Sampling Methodology

The fieldwork methodology for soil sampling is outlined in Table 5.5.

Table 5.5: Soil Sampling Methodology

Activity	Details
Subsurface clearance	A Dial Before You Dig underground services check will be completed prior to fieldwork. Sample locations will be marked out and cleared by a suitably qualified and experienced locator prior to the commencement of subsurface works. Sampling locations that need to be moved due to underground or overhead services will be relocated at the time of the subsurface clearance.
Concrete coring	Coring of surface concrete will be completed at sampling locations requiring this work prior to the commencement of fieldwork.
Drilling and hand augering	The majority of the sampling locations will be drilled using pushtubes to the required depth of the investigation. Hollow augers will be used where possible to complete the boreholes that will be completed with groundwater monitoring wells. Where access with a drill rig is restricted or only surface samples are required, soil samples will be collected by hand auger.
Test Pitting	A back hoe will be used to test pit the playing fields. Test pits will be extended through fill material into natural soils. Test pits will be backfilled and track rolled on completion.
Soil logging	Soil logging will be undertaken by a suitably qualified and experienced environmental scientist from ENVIRON. It is intended that the environmental scientist from ENVIRON will be the same person who completed fieldwork for the Phase 2 ESA. The approximate location of sampling locations will be recorded by measuring the distance from known locations e.g. buildings or fences.

Table 5.5: Soil Sampling Methodology	
Activity	**Details**
Soil sampling	Soil samples will be collected from suitable locations at each borehole. Where the mechanism of contamination is from the surface of the site into the soil, soil samples will be collected from the surface (0.0-0.1m) and from a depth around 0.5m. Where the mechanism of contamination is associated with an underground structure such as a UST, soil samples will be collected from the depth at which contamination is likely to be present. Soil samples will be collected using dedicated disposable gloves into laboratory-supplied glass jars.
Soil screening	A Photoionisation Detector (PID) will be used to screen soil samples for the presence of volatile contaminants in areas where volatile contaminants are of concern. Sample material will be placed into a plastic bag and sealed for soil screening.
Decontamination	Reusable sampling equipment (if any) will be decontaminated by washing with Decon90 and rinsing with potable water between samples.
Disposal of soil	Spoil will be returned to the boreholes.

5.5.2 Groundwater Sampling Methodology

The fieldwork methodology for groundwater sampling is outlined in Table 5.6.

Table 5.6: Groundwater Sampling Methodology

Activity	Details
Well installation	The groundwater wells will be extended from the boreholes to approximately 1m below the groundwater table using solid flight augers. The wells will be constructed using machine slotted 50mm PVC screen from the base of the well to 0.5m past the intercepted groundwater depth and screw threaded 50mm PVS casing will be extended to the surface. The well annulus will be backfilled with 2mm graded sand to approximately 1m past the top of the screen, followed by bentonite backfill to the surface. A lockable steel monument will be concreted in over the well access.
Well gauging	Monitoring wells will be gauged using an oil/water interface probe. The interface probe will be decontaminated between each measurement.
Well purging	Groundwater purging and sampling will be completed approximately one week following well installation. Water will be purged from each monitoring well using peristaltic sampling equipment until the groundwater parameters have stabilised. Groundwater parameters including pH, temperature, dissolved oxygen, redox potential and electrical conductivity will be recorded using a water quality meter during purging.
Sampling method	Following stabilization of groundwater parameters, sampling will be completed using peristaltic techniques. Groundwater samples will be collected into laboratory-supplied bottles that are preserved as required.
Decontamination	Dedicated tubing will be used per well. Decontamination of re-useable sampling equipment will be completed using Decon90 and rinsing with potable water.
Disposal of water	Groundwater collected during purging and sampling will be disposed of to land down gradient of the well following sampling.

5.5.3 Sample Handling and Preservation

The following sample handling and preservation procedures will be used:

- The use of a new pair of disposable nitrile gloves to handle each soil and groundwater sample;
- Soil samples are to be placed immediately into laboratory-supplied acid-rinsed glass jars;
- Groundwater samples are to be placed immediately into laboratory-supplied appropriately-preserved bottles;
- Sample jars and bottles are to be fill so that no headspace remains;
- Sample jars and bottles are to be stored in chilled, insulated containers with ice for transportation to the laboratory;
- Sample numbers, depths, preservation and analytical requirements are to be recorded on chain of custody documents;
- Samples jars and bottles are to be transported to the laboratory under chain of custody conditions.

6 Data Quality Indicators

The project Data Quality Indicators (DQIs) have been established to set acceptance limits on field and laboratory data collected as part of this investigation. Field and laboratory procedures acceptance limits are set at different levels for different projects and by different laboratories. Non-compliance with acceptable limits are to be documented and discussed in the Stage 2 Phase 2 ESA report. The DQIs are presented in Table 6.1.

Table 6.1: Data Quality Indicators

DQI	Field	Laboratory	Acceptability Limits
Completeness	All critical locations sampled, All samples collected Experienced sampler Documentation correct	All critical samples analysed and all analytes analysed according to Standard Operating Procedures (SOPs) Appropriate Practical Quantitation Limits (PQLs) Sample documentation complete Sample holding times complied with	As per NEPM (2013)
Comparability	Experienced sampler In the event of multiple sampling events: Same types of samples collected Same sampling methodologies used Climatic conditions	Same analytical methods used Same PQLs Same units Same primary and secondary laboratories	As per NEPM (2013)
Representativeness	Appropriate media sampled Relevant media sampled	All samples analysed according to SOPs	
Precision	Collection of duplicate samples Sampling methodologies appropriate and complied with	Analysis of: Blind duplicate samples at rate of 1 in 10 samples Split duplicate samples at rate of 1 in 20 samples Laboratory duplicate samples	 RPD of 30 to 50% RPD of 30 to 50% RPD of 30 to 50%
Accuracy	Sampling methodologies appropriate and complied with.	Analysis of: Method blanks Matrix spikes Surrogate spikes Laboratory control samples Reagent blanks Reference material	 Non-detect 70 to 130% 70-130% 70 to 130%

7 Basis for Assessment Criteria

7.1 Soil

The criteria proposed for the assessment of soil contamination were sourced from the following references:

- National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM).

The variation to the National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) was approved on 19 June 2013 by the NSWEPA under the *Contaminated Land Management Act 1997*. NEPM (2013) provide revised health-based soil investigation levels (HILs) and ecological-based investigation levels (EILs) for various land uses. The NEPM 2013 also introduces health-based and ecological screening levels and management limits for petroleum hydrocarbons (HSLs and ESLs). The levels have been derived from recent assessments that more accurately define the exposure mechanisms and risks from sites contaminated with petroleum hydrocarbons.

The guidelines adopted for the site from the NEPM are as follows:

- HIL D – Health investigation level for commercial/industrial such as shops, offices, factories and industrial sites. The HILs are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are generic to all soil types and apply generally to a depth of 3 m below the surface for industrial use.
- HSLs for commercial/industrial use - Health screening levels for soil vapour intrusion from petroleum hydrocarbons are guidelines that prevent accumulation of vapours at concentrations that may represent a health risk. The HSLs are derived for various depths and are for the same generic land uses as for the HILs. The guidelines are relevant were soils are beneath building or structures such as confined spaces;
- EIL for commercial/ industrial use – ecological investigations levels applicable for assessing risk to terrestrial ecosystems. EILs depend on specific soil physicochemical properties and generally apply to the top 2 m of soil.
- ESLs for commercial/ industrial use – ecological screening levels developed for selected petroleum hydrocarbon compounds and fractions and are applicable for assessing risk to terrestrial ecosystems. These are also generally applicable to the top 2m of soil.
- Management Limits where concentrations above these limits may indicate poor aesthetics, high odour and potentially explosive vapour. Management limits are to be applied after consideration of relevant ESLs and HSLs.

The applicable assessment criteria for heavy metals and PAHs in soil are presented in **Table 7.1**:

Table 7.1: Soil Assessment Criteria (mg/kg) – Health and Ecological Investigation Levels		
	HIL D	**EIL**
Arsenic	3000	160
Cadmium	900	-
Chromium (VI)	3600	320 (CR III, 1% clay)
Copper	240 000	130
Lead	1500	1800
Nickel	6000	40
Zinc	400 000	380
Mercury (inorganic)	730	-
Fluoride	Ref 7. 5	Ref Table 5
Cyanide (free)	1500	-
Carcinogenic PAHs (as BaP TEQ)	40	-
Total PAHs	4000	-
DDT+DDE+DDD	3600	
Aldrin +dieldrin	45	
Chlordane	530	
Endosulfan	2000	
Endrin	100	
Heptachlor	50	
Methoxychlor	2500	
Chlorpyrifos	2000	

1 EILs represent the most conservative value possible as the lowest value for added contaminant limit (ACL) was used and the ambient background concentration (ABC) was not added, with the exception of zinc and copper, where the EIL was calculated by adding the ACL with the estimated ABC using the NEPM (2013) EIL Calculation Spreadsheet .

The applicable assessment criteria for petroleum hydrocarbons in soil are presented in **Table 7.2** and **Table 7.3**:

Table 7.2: Soil Assessment Criteria for Vapour Intrusion - HSL D (mg/kg) - Sand				
	0 to <1m	**1m to <2m**	**2m to <4m**	**4m+**
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	230	NL	NL	NL
Naphthalene	NL	NL	NL	NL
Benzene	3	3	3	3
F1(4)	260	370	630	NL
F2(5)	NL	NL	NL	NL

1 The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the

derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

2 (For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

3 To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

4 To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Table 7.3: ESLs and Management Limits for Petroleum Hydrocarbons in Soil

TPH fraction	Soil texture	ESLs (mg/kg dry soil)	Management Limits[1] (mg/kg dry soil)
		Commercial and Industrial	Commercial and Industrial
F1 C6- C10	Fine	215*	800
F2 >C10-C16	Fine	170*	1000
F3 >C16-C34	Fine	2500	5000
F4 >C34-C40	Fine	6600	10 000
Benzene	Fine	95	-
Toluene	Fine	135	-
Ethylbenzene	Fine	185	-
Xylenes	Fine	95	-
Benzo(a)pyrene	Fine	0.7	-

1 Management limits are applied after consideration of relevant ESLs and HSLs.

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

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

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

The HSLs for asbestos are applicable for assessing human health risk via the exposure pathway of inhalation of airborne asbestos and are presented in **Table 7.4**. The HSLs are generic to all soil types.

Table 7.4. Health Screening Levels for Asbestos Contamination in Soil (w/w)

Form of asbestos	Residential A[1]	Residential B[2]	Recreational C[3]	Commercial/ Industrial D[4]
Bonded ACM	0.01%	0.04%	0.02%	0.05%
FA and AF[1] (friable asbestos)	0.001%			
All forms of asbestos	No visible asbestos for surface soil			

1. The screening level of 0.001% w/w asbestos in soil for FA and AF (i.e. non-bonded/friable asbestos) only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres.

NEPM (2013) do not provide criteria for fluoride in soils in Australia. Therefore, ENVIRON (2013) conducted a preliminary level Human Health Risk Assessment (HRA) specific to fluoride in order to derive a specific preliminary screening level for fluoride for the Hydro

Aluminium Kurri Kurri Smelter . The screening levels are protective of the range of human receptors and are provided in **Table 7.5**:

Table 7.5: Site Specific Soil Assessment Guidelines for Fluoride (mg/kg)	
Preliminary screening levels	
Land Use	**Preliminary screening level**
Commercial/ industrial - soil	F 17000mg/kg

Consistent with the guidance provided in the NEPM, the data was assessed against the above adopted site guidelines by:

- Comparing individual concentrations against the relevant guidelines and if discrete samples are in excess of the relevant guideline then;
- Comparing the 95% upper confidence limit of mean against the relevant guideline also ensuring that:
    - the standard deviation of the results is less than 50% of the relevant investigation or screening level, and
    - no single value exceed 250% of the relevant investigation or screening level.

8 Reporting Requirements

At the completion of the Stage 2 Phase 2 ESA, a report shall be provided that includes the following information, in accordance with NSW OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites:

- Executive summary;
- Scope of work;
- Site identification;
- Summary of previous investigations, including a summary of the site history, site condition, surrounding environment, geology and hydrogeology;
- A summary of this SAQP and sampling methodologies;
- Field and laboratory QA/QC;
- QA/QC data evaluation;
- Basis for assessment criteria;
- Results;
- Site characterisation, including updated conceptual site model;
- Requirements for remediation;
- Conclusion and recommendations.

The Stage 2 Phase 2 ESA report will comply with the requirements of NSW DEC (2006) Contaminated Sites: Guidelines for the NSW Site Auditor Scheme.

9 References

ENVIRON (March 2012) ‘Sampling, Analysis and Quality Plan, Kurri Kurri Aluminium Smelter’

ENVIRON (1 November 2012) ‘Phase 2 Environmental Site Assessment, Kurri Kurri Aluminium Smelter

ENVIRON (2 April 2013) ‘Preliminary Screening Level, Human Health Risk Assessment for Fluoride and Aluminium, Part of the Kurri Kurri Aluminium Smelter, Hart Road, Loxford’

NEPM (2013) ‘Schedule B1: Guideline on Investigations Levels for Soil and Groundwater’

10 Limitations

ENVIRON Australia prepared this report in accordance with the scope of work as outlined in our proposal to Hydro Aluminium Kurri Kurri Pty Ltd dated June 2014 and in accordance with our understanding and interpretation of current regulatory standards.

A representative program of sampling and laboratory analyses was undertaken as part of this investigation, based on past and present known uses of the site. While every care has been taken, concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. We cannot therefore preclude the presence of materials that may be hazardous.

Site conditions may change over time. This report is based on conditions encountered at the site at the time of the report and ENVIRON disclaims responsibility for any changes that may have occurred after this time.

The conclusions presented in this report represent ENVIRON's professional judgment based on information made available during the course of this assignment and are true and correct to the best of ENVIRON's knowledge as at the date of the assessment.

ENVIRON did not independently verify all of the written or oral information provided to ENVIRON during the course of this investigation. While ENVIRON has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to ENVIRON was itself complete and accurate.

This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

10.1 User Reliance

This report has been prepared exclusively for [INSERT COMPANY NAME] and may not be relied upon by any other person or entity without ENVIRON's express written permission.

Figures

Location of Smelter

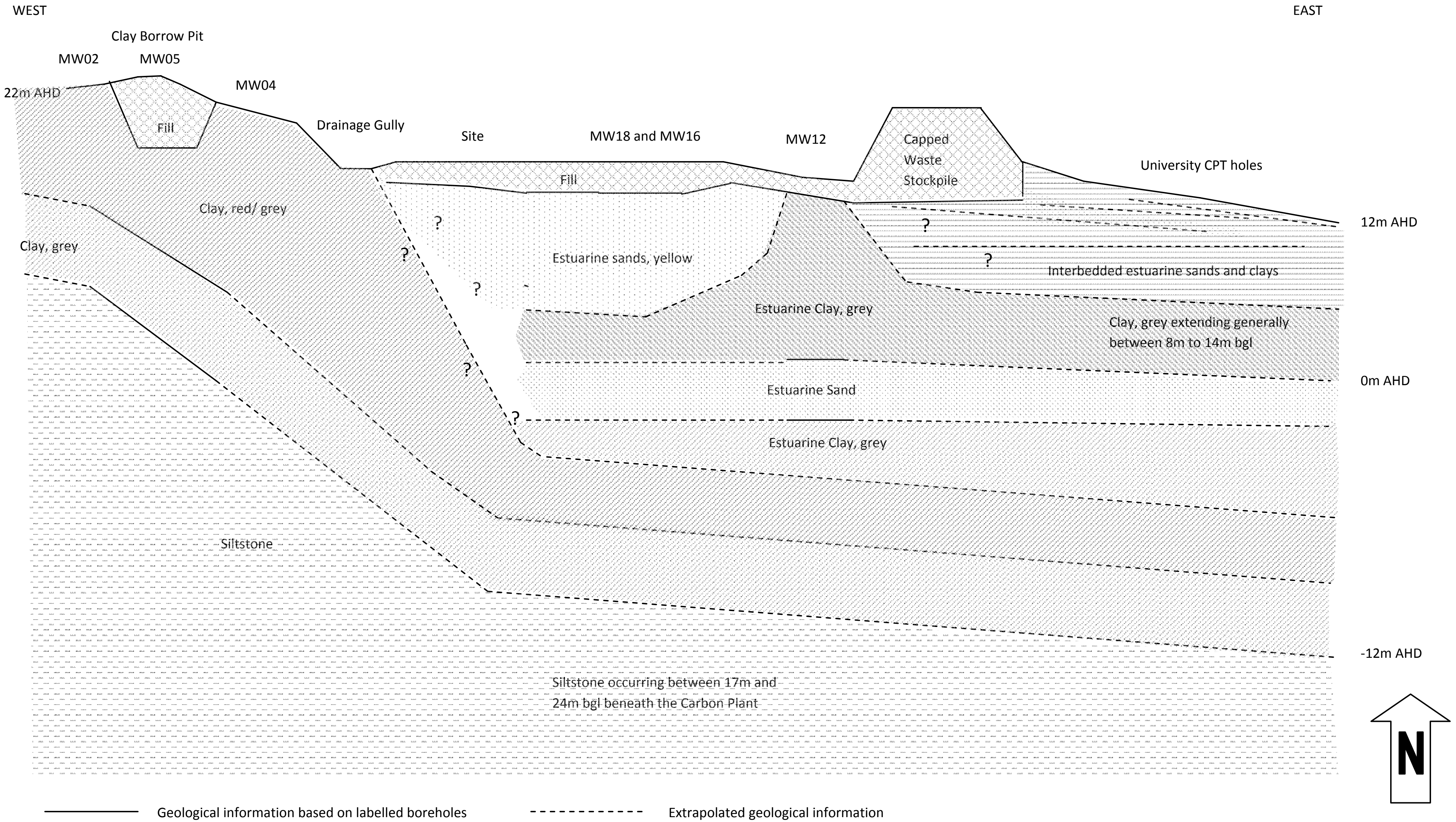
Location of Buffer Zone

Location of Land Owned by Hydro

N

HYDRO AUSTRALIA STAGE 2 PHASE 2 ESA, KURRI KURRI	SITE LOCATION PLAN

ENVIRON JOB NO: AS130328 DATE: 19/05/2014 FIGURE 1



HYDRO AUSTRALIA STAGE 2 PHASE 2 ESA, KURRI KURRI

CONCEPTUAL SITE MODEL

ENVIRON

JOB NO: AS130328

DATE: 19/05/2014

FIGURE 2

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA

AEC 2 - Anode Waste Pile

ENVIRON

JOB NO: AS130328

DATE: May 2014

FIGURE 3

New groundwater well locations

Existing sampling locations

N

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA	AEC 3 – Refuelling Area

ENVIRON JOB NO: AS130328 DATE: May 2014 FIGURE 4

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA

AEC 4 – Diesel Spray Area

ENVIRON

JOB NO: AS130328

DATE: May 2014

FIGURE 5

New groundwater well locations

New soil locations

Existing sampling locations

N

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA	AEC 8 – Carbon Plant

ENVIRON JOB NO: AS130328 DATE: May 2014 FIGURE 6

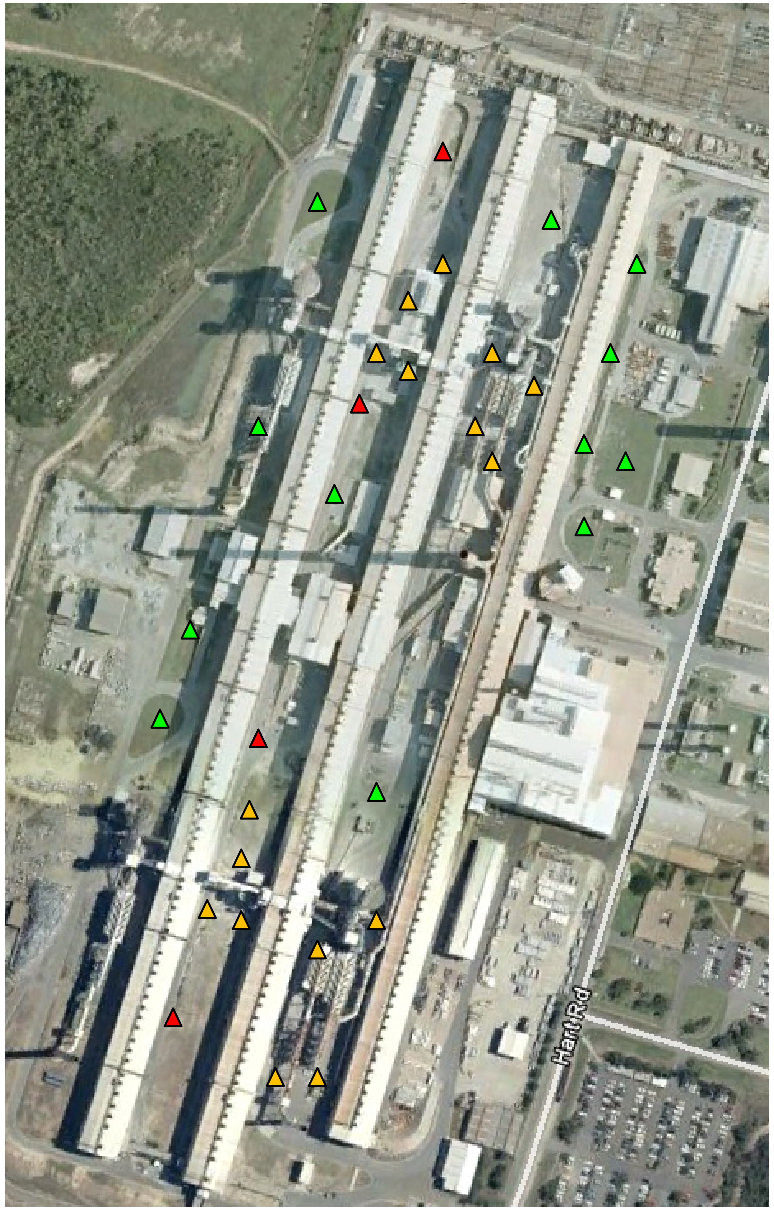
New soil locations

Existing sampling locations

N

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA	AEC 11 – Washdown Bay

ENVIRON JOB NO: AS130328 DATE: May 2014 FIGURE 7



New soil locations – AEC 25

New soil locations – AEC 12

Existing sampling locations

N

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA

AEC 12 – Pot Lines and AEC 25 – Dry Scrubbers

ENVIRON

JOB NO: AS130328

DATE: May 2014

FIGURE 8

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA

AEC 26 – Ring furnace Scrubber

ENVIRON

JOB NO: AS130328

DATE: May 2014

FIGURE 9

New soil locations

N

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA

AEC 28 – Playing Fields

ENVIRON

JOB NO: AS130328

DATE: May 2014

FIGURE 10

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA			AEC 29 – Area East of Playing Fields
ENVIRON	JOB NO: AS130328	DATE: May 2014	FIGURE 11

New soil locations

Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA

AEC 30 – Area East of Clay Borrow Pit

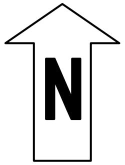
ENVIRON

JOB NO: AS130328

DATE: May 2014

FIGURE 12

New soil locations



Hydro Aluminium Kurri Kurri – Stage 2 Phase 2 ESA

AEC 31 – Storage Area West of Clay Borrow Pit

ENVIRON

JOB NO: AS130328

DATE: May 2014

FIGURE 13

Appendix C

Field Methodologies

1 Field Methodology

1.1 Soil Sampling

The fieldwork methodology for soil sampling is outlined in Table A.1.

Table A.1: Soil Field Methodology

Activity	Details
Soil Logging	Soil logging was undertaken by two suitably qualified and experienced environmental scientists from ENVIRON. The push tube drilling locations were logged by Kirsty Greenfield, who completed the fieldwork for the 2012 Phase 2 ESA. Kirsty has 12 years experience as an environmental scientist. The test pit and hand auger locations were logged by Kate Woods, who has 7 years of experience as an environmental scientist.
Intrusive Investigation Methods	Three intrusive investigation methods were used during this investigation: drilling, hand augering and test pitting. Test pitting was completed using a back hoe to excavate through fill material (where present) into natural soil. Test pitting was completed in large open areas of the Smelter Site, such as the playing fields, the area next to the playing fields and the storage area west of Pot Line 3. Boreholes were drilled using pushtubes to the required depth of the investigations in areas of the Smelter Site not accessible for test pitting. Solid flight augers were used to complete the boreholes that were completed as groundwater monitoring wells. Where shallow sampling was required in grassed areas of the Smelter Site, soil samples were collected by hand auger to a depth of 0.5m bgs or prior refusal.
Soil Sampling	Soil sampling was completed as per the requirements of Table 5.4 of the SAQP (June 2014). This table indicates the depth at which soil samples are to be collected for each AEC.
Soil Screening	Screening of soil samples for the presence of volatile contaminants was not undertaken, as volatile contaminants were not the main chemicals of concern.
Decontamination	A hand auger was the only non-disposable sampling equipment used. The hand auger was decontaminated by washing in a Decon90 solution and rinsing with water between samples.
Disposal of Soil	Test pits were backfilled with spoil and track rolled. Spoil was returned to the boreholes, where possible. Excess spoil was collected into a bin on site for disposal by Hydro personnel.

1.2 Groundwater Sampling

The fieldwork methodology for groundwater sampling is outlined in Table A.2.

Table A.2: Groundwater Field Methodology

Activity	Details
Well Installation	The groundwater wells were extended from the boreholes to approximately 2m below the top of groundwater using solid flight augers. The wells were constructed using machine slotted 50mm PVC screen from the base of the well to 1m past the intercepted groundwater depth and screw threaded 50mm PVC casing extended to the surface. The well annulus was backfilled with 2mm graded sand to approximately 1m past the top of the screen, followed by bentonite backfill for approximately 1m, followed by backfill of the cuttings to the surface. Where the cuttings could not be used a backfill, bentontie backfill was used. A lockable steel monument or a gatic cover in traffic areas was concreted in over the well access.
Wee Development	Wells were developed by bailing the wells dry with a bailer.
Well Gauging	Monitoring wells were gauged using an oil/ water interface probe. The interface probe was decontaminated between each measurement.
Well Purging	Groundwater purging and sampling was completed approximately one week following well installation. A minimum of 0.5L was removed from each monitoring well using low flow peristaltic sampling equipment. Groundwater parameters, including pH, temperature, dissolved oxygen, redox potential and electrical conductivity were recorded using a water quality meter during purging.
Sampling Methods	Following stabilisation of groundwater parameters, sampling was completed using low flow techniques.
Decontamination	A short length of silicon tubing used in the peristaltic pump was decontaminated using Decon90 and potable water.
Disposal of Water	Groundwater collected during purging and sampling was disposed of to land down gradient of the well following sampling.

1.3 Groundwater Observations

During the drilling of the new wells, groundwater was encountered within estuarine sands at depths ranging between 1m and 5m bgs beneath the Smelter Site.

The newly installed and 2012 groundwater wells were gauged during groundwater sampling, as shown in Table A.3. Groundwater depths within the estuarine sands range from 10.42mAHD in MW106 to 13.81mAHD in S3A.

Groundwater in MW12 is located within sands beneath a confining clay layer at a depth of 8.17mAHD. Groundwater at this location is considered to be disconnected from the shallow aquifer.

Table A.3: Depth to Water (mAHD)

Well ID	Screened Interval	Depth to Water (m BGL) 2012	Depth to Water (m BGL) 2014	Depth to Water (mAHD) 2012	Depth to Water (mAHD) 2014
MW01	5.3 – 11.3	3.10	NS	19.7	NS
MW03	4.8 – 10.8	4.83	NS	19.3	NS
MW04	4.5 – 10.5	1.31	NS	18.4	NS
MW05	1 – 4	2.19	NS	22.6	NS
MW06	3 – 6	1.55	2.54	12.2	11.23
MW07	0.5 – 3.5	1.85	2.20	13.9	13.5
MW08	0.5 – 3.5	0.97	1.32	13.8	13.48
MW09	2.5 – 5.5	2.02	2.20	13.5	13.29
MW10	3.5 – 6.5	2.94	3.15	12.3	12.14
MW11	1.4 – 4.4	1.68	1.96	14.0	13.71
MW12	11.5 – 14.5	6.99	6.53	7.7	8.17
MW13	0.9 – 3.9	1.53	1.76	13.4	13.15
MW14	4.5 – 7.5	2.94	3.25	12.4	12.07
MW15	3 – 6	2.42	3.05	12.1	11.42
MW16	1 – 3	0.23	0.61	14.1	13.74
MW17	3 – 6	0.37	1.45	14.0	12.97
MW18	0.8 – 3.8	1.85	1.73	13.6	13.74
MW19	3 – 6	2.20	2.38	12.1	11.88
MW20	3 – 6	2.38	2.63	11.9	11.64
MW21	5.6 – 11.6	3.80	NS	13.3	NS
S3B	Unknown	4.60	4.45	11.2	11.36
S3A	Unknown	1.42	1.91	14.3	13.81
MW101	2 – 5	-	1.76	-	13.35
MW102	1 – 4	-	1.53	-	13.56
MW103	3 – 6	-	1.79	-	13.03
MW104	1 – 4	-	1.78	-	13.18
MW105	1 – 4	-	1.02	-	13.66
MW106	2.5 – 5.5	-	4.81	-	10.42
MW107	1 – 4	-	1.43	-	13.53

NS Not Sampled; - Did not Exist

Groundwater flow in the estuarine sands aquifer at the Smelter Site has been impacted by the construction of the Carbon Plant, which involved the excavation of sands to depths of 5.6m bgl and backfilling with granular material around the concrete lined pits containing the bake furnaces. The general groundwater flow direction beneath the Smelter Site is understood to be towards the north east, flowing towards the low lying Wentworth Swamp.

Groundwater parameters were recorded during groundwater sampling, including pH, electrical conductivity (EC), redox potential, dissolved oxygen and temperature. This data is presented in Table A.4 and field sheets are included in Appendix H.

Table A.4: Groundwater Parameters

Well ID	pH	EC (µS/cm)	DO (ppm)	Redox (Eh)	Temp (ºC)
MW06	6.19	24,890	1.84	157	19.6
MW07	6.22	1900	2.03	126	15.4
MW08	6.26	322	4.12	113	17.9
MW09	7.36	4590	5.04	66	18.9
MW10	6.12	10,260	1.40	107	18.9
MW11	6.71	2146	3.81	56	16.5
MW12	6.24	16,020	2.46	139	20.4
MW13	7.32	5040	3.35	50	17.9
MW14	7.14	5040	4.83	45	19.8
MW15	9.7	1954	2.39	81	19.7
MW16	6.97	458	2.88	114	17.0
MW17	6.94	888	4.43	125	18.0
MW18	5.60	234	3.16	172	16.6
MW19	6.38	1111	2.54	77	19.7
MW20	6.94	2570	6.69	78	17.3
MW21	Not Sampled – Inaccessible due to parked cars				
S3A	8.13	270	9.14	81	15.3
S3B	7.13	1213	7.14	91	19.4
MW101	6.55	548	4.25	94	20.2
MW102	7.06	482	4.29	106	19.5
MW103	5.98	2210	2.02	93	17.5
MW104	6.84	2660	0.83	16	18.5
MW105	9.73	958	1.78	101	15.5
MW106	7.30	1706	1.92	95	19.9

Table A.4: Groundwater Parameters					
Well ID	**pH**	**EC (µS/cm)**	**DO (ppm)**	**Redox (Eh)**	**Temp (ºC)**
MW107	5.52	604	2.06	153	16.0

The background well, MW06, which is located within the estuarine sand aquifer, has an electrical conductivity result indicating brackish water (24,890µg/L). Electrical conductivity results for other wells within the estuarine sand aquifer at the Smelter Site vary between fresh (234µg/L and 1954µg/L) and brackish water (2146µg/L and 16,020µg/L).

The background well (MW06) has a pH of 6.19. pH in on-site wells varies from 5.52 in MW107 to 9.73 in MW105. The pH range extends marginally outside the normal range for groundwater systems of 6 to 8.5.

Appendix D

QA/QC Assessment

QUALITY ASSURANCE AND QUALITY CONTROL

A quality assurance assessment for this report is presented in Table A, B and C below. An assessment was made of data completeness, comparability, representativeness, precision and accuracy based on field and laboratory considerations, as outlined in NSW DEC (2006) and NSW EPA (2007) guidelines. These Data Quality Indicators (DQIs) are outlined in Section 6 of the SAQP.

Table A: QA/QC – Sampling and Analysis Methodology Assessment

Sampling Methodology	ENVIRON Assessment
Sampling Pattern and Locations	Soil and groundwater samples were collected from targeted locations based on ENVIRON's assessment of PAECs and COCs completed as part of the SAQP. Sampling patterns for AECs identified from the 2012 Phase 2 ESA were generally targeted to allow for the vertical and lateral delineation of contamination. Sampling patterns for PAECs identified as part of the data gap review were generally grid based to assess the potential for contamination in these areas. Sampling locations were completed at the following AECs identified from the 2012 Phase 2 ESA: Anode Waste Pile, Refuelling Area, Diesel Spray Area, Carbon Plant, Washdown Bay and Pot Lines. It is noted that sampling locations at the Refuelling Area and Washdown Bay were limited by the locations of buildings and services. The available sampling locations did not have an adverse impact on the sampling patterns in these areas. Sampling locations were completed at the following PAECs identified during the data gap review: Dry Scrubbers, Bake Furnace Scrubber, Playing Fields, Area East of Playing Fields and Storage Area West of Pot Line 3.
Sampling Density	The number of soil investigation locations at the site does not meet the minimum recommended by EPA (1995) "Sampling Design Guidelines". As the investigations are targeted to specific PAECs at the Smelter Site, use of the EPA (1995) "Sampling Design Guidelines" is not relevant in this case.
Sample depths	Soil sample depths were targeted to either the depth at which contamination was identified in the 2012 Phase 2 ESA or the depth at which contamination was likely to be present based on the method of contamination. The method of contamination for soil around the Dry Scrubbers and Bake Furnace Scrubber was considered to be aerial fallout. As such, surface soils were targeted for investigation. The method of contamination for soil at the Playing Fields, Area East of Playing Fields and Storage Area West of Pot Line 3 was the potential burial of wastes. As such, test pits were excavated to the full depth of any identified fill material into underlying natural soil. Soil samples were collected from within the fill material and from natural soil.
Sample Collection Method	Soil samples were collected from push tubes, test pits and hand augers. Soil samples from test pits were collected from the

Table A: QA/QC – Sampling and Analysis Methodology Assessment	
Sampling Methodology	**ENVIRON Assessment**
	centre of the backhoe bucket. Sample jars were filled using a new pair of dedicated disposable gloves for each sample. Groundwater samples were collected using low-flow methods (peristaltic pump). Dedicated tubing was used for each well.
Decontamination Procedures	Decontamination was not required for the push tubes or test pits as soil samples were collected directly from each push tube or from the centre of the backhoe bucket. The hand auger was decontaminated between the collection of samples by brushing off the soil and washing the hand auger in a solution of Decon90 and potable water. The small piece of tubing that was reused in groundwater sampling was decontaminated using Decon90 and potable water.
Sample handling and containers	All soil samples were placed into laboratory-supplied, acid-rinsed glass jars. Water samples were collected into laboratory-supplied bottles that contained preservatives, as required. Soil and water samples were placed on ice following collection and during transportation to the laboratory.
Chain of Custody	Samples were transported to the laboratory under chain of custody conditions. The chain of custody forms were signed by the laboratory on receipt of the samples.
Detailed description of field screening protocols	Field screening for volatiles was not completed during soil sampling as volatile contaminants were not the main chemical of concern.
Calibration of field equipment	No field equipment requiring calibration was used during this investigation.
Sampling Logs	The lithology of surface soil samples was documented on the borehole, test pit and hand auger logs, which are included in Appendix E.

Table B: QA/QC – Field and Lab Quality Assurance and Quality Control	
Field and Lab QA/QC	**ENVIRON Comments**
Field quality control samples	Analysis of intra laboratory duplicates for soil was completed at a rate of 7-8%, which is just less than the targeted rate of 10%. Analysis of inter laboratory duplicates was completed at a rate of 2%, which is less than the targeted rate of 5%. Analysis of intra laboratory duplicates for groundwater was completed at a rate of 8%, which is just less than the targeted rate of 10%. Analysis of inter laboratory duplicates was completed at a rate of 4%, which is just less than the targeted rate of 5% The low rate of duplicate analysis is not considered to affect the assessment of precision based on the acceptable relative percent differences (RPDs) between primary and duplicate sample results.

Table B: QA/QC – Field and Lab Quality Assurance and Quality Control	
Field and Lab QA/QC	**ENVIRON Comments**
	Trip spike and trip blank samples were not collected for anlaysis as volatile contaminants were not the main chemicals of concern.
Field quality control results	RPD results for soil were within acceptable limits, aside from high RPDs for fluoride in two intra laboratory duplicate pairs and high RPDs for PAHs in one intra laboratory duplicate pair. The primary and duplicate concentrations in these three samples were well below the selected criteria and the high RPDs are not considered to affect the outcome of the investigation. Duplicate soil results are included in Table LR12. RPD results for groundwater were within acceptable limits, with the exception of aluminium, chromium, nickel, lead and zinc in duplicate pair MW102/ DUP A. The duplicate results appear to be anomalous and this sample may not have been filtered at the laboratory, as requested. Duplicate groundwater results are included in Table LR13.
NATA registered laboratory and NATA endorsed methods	Envirolab was used as the primary laboratory and ALS was used as the secondary laboratory. Envirolab and ALS laboratory certificates are NATA stamped and both laboratories are accredited for the analyses performed for this assessment.
Analytical methods	A summary of analytical methods were included in the laboratory test certificates.
Holding times	Review of the COCs and laboratory certificates indicate that holding times were met.
Practical Quantitation Limits (PQLs)	PQLs for soil and groundwater analytes were below the assessment criteria.
Laboratory quality control samples	Laboratory quality control samples including duplicates, laboratory control samples, matrix spikes, surrogate spikes and blanks were undertaken by the laboratories at appropriate frequencies.
Laboratory quality control results	All results for laboratory soil duplicates, laboratory control samples, matrix spikes and surrogates were acceptable and no detections were made in blank samples.

Overall it is considered that the completed investigation works and the data obtained adequately complied with the requirements of NSW DEC (2006) and NSW EPA (2007) guidelines. Assessment of the Data Quality Indicators of completeness, comparability, representativeness, precision and accuracy, which are outlined in Section 6 of the SAQP (ENVIRON, 2012), is made in Table C.

Table C: QA/QC – Assessment of DQIs	
DQI	**ENVIRON Comments**
Completeness	Completeness is a measure of whether all the data necessary to meet the project objectives was collected. As noted in Table A above, sampling locations were generally

Table C: QA/QC – Assessment of DQIs	
DQI	**ENVIRON Comments**
	completed as per the SAQP. In two areas, sampling locations were restricted by buildings and services. However this did not impact on data collection. Soil and groundwater samples were analysed for chemicals of concern based on historical use of each area of the Smelter Site in conjunction with observations made during the fieldwork. ENVIRON considers the investigation to be complete.
Comparability	Comparability is a measure of confidence that the data may be considered to be equivalent for each sampling and analysis event. The field investigations were completed by experienced personnel from ENVIRON using standard operating procedures. Part of the fieldwork, including groundwater well installation, was completed by Kirsty Greenfield who also completed the 2012 Phase 2 field investigations. The laboratory analysis was undertaken by NATA registered laboratories using accredited analytical methods. It is noted that the primary laboratory for this investigation (Envirolab Services) was the secondary laboratory for the 2012 Phase 2. The primary and secondary laboratories were switched as Envirolab Services provided better analytical services for assessment of fluoride in soil and groundwater. ENVIRON considers the soil and groundwater data collected during this Phase 2 investigation to be comparable to the 2012 Phase 2 investigation.
Representativeness	Representativeness is the confidence that the data is representative of each media present at the site. In the field, representativeness is achieved by completing an adequate number of sampling points to characterise each PAEC/ AEC. As outlined in Table A, both targeted and grid-based sampling patterns were used to assess contamination at the PAECs/AECs and the number of sampling points at each PAEC/AEC was considered adequate for characterisation. Both soil and groundwater was sampled.
Precision	Precision is a measure of the reproducibility of the data. In the field, ENVIRON achieved precision by using standard operating procedures for the collection of soil and groundwater samples and by collecting duplicate and triplicate samples for analysis. As outlined in Table B, RPD results for duplicate samples were acceptable. At the laboratory, precision is assessed using blind replicate samples and split samples. As outlined in Table B, all results for laboratory soil duplicates were acceptable and no detections were made in blank samples.
Accuracy	Accuracy is a measure of the closeness of a measurement to the true parameter value. In the field, ENVIRON achieved accuracy by using standard operating procedures for the collection of soil and groundwater samples.

Table C: QA/QC – Assessment of DQIs	
DQI	**ENVIRON Comments**
	At the laboratory, precision is assessed using blind replicate samples and split samples. As outlined in Table B, all results for laboratory control samples, matrix spikes and surrogates were acceptable and no detections were made in blank samples.

In general, the Data Quality Indicators of completeness, comparability, representativeness, precision and accuracy have been met. It is considered that the data is of suitable quality to meet the project objectives.

Appendix E

NEPM (2013) EIL Calculation Spreadsheets

Inputs
Select contaminant from list below
Cr_III
Below needed to calculate fresh and aged ACLs
Enter % clay (values from 0 to 100%)
1
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cr III soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	#NUM!	70
Urban residential and open public spaces	#NUM!	190
Commercial and industrial	#NUM!	320

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)
7.26
Enter soil pH (calcium chloride method) (values from 1 to 14)
5.5
Enter organic carbon content (%OC) (values from 0 to 50%)
1.3
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	#NUM!	60
Urban residential and open public spaces	#NUM!	150
Commercial and industrial	#NUM!	210

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)
7.26
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Ni soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	#NUM!	20
Urban residential and open public spaces	#NUM!	85
Commercial and industrial	#NUM!	140

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)
7.26
Enter soil pH (calcium chloride method) (values from 1 to 14)
5.5
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Zn soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	#NUM!	130
Urban residential and open public spaces	#NUM!	310
Commercial and industrial	#NUM!	440

Appendix F

Borehole, Test Pit and Hand Auger Logs

BOREHOLE NUMBER HA101

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri **PROJECT NAME** Phase 2 ESA

PROJECT NUMBER AS130383 **PROJECT LOCATION**

DATE STARTED 26/6/14 **COMPLETED** 26/6/14 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR **SLOPE** 90° **BEARING** ---

EQUIPMENT Hand Auger **HOLE LOCATION** AEC12

HOLE SIZE **LOGGED BY** KW **CHECKED BY**

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, dark brown, no odour	HA101 - 0.0m HA101 - 0.1m HA101 - 0.15m	
						FILL; Sandy CLAY, no odour	HA101 - 0.2m	
						FILL; Silty SAND, dark brown, no odour		
			0,5			Borehole HA101 terminated at 0.4m		
			1,0					
			1,5					
			2,0					

BOREHOLE NUMBER HA102

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC12
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.5			FILL; Sandy SILT, dark brown, slight H_s2 odour, moist	HA102 - 0.1m HA102 - 0.15m HA102 - 0.2m	
			1.0 1.5 2.0			Borehole HA102 terminated at 0.5m		

BOREHOLE NUMBER HA103

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC12
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, dark brown with (small) gravel, no odour	HA103 - 0.1m HA103 - 0.15m	
						As Above, light brown with timber, no gravel, no odour	HA103 - 0.2m	
			0.5			Grey, no gravel		
						Borehole HA103 terminated at 0.5m		
			1.0					
			1.5					
			2.0					

BOREHOLE NUMBER HA104

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC12
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, brown with gravel (small)		
						FILL; Sandy CLAY, brown/orange, soft, moist with gravel (small)	HA104 - 0.1M HA104 - 0.15M HA104 - 0.2M	
						FILL; Silty SAND, grey		
			0.5			Borehole HA104 terminated at 0.5m		
			1.0					
			1.5					
			2.0					

BOREHOLE / TEST PIT AS130383 PHASE 2 ESA AEC 12_8_26_25_28.GPJ GINT STD AUSTRALIA.GDT 30/1/15

BOREHOLE NUMBER HA105

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED	26/6/14	**COMPLETED**	26/6/47	**R.L. SURFACE**		**DATUM**	
DRILLING CONTRACTOR				**SLOPE**	90°	**BEARING**	---
EQUIPMENT	Hand Auger			**HOLE LOCATION**	AEC12		
HOLE SIZE				**LOGGED BY**	KW	**CHECKED BY**	
NOTES							

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, brown, with gravel (small), no odour		
						FILL; Sandy CLAY, brown/orange with gravel (small), no odour	HA105 - 0.1M HA105 - 0.15M HA105 - 0.2M	
			0.5			FILL; Silty SAND, dark brown, no odour		
						Borehole HA105 terminated at 0.5m		
			1.0					
			1.5					
			2.0					

BOREHOLE NUMBER HA106

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC8
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, with gravel (small), dark brown, no odour	HA106 - 0.1M HA106 - 0.15M HA106 - 0.2M	
			0.5 1.0 1.5 2.0			Refusal Borehole HA106 terminated at 0.25m		

BOREHOLE NUMBER HA107

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC8
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, dark brown, with gravel (very small), no odour	HA107 - 0.1M HA107 - 0.15M HA107 - 0.2M	
			0.5			FILL; Silty SAND, very light brown, no odour, moist, no gravel		
			1.0 1.5 2.0			Borehole HA107 terminated at 0.5m		

BOREHOLE NUMBER HA108

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED	26/6/14	**COMPLETED**	26/6/14	**R.L. SURFACE**	
DATUM					
DRILLING CONTRACTOR				**SLOPE**	90°
BEARING	---				
EQUIPMENT	Hand Auger			**HOLE LOCATION**	AEC8
HOLE SIZE				**LOGGED BY**	KW
CHECKED BY					
NOTES					

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, dark brown with grass roots, no odour	HA108 - 0.1M	
						Lighter Brown		
						Grey, with cobbles	HA108 - 0.3M	
						Brown		
			0,5			Borehole HA108 terminated at 0.5m		
			1,0					
			1,5					
			2,0					

BOREHOLE NUMBER HA109

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC8
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, dark brown, no odour	HA109 - 0.0-0.1M	
						FILL; Sandy CLAY, brown/grey with cobbles	HA109 - 0.3-0.4M	
			0.5			FILL; Silty SAND, grey		
						Borehole HA109 terminated at 0.5m		
			1.0					
			1.5					
			2.0					

BOREHOLE NUMBER HA110

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC8
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, black with grass roots, no odour	HA110 - 0.0-0.1M	
							HA110 - 0.3-0.4M	
			0,5			FILL; Silty SAND, light brown with cobbles, no odour		
						Borehole HA110 terminated at 0.5m		
			1,0					
			1,5					
			2,0					

BOREHOLE NUMBER HA111

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC8
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, black, grass roots, no odour	HA111 - 0.0-0.1M	
						FILL; Silty SAND, brown with cobbles, no odour	HA111 - 0.3-0.4M	
			0,5			Borehole HA111 terminated at 0.5m		
			1,0					
			1,5					
			2,0					

BOREHOLE NUMBER HA112

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri

PROJECT NAME Phase 2 ESA

PROJECT NUMBER AS130383

PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14

R.L. SURFACE

DATUM

DRILLING CONTRACTOR

SLOPE 90°

BEARING ---

EQUIPMENT Hand Auger

HOLE LOCATION AEC8

HOLE SIZE

LOGGED BY KW

CHECKED BY

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, black/brown, grass roots, with cobbles, no odour	HA112 - 0.0-0.1M	
						As Above, light brown	HA1120 - 0.3-0.4M	
			0,5			Borehole HA112 terminated at 0.5m		
			1,0					
			1,5					
			2,0					

BOREHOLE NUMBER HA113

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri

PROJECT NAME Phase 2 ESA

PROJECT NUMBER AS130383

PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14

R.L. SURFACE

DATUM

DRILLING CONTRACTOR

SLOPE 90°

BEARING ---

EQUIPMENT Hand Auger

HOLE LOCATION AEC26

HOLE SIZE

LOGGED BY KW

CHECKED BY

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, brown with cobbles (small) and grass roots, no odour	HA113 - 0.0-0.1M	
						FILL; Sandy CLAY, brown/dark brown with gravel, no odour	HA113 - 0.3-0.4M	
			0,5			Borehole HA113 terminated at 0.5m		
			1,0					
			1,5					
			2,0					

BOREHOLE NUMBER HA114

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri

PROJECT NAME Phase 2 ESA

PROJECT NUMBER AS130383

PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14

R.L. SURFACE

DATUM

DRILLING CONTRACTOR

SLOPE 90°

BEARING ---

EQUIPMENT Hand Auger

HOLE LOCATION AEC26

HOLE SIZE

LOGGED BY KW

CHECKED BY

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Sandy CLAY with crushed brick, orange, no odour	HA114 - 0.0-0.1M	
						FILL; Silty SAND, brown with cobbles/gravel, no odour	HA114 - 0.3-0.4M	
			0.5			FILL; Sandy CLAY, brown with gravel, no odour		
						Borehole HA114 terminated at 0.5m		
			1.0					
			1.5					
			2.0					

BOREHOLE NUMBER HA115

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC26
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, brown with black ash and gravel (small), no odour	HA115 - 0.0-0.1M	
						FILL; Sandy CLAY, brown with black ash and gravel, no odour	HA115 - 0.2-0.3M	
						Borehole HA115 terminated at 0.4m		
			0.5					
			1.0					
			1.5					
			2.0					

BOREHOLE NUMBER HA116

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri

PROJECT NAME Phase 2 ESA

PROJECT NUMBER AS130383

PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14

R.L. SURFACE

DATUM

DRILLING CONTRACTOR

SLOPE 90°

BEARING ---

EQUIPMENT Hand Auger

HOLE LOCATION AEC26

HOLE SIZE

LOGGED BY KW

CHECKED BY

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, brown, with gravel, no odour	HA116 - 0.0-0.1M HA116 - 0.2-0.25M	
						FILL; Silty SAND, brown with gravel (compacted roadbase), small to medium, no odour	HA116 - 0.3-0.4M	
			0,5 1,0 1,5 2,0			Borehole HA116 terminated at 0.4m		

BOREHOLE NUMBER HA117

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC26
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						Silty SAND, brown, no odour	HA117 - 0.0-0.1m HA117 - 0.25-0.3m	
						Sandy CLAY, brown with gravel (small to medium), no odour, very compacted	HA117 - 0.3-0.35m HA117 - 0.35-0.4m	
			0,5			Borehole HA117 terminated at 0.4m		
			1,0					
			1,5					
			2,0					

BOREHOLE NUMBER HA119

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC26
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						Silty SAND, brown, gravel (small), no odour	HA119 - 0.0-0.1m	
						Sandy CLAY, brown with gravel, no odour	HA119 - 0.3-0.4m	
			0.5			Borehole HA119 terminated at 0.42m		
			1.0					
			1.5					
			2.0					

BOREHOLE NUMBER HA120

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC26
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						Silty SAND, brown, with gravel, no odour	HA120 - 0.0-0.1m	
						Sandstone		
						Sandy CLAY, brown with gravel (small to medium), no odour	HA120 - 0.3-0.4m	
			0,5			Borehole HA120 terminated at 0.4m		
			1,0					
			1,5					
			2,0					

BOREHOLE NUMBER HA121

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR **SLOPE** 90° **BEARING** ---
EQUIPMENT Hand Auger **HOLE LOCATION** AEC26
HOLE SIZE **LOGGED BY** KW **CHECKED BY**
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						Silty SAND, brown, no odour	HA121 - 0.0-0.1m	
						Sandy CLAY, brown, with concrete pieces and gravel (small to medium), compacted, no odour		
						Terminated in compacted ground Borehole HA121 terminated at 0.3m	HA121 - 0.3-0.4m	
			0,5					
			1,0					
			1,5					
			2,0					

BOREHOLE NUMBER HA122

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR **SLOPE** 90° **BEARING** ---
EQUIPMENT Hand Auger **HOLE LOCATION** AEC26
HOLE SIZE **LOGGED BY** KW **CHECKED BY**
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						Sandy CLAY, red with cobbles, gravel and crushed brick pieces, no odour	HA122 - 0.0-0.1m	
			0,5			Sandy CLAY, with asphalt and gravel, no odour	HA122 - 0.3-0.4m	
						Borehole HA122 terminated at 0.5m		
			1,0					
			1,5					
			2,0					

BOREHOLE NUMBER HA123

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR **SLOPE** 90° **BEARING** ---
EQUIPMENT Hand Auger **HOLE LOCATION** AEC12
HOLE SIZE **LOGGED BY** KW **CHECKED BY**
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						Silty SAND, brown, no odour,	HA123 - 0.0-0.1m	
						Sandy CLAY, brown with gravel, no odour (50% clay, 50% sand)	HA123 - 0.1-0.2m	
			0.5			Small-medium gravel		
						Borehole HA123 terminated at 0.5m		
			1.0					
			1.5					
			2.0					

BOREHOLE NUMBER HA124

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC12
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						Silty SAND, brown/grey, no odour	HA124 - 0.0-0.1m HA124 - 0.1-0.2m	
			0.5			Sandy CLAY, brown, with gravel, no odour	HA124 - 0.2-0.3m	
			1.0 1.5 2.0			Borehole HA124 terminated at 0.5m		

BOREHOLE NUMBER HA125

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 27/6/14 **COMPLETED** 27/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC12
HOLE SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						Silty SAND, brown/grey, no odour	HA125 - 0.0-0.1m	
							HA125 - 0.1-0.2m	
						Increased gravel/cobbles, very compacted	HA125 - 0.2-0.3m	
			0.5			Borehole HA125 terminated at 0.5m		
			1.0					
			1.5					
			2.0					

BOREHOLE NUMBER MW101

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 30/6/14 **COMPLETED** 30/6/14 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Terratest **SLOPE** 90° **BEARING** ---
EQUIPMENT Auger and Drill tube **HOLE LOCATION** AEC3
HOLE SIZE **LOGGED BY** KG **CHECKED BY**
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							BITUMEN		
							FILL; Clayey SAND, brown, medium grained		
				1			ALLUVIAL: SAND, yellow, fine grained		
							ALLUVIAL; Clayey SAND, yellow		
				2					
	▶			3			Wet at 3.0m, no odour		
				4					
				5			Borehole MW101 terminated at 5m		
				6					

BOREHOLE NUMBER MW102

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri

PROJECT NAME Phase 2 ESA

PROJECT NUMBER AS130383

PROJECT LOCATION

DATE STARTED 30/6/14 **COMPLETED** 30/6/14 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Terratest **SLOPE** 90° **BEARING** ---

EQUIPMENT Auger and Drill Tube **HOLE LOCATION** AEC3

HOLE SIZE **LOGGED BY** KG **CHECKED BY**

NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							BITUMEN		
							FILL; Clayey SAND, brown, medium grained		
				1					
							ALLUVIAL; SAND, yellow, fine grained		
							ALLUVIAL; Clayey SAND, yellow		
				2					
	►						Wet, no odour		
				3					
				4			Borehole MW102 terminated at 4m		
				5					
				6					

BOREHOLE NUMBER MW103

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 30/6/14 **COMPLETED** 30/6/14 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Terratest **SLOPE** 90° **BEARING** ---
EQUIPMENT Push Tube 1m Auger **HOLE LOCATION** AEC2
HOLE SIZE **LOGGED BY** KG **CHECKED BY**
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							FILL; Gravelly SAND, coarse grained, orange then black, some white AOS Anodes crushed	MW103 0.0-0.1 MW103 0.3-0.4	
				1			ALLUVIAL; SAND, fine grained, grey then orange, moist		
				2			with some clay		
							ALLUVIAL; sandy CLAY, high plasticity, brown, moist		
				3					
				4			ALLUVIAL; Clayey SAND, coarse grained, brown, clay high plasticity, moist		
				5					
				6			Grading to clay		

Borehole MW103 terminated at 6m

BOREHOLE NUMBER MW104

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 30/6/14 **COMPLETED** 30/6/14 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Terratest **SLOPE** 90° **BEARING** ---
EQUIPMENT **HOLE LOCATION** AEC2
HOLE SIZE **LOGGED BY** KG **CHECKED BY**
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							FILL; Gravelly SAND, brown, coarse grained with some brick (2)	MW104 0.0-0.1 MW104 0.3-0.4	
				1			ALLUVIAL; Sand, fine grained, grey/khaki		
	►			2			Wet		
				3					
				4			Borehole MW104 terminated at 4m		
				5					
				6					

BOREHOLE NUMBER MW105

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 30/6/14 **COMPLETED** 30/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR Terratest
SLOPE 90°
BEARING ---
EQUIPMENT
HOLE LOCATION AEC8 (HTM oil spill)
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							CONCRETE		
							FILL; Gravelly SAND, coarse grained, black with some brick fill, HTM oil odour	MW105 0.15-0.25 MW105 0.3-0.4	
							ALLUVIAL; SAND, khaki/grey, fine grained, little odour		
				1				MW105 0.9-1.0	
	►						Wet		
				2					
				3					
				4					
							Borehole MW105 terminated at 4m		
				5					
				6					

BOREHOLE NUMBER MW106

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 1/7/14 **COMPLETED** 1/7/14 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Terratest **SLOPE** 90° **BEARING** ---
EQUIPMENT **HOLE LOCATION** AEC8
HOLE SIZE **LOGGED BY** KG **CHECKED BY**
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							FILL; Gravelly SAND, black/brown, coarse grained with some refractory brick	MW106 - 0.0-0.1	
								MW106 - 0.3-0.4	
							ALLUVIAL; SAND, fine grained, brown		
				1			ALLUVIAL; Sandy CLAY, medium plasticity, brown, fine grained sand		
				2					
				3			ALLUVIAL; Clayey SAND, brown, fine grained		
	►						Wet		
				4					
				5					
							Borehole MW106 terminated at 5.5m		
				6					

BOREHOLE / TEST PIT AS130383 PHASE 2 ESA AEC 12_8_26_25_28.GPJ GINT STD AUSTRALIA.GDT 30/1/15

BOREHOLE NUMBER MW107

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED	1/7/14	**COMPLETED**	1/7/14	**R.L. SURFACE**		**DATUM**	
DRILLING CONTRACTOR	Terratest			**SLOPE**	90°	**BEARING**	---
EQUIPMENT				**HOLE LOCATION**	AEC8		
HOLE SIZE				**LOGGED BY**	KG	**CHECKED BY**	
NOTES							

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							CONCRETE		
							ALLUVIAL FILL; Clayey SAND, fine grained, mottled orange/grey	MW107 - 0.15-0.25 MW107 - 0.3-0.4	
				1			ALLUVIAL; SAND, fine grained, black, then whiteish		
	►			2			Wet		
				3					
				4			Borehole MW107 terminated at 4m		
				5					
				6					

BOREHOLE / TEST PIT AS130383 PHASE 2 ESA AEC 12_8_26_25_28.GPJ GINT STD AUSTRALIA.GDT 30/1/15

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri

PROJECT NAME Phase 2 ESA

PROJECT NUMBER AS130383

PROJECT LOCATION

DATE STARTED 30/6/14 **COMPLETED** 30/6/14

R.L. SURFACE

DATUM

DRILLING CONTRACTOR Terratest

SLOPE 90°

BEARING ---

EQUIPMENT Push Tube

HOLE LOCATION AEC11

HOLE SIZE

LOGGED BY KG

CHECKED BY

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						Aluminium Scrap on Surface. TOPSOIL; Clayey SAND, fine grained, brown	SB101 - 0.0-0.1	
						FILL; Sandy CLAY, brown, high plasticity with some gravel	SB101 - 0.3-0.4 DUP A	
			0,5					
						ALLUVIAL; SAND, grey, fine grained		
			1,0					
						Borehole SB101 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB103

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 30/6/14 **COMPLETED** 30/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC2
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Sandy GRAVEL, black/grown, medium grained with some brick	SB103 - 0.0-0.1	
						ALLUVIAL; SAND, grey, fine grained	SB103 - 0.3-0.4	
			0,5			ALLUVIAL; SAND, brown/grey, fine grained		
						ALLUVIAL; Clayey SAND, grey, fine grained		
			1,0			Borehole SB103 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB104

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 30/6/14 **COMPLETED** 30/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC2
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0–0.7			FILL; Gravelly SAND, black/some white AOS, coarse grained, AOS Anode crushed waste	SB104 - 0.0-0.1; SB104 - 0.3-0.4	
			0.7–1.0			ALLUVIAL; SAND, fine grained, khaki		
			1.0			Borehole SB104 terminated at 1m		

Depth scale: 0,5; 1,0; 1,5; 2,0

BOREHOLE NUMBER SB105

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 30/6/14 **COMPLETED** 30/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC2
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Gravelly SAND, coarse grained with some ASO Anode crushed waste	SB105 - 0.0-0.1 SB105 - 0.3-0.4	
			0,5			ALLUVIUM; SAND, black then grey, fine grained		
			1,0			Borehole SB105 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB106

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 30/6/14 **COMPLETED** 30/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC26
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Clayey GRAVEL, brown, coarse grained	SB106 - 0.0-0.1	
						ALLUVIAL; SAND, khaki, fine grained	SB106 - 0.3-0.4	
			0,5					
			1,0					
						Borehole SB106 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB107

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 30/6/14 **COMPLETED** 30/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC8
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0–0.3			FILL; Gravelly SAND, dark brown, coarse grained	SB107 - 0.0-0.1	
			0.3–1.0			ALLUVIAL; Clayey SAND, khaki, fine grained, high plasticity clay	SB107 - 0.3-0.4	
			1.0			Borehole SB107 terminated at 1m		

Depth scale: 0,5 — 1,0 — 1,5 — 2,0

BOREHOLE NUMBER SB108

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 30/6/14 **COMPLETED** 30/6/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC8
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Gravelly Clayey SAND, black/brown, with some brick	SB108 - 0.0-0.1 DUP B	
							SB108 - 0.3-0.4	
			0,5					
						ALLUVIUM; SAND, yellow, fine grained		
			1,0					
						Borehole SB108 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB109

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED	1/7/14	**COMPLETED** 1/7/14	**R.L. SURFACE**		**DATUM**
DRILLING CONTRACTOR			**SLOPE**	90°	**BEARING** ---
EQUIPMENT	Hand Auger		**HOLE LOCATION**	AEC8	
HOLE SIZE			**LOGGED BY**	KG	**CHECKED BY**
NOTES					

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Gravelly SAND, coarse grained, dark grey	SB109 - 0.0-0.1	
							SB109 - 0.3-0.4	
			0,5			ALLUVIAL; SAND, grey, fine grained		
	▶		1,0			wet Borehole SB109 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB110

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 1/7/14 **COMPLETED** 1/7/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC8
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Sandy GRAVEL, medium grained	SB110 - 0.0-0.1	
							SB110 - 0.3-0.4	
			0,5			ALLUVIAL; SAND, grey, fine grained		
						ALLUVIAL; SAND, yellow, fine grained, moist		
			1,0			Wet Borehole SB110 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB111

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 1/7/14 **COMPLETED** 1/7/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC4
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Gravelly SAND, black then brown, coarse grained with some refractory brick at 0.7m	SB111 - 0.0-0.1	
			0,5				SB111 - 0.4-0.5	
						ALLUVIAL; SAND, grey, fine grained	SB111 - 0.8-0.9	
			1,0			Borehole SB111 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB112

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED	1/7/14	**COMPLETED**	1/7/14	**R.L. SURFACE**	
DATUM					
DRILLING CONTRACTOR		**SLOPE**	90°	**BEARING**	---
EQUIPMENT	Hand Auger	**HOLE LOCATION**	AEC4		
HOLE SIZE		**LOGGED BY**	KG	**CHECKED BY**	
NOTES					

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0–0.3			FILL; Sandy GRAVEL, khaki, medium grained	SB112 - 0.0-0.1	
			0.3–0.7			FILL; Gravelly SAND, dark brown, coarse grained, with some refractory brick	SB112 - 0.4-0.5	
			0.7–1.0			ALLUVIAL; SAND, grey, fine grained	SB112 - 0.8-0.9 DUP C	
			1,0			Borehole SB112 terminated at 1m		

Depth scale: 0,5; 1,0; 1,5; 2,0

BOREHOLE / TEST PIT AS130383 PHASE 2 ESA AEC 12_8_26_25_28.GPJ GINT STD AUSTRALIA.GDT 30/1/15

BOREHOLE NUMBER SB113

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED	1/7/14	**COMPLETED**	1/7/14	**R.L. SURFACE**	
DATUM					
DRILLING CONTRACTOR				**SLOPE**	90°
BEARING	---				
EQUIPMENT	Hand Auger			**HOLE LOCATION**	AEC4
HOLE SIZE				**LOGGED BY**	KG
CHECKED BY					
NOTES					

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Sandy GRAVEL, medium grained, dark brown	SB113 - 0.0-0.1	
			0,5			FILL; Gravelly Sandy CLAY, brown, low plasticity	SB113 - 0.4-0.5	
						FILL; Gravelly SAND, black, coarse grained		
			1,0			ALLUVIAL; SAND, grey, fine grained	SB113 - 0.8-0.9	
			1,5			Borehole SB113 terminated at 1m		
			2,0					

BOREHOLE NUMBER SB114

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri

PROJECT NAME Phase 2 ESA

PROJECT NUMBER AS130383

PROJECT LOCATION

DATE STARTED 1/7/14 **COMPLETED** 1/7/14

R.L. SURFACE

DATUM

DRILLING CONTRACTOR

SLOPE 90°

BEARING ---

EQUIPMENT Hand Auger

HOLE LOCATION AEC4

HOLE SIZE

LOGGED BY KG

CHECKED BY

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Gravel, with some sand	SB114 - 0.0-0.1	
			0,5			FILL; Gravelly CLAY, yellow, medium plasticity	SB114 - 0.4-0.5	
			1,0			ALLUVIAL; SAND, grey, fine grained	SB114 - 0.8-0.9	
			1,5			Borehole SB114 terminated at 1m		
			2,0					

BOREHOLE NUMBER SB115

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED **COMPLETED** **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR **SLOPE** 90° **BEARING** ---
EQUIPMENT Hand Auger **HOLE LOCATION** AEC12
HOLE SIZE **LOGGED BY** KG **CHECKED BY**
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, brown, fine grained	SB115 - 0.0-0.1	
							SB115 - 0.1-0.2	
						FILL; Sandy GRAVEL, coarse grained, grey		
			0,5			ALLUVIAL; Clayey SAND, orange/brown		
			1,0			Borehole SB115 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB116

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED	1/7/14	**COMPLETED**	1/7/14	**R.L. SURFACE**	
DATUM					
DRILLING CONTRACTOR		**SLOPE**	90°	**BEARING**	---
EQUIPMENT	Hand Auger	**HOLE LOCATION**	AEC12		
HOLE SIZE		**LOGGED BY**	KG	**CHECKED BY**	
NOTES					

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0–0.3			FILL; Clayey SAND, brown, coarse grained with some gravel	SB116 - 0.0-0.1 DUP F SB116 - 0.1-0.2	
			0.3–0.8			FILL; Clayey GRAVEL, medium grained, grey/brown		
			0.8–1.0			ALLUVIUM; CLAY, brown, high plasticity		
			1,0			Borehole SB116 terminated at 1m		

Depth scale: 0,5 — 1,0 — 1,5 — 2,0

BOREHOLE NUMBER SB117

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 2/7/14 **COMPLETED** 2/7/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC12
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						BITUMEN	SB117 - 0.0-0.1	
						FILL; Gravelly SAND, black, coarse grained	SB117 - 0.1-0.2	
						With some clay, grey		
			0,5			ALLUVIAL; Clayey SAND, fine grained, grey		
						Borehole SB117 terminated at 0.6m		
			1,0					
			1,5					
			2,0					

BOREHOLE NUMBER SB118

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED	2/7/14 **COMPLETED** 2/7/14	**R.L. SURFACE**		**DATUM**	
DRILLING CONTRACTOR		**SLOPE**	90°	**BEARING**	---
EQUIPMENT	Hand Auger	**HOLE LOCATION**	AEC12		
HOLE SIZE		**LOGGED BY**	KG	**CHECKED BY**	
NOTES					

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						BITUMEN	SB118 - 0.0-0.1	
						FILL; Sandy GRAVEL, dark brown, fine to coarse grained	SB1180-00.1-0.2	
			0,5			ALLUVIAL; SAND, grey, fine grained		
			1,0			Borehole SB118 terminated at 0.3m		
			1,5					
			2,0					

BOREHOLE NUMBER SB119

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 1/7/14 **COMPLETED** 1/7/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC25
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND, fine grained, brown, with some gravel at 0.35m	SB119 - 0.0-0.1 SB119 - 0.3-0.4 DUP D	
			0,5			ALLUVIAL; Clayey SAND, brown, fine grained, clay is high plasticity		
			1,0			ALLUVIAL; SAND, yellow, fine grained		
			1,5			Borehole SB119 terminated at 1m		
			2,0					

BOREHOLE NUMBER SB120

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 1/7/14 **COMPLETED** 1/7/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC25
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Sandy GRAVEL, yellow/grey, coarse grained, angular refractory brick(?)	SB120 - 0.0-0.1 SB120 - 0.1-0.2	
			0,5					
						ALLUVIAL; Sandy CLAY, high plasticity, brown/yellow		
			1,0					
						Borehole SB120 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB121

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri | **PROJECT NAME** Phase 2 ESA
PROJECT NUMBER AS130383 | **PROJECT LOCATION**

DATE STARTED | **COMPLETED** | **R.L. SURFACE** | **DATUM**
DRILLING CONTRACTOR | **SLOPE** 90° | **BEARING** ---
EQUIPMENT Hand Auger | **HOLE LOCATION** AEC25
HOLE SIZE | **LOGGED BY** KG | **CHECKED BY**
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Sandy GRAVEL, brown, fine to coarse grained	SB121 - 0.0-0.1 SB121 - 0.1-0.2	
			0,5					
						Borehole SB121 terminated at 0.8m		
			1,0					
			1,5					
			2,0					

BOREHOLE NUMBER SB122

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 1/7/14 **COMPLETED** 1/7/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC25
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Clayey gravelly SAND, dark brown, coarse grained	SB122 - 0.0-0.1 SB122 - 0.1-0.2	
			0,5			ALLUVIAL; Sandy CLAY, yellow/brown/grey, high plasticity		
			1,0			Borehole SB122 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB123

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED	1/7/14	**COMPLETED** 1/7/14	**R.L. SURFACE**	**DATUM**	
DRILLING CONTRACTOR			**SLOPE** 90°	**BEARING**	---
EQUIPMENT	Hand Auger		**HOLE LOCATION** AEC25		
HOLE SIZE			**LOGGED BY** KG	**CHECKED BY**	
NOTES					

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Gravelly SAND, brown/grey, coarse grained	SB123 - 0.0-0.1 SB123 - 0.1-0.2	
			0,5			ALLUVIAL; Sandy CLAY, orange/yellow, high plasticity		
						ALLUVIAL; SAND, black, coarse grained		
			1,0			Borehole SB123 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB124

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 1/7/14 **COMPLETED** 1/7/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC25
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Sandy gravelly CLAY, brown, medium plasticity	SB124 - 0.0-0.1 SB124 - 0.1-0.2	
			0,5			ALLUVIAL; Sandy CLAY, high plasticity, brown		
			1,0			Borehole SB124 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB125

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri

PROJECT NAME Phase 2 ESA

PROJECT NUMBER AS130383

PROJECT LOCATION

DATE STARTED 1/7/14 **COMPLETED** 1/7/14

R.L. SURFACE

DATUM

DRILLING CONTRACTOR

SLOPE 90°

BEARING ---

EQUIPMENT Hand Auger

HOLE LOCATION AEC25

HOLE SIZE

LOGGED BY KG

CHECKED BY

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0–0.35			FILL; Gravelly clayey SAND, brown, fine grained	SB125 - 0.0-0.1 SB125 - 0.1-0.2	
			0.35–1.0 (0,5; 1,0)			ALLUVIAL; CLAY, high plasticity, black/orange		
			1,0			Borehole SB125 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB126

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri

PROJECT NAME Phase 2 ESA

PROJECT NUMBER AS130383

PROJECT LOCATION

DATE STARTED 1/7/14 **COMPLETED** 1/7/14

R.L. SURFACE

DATUM

DRILLING CONTRACTOR

SLOPE 90°

BEARING ---

EQUIPMENT Hand Auger

HOLE LOCATION AEC25

HOLE SIZE

LOGGED BY KG

CHECKED BY

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Gravelly clayey SAND, dark brown, coarse grained	SB126 - 0.0-0.1	
							SB126 - 0.2-0.3	
						FILL; GRAVEL, coarse grained, grey		
			0,5			ALLUVIAL; CLAY, high plasticity, orange/grey mottled		
			1,0			Borehole SB126 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB127

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 1/7/14 **COMPLETED** 1/7/14
R.L. SURFACE **DATUM**
DRILLING CONTRACTOR
SLOPE 90° **BEARING** ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC25
HOLE SIZE
LOGGED BY KG **CHECKED BY**
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Sandy GRAVEL, brown/grey, fine to coarse grained	SB127 - 0.0-0.1 SB127 - 0.1-0.2	
			0,5			ALLUVIUM; CLAY, high plasticity, orange/grey mottled	SB127 - 0.4-0.6 DUP E, DUP E1	
			1,0			Borehole SB127 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB128

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 2/7/14 **COMPLETED** 2/7/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC25
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						BITUMEN. FILL; Gravelly SAND, black, coarse grained	SB128 - 0.0-0.1	
			0.5			ALLUVIAL; Clayey SAND, fine grained, grey	SB128 - 0.2-0.3	
						ALLUVIAL; SAND, grey/khaki, fine grained		
			1.0			ALLUVIAL; CLAY, grey, high plasticity		
			1.5			Borehole SB128 terminated at 1m		
			2.0					

BOREHOLE NUMBER SB129

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED 2/7/14	**COMPLETED** 2/7/14	**R.L. SURFACE**		**DATUM**	
DRILLING CONTRACTOR		**SLOPE**	90°	**BEARING**	---
EQUIPMENT	Hand Auger	**HOLE LOCATION**	AEC25		
HOLE SIZE		**LOGGED BY**	KG	**CHECKED BY**	
NOTES					

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						BITUMEN. FILL; Gravelly SAND, dark brown, coarse grained	SB129 - 0.0-0.1	
			0,5			FILL; Gravelly clayey SAND, brown	SB129 - 0.1-0.2	
			1,0			FILL; Gravelly SAND, dark brown, coarse grained	SB129 - 0.9-1.0	
			1,5			Borehole SB129 terminated at 1m		
			2,0					

BOREHOLE NUMBER SB130

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 2/7/14 **COMPLETED** 2/7/14 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR **SLOPE** 90° **BEARING** ---
EQUIPMENT Hand Auger **HOLE LOCATION** AEC25
HOLE SIZE **LOGGED BY** KG **CHECKED BY**
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						CONCRETE. REFUSAL ON CONCRETE Borehole SB130 terminated at 0m		
			0.5					
			1.0					
			1.5					
			2.0					

BOREHOLE NUMBER SB131

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 2/7/14 **COMPLETED** 2/7/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC25
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						BITUMEN. FILL; Gravelly SAND, black, coarse grained	SB131 - 0.0-0.1	
						ALLUVIAL; SAND, grey/fine grained	SB131 - 0.3-0.4 DUP G	
			0,5					
						ALLUVIAL; Sandy CLAY, high plasticity, grey		
						ALLUVIAL; SAND, yellow, fine grained		
			1,0			Borehole SB131 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB132

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 2/7/14 **COMPLETED** 2/7/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC25
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						BITUMEN. FILL; Gravelly SAND, black, coarse grained	SB132 - 0.0-0.1	
			0,5 1,0			ALLUVIAL; CLAY, high plasticity, grey, with some sand	SB132 - 0.1-0.2	
			1,5 2,0			Borehole SB132 terminated at 1m		

BOREHOLE NUMBER SB133

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 2/7/14 **COMPLETED** 2/7/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC25
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						BITUMEN; NO RECOVERY		
						ALLUVIAL; CLAY, high plasticity, grey	SB133 - 0.2-0.3	
			0,5			ALLUVIAL; SAND, coarse grained, yellow	SB133 - 0.3-0.4 DUP H, DUP H1	
			1,0			Borehole SB133 terminated at 1m		
			1,5					
			2,0					

BOREHOLE NUMBER SB134

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 2/7/14 **COMPLETED** 2/7/14
R.L. SURFACE
DATUM
DRILLING CONTRACTOR
SLOPE 90°
BEARING ---
EQUIPMENT Hand Auger
HOLE LOCATION AEC25
HOLE SIZE
LOGGED BY KG
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						BITUMEN. FILL; Gravelly SAND, black, coarse grained	SB134 - 0.0-0.1	
			0,5 / 1,0			ALLUVIAL; CLAY, high plasticity, orange/grey mottled	SB134 - 0.2-0.3	
			1,5 / 2,0			Borehole SB134 terminated at 1m		

BOREHOLE NUMBER SB135

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri

PROJECT NAME Phase 2 ESA

PROJECT NUMBER AS130383

PROJECT LOCATION

DATE STARTED 2/7/14 **COMPLETED** 2/7/14

R.L. SURFACE

DATUM

DRILLING CONTRACTOR

SLOPE 90°

BEARING ---

EQUIPMENT Hand Auger

HOLE LOCATION AEC25

HOLE SIZE

LOGGED BY KG

CHECKED BY

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						BITUMEN. FILL; Gravelly SAND, black, coarse grained	SB135 - 0.0-0.1	
						Grading to grey/black	SB135 - 0.1-0.2	
						Very black	SB135 - 0.3-0.4	
			0,5			FILL; CLAY, high plasticity, orange/grey mottled		
			1,0			Borehole SB135 terminated at 1m		
			1,5					
			2,0					

TEST PIT NUMBER TP101

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED	23/6/14	**COMPLETED**	26/6/14	**R.L. SURFACE**	
DATUM					
EXCAVATION CONTRACTOR		**SLOPE**	---	**BEARING**	---
EQUIPMENT	Backhoe	**TEST PIT LOCATION**	AEC28		
TEST PIT SIZE		**LOGGED BY**	KW	**CHECKED BY**	
NOTES					

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND; brown and grey with cobbles, small with grass roots, no odour	TP101 - 0.2-0.3m	
			0.5			NATURAL; CLAY; orange/red/grey mottle, no odour		
						Borehole TP101 terminated at 0.6m		
			1.0					
			1.5					
			2.0					

BOREHOLE / TEST PIT AS130383 PHASE 2 ESA AEC 12_8_26_25_28.GPJ GINT STD AUSTRALIA.GDT 30/1/15

TEST PIT NUMBER TP102

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND; brown with grass roots, no odour		
						As above; orange, no odour	TP102 - 0.3-0.4m	
			0,5			NATURAL; CLAY; orange/red/grey mottle, no odour		
						Borehole TP102 terminated at 0.7m		
			1,0					
			1,5					
			2,0					

TEST PIT NUMBER TP103

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND; brown and grey with cobbles, small with grass roots, no odour	TP103 - 0.2-0.4m	
			0.5			NATURAL; CLAY; orange/red/grey mottle, no odour		
						Borehole TP103 terminated at 0.6m		
			1.0					
			1.5					
			2.0					

TEST PIT NUMBER TP104

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty Sandy CLAY; orange/grey/red mottle with gravel, small-medium, no odour	TP104 - 0.0-0.2M	
			0.5			FILL; Silty SAND; black grey, no odour	TP104 - 0.5-0.6m	
						As above; orange, with gravel, medium, no odour	TP104 - 0.7-0.9m	
			1.0			Silty SAND; yellow		
			1.5			Borehole TP104 terminated at 1.5m		
			2.0					

TEST PIT NUMBER TP105

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty sandy CLAY; orange/grey/red mottle with gravel, small-medium, no odour		
			0.5			FILL; Silty SAND; black grey, no odour	TP105 - 0.5-0.6M	
			1.0			NATURAL; silty SAND; yellow		
			1.5 2.0			Borehole TP105 terminated at 1.1m		

TEST PIT NUMBER TP106

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND; brown and grey with cobbles, small, with grass roots, no odour		
			0.5					
						NATURAL; CLAY; orange/red/grey mottle, no odour	TP106 - 0.7-0.8m	
						Borehole TP106 terminated at 0.8m		
			1.0					
			1.5					
			2.0					

TEST PIT NUMBER TP107

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND; brown and grey with cobbles, small, with grass roots, no odour		
			0.5			NATURAL; CLAY; orange/red/grey mottle, no odour	TP107 - 0.5-0.6m	
						Borehole TP107 terminated at 0.7m		
			1.0					
			1.5					
			2.0					

TEST PIT NUMBER TP108

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND; brown and grey with cobbles, small, with grass roots, no odour	TP108 - 0.3-0.4m	
			0.5			NATURAL; CLAY; orange/red/grey mottle, no odour		
						Borehole TP108 terminated at 0.6m		
			1.0					
			1.5					
			2.0					

TEST PIT NUMBER TP109

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND; brown and grey with cobbles, small, with grass roots, no odour	TP109 - 0.0-0.2m	
			0,5			NATURAL; CLAY; orange/red/grey mottle, no odour		
			1,0 1,5 2,0			Borehole TP109 terminated at 0.7m		

TEST PIT NUMBER TP110

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND; brown and grey with cobbles, small, with grass roots		
			0.5					
						yellow	TP110 - 0.7-0.9m	
			1.0			NATURAL; Sandy CLAY		
						Borehole TP110 terminated at 1.3m		
			1.5					
			2.0					

TEST PIT NUMBER TP111

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0–0.3			FILL; silty clay with gravel, small, and bricks (orange), no odour	TP111 - 0.0-0.3m	
			0.3–0.5			NATURAL; Silty SAND; brown, grey to 0.5m, no odour		
			0,5			Orange/yellow at 0.5-1.6m	TP111 - 0.5-0.6m	
			1,0					
			1,5					
			1.6			Borehole TP111 terminated at 1.6m		
			2,0					

TEST PIT NUMBER TP112

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED	23/6/14	**COMPLETED**	23/6/14	**R.L. SURFACE**	**DATUM**
EXCAVATION CONTRACTOR				**SLOPE** ---	**BEARING** ---
EQUIPMENT	Backhoe			**TEST PIT LOCATION** AEC28	
TEST PIT SIZE				**LOGGED BY** KW	**CHECKED BY**
NOTES					

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; sandy CLAY with gravel, small, no odour	TP12 - 0.0-0.3m	
						Silty SAND; brown, grey to 0.5m, no odour,		
			0.5			orange/yellow 0.5-1.3m		
			1.0					
						Borehole TP112 terminated at 1.3m		
			1.5					
			2.0					

TEST PIT NUMBER TP113

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						TOPSOIL; Silty SAND; topsoil with grass roots, brown		
						NATURAL; Sandy CLAY; grey/red/orange mottled	TP113 - 0.4-0.5m	
			0,5					
						Borehole TP113 terminated at 0.9m		
			1,0					
			1,5					
			2,0					

TEST PIT NUMBER TP114

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						TOPSOIL; Silty SAND; with grass roots, brown		
			0.5			NATURAL; Sandy CLAY; grey/red/orange mottled	TP114 - 0.5-0.6m	
			1.0 / 1.5 / 2.0			Borehole TP114 terminated at 0.8m		

TEST PIT NUMBER TP115

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						TOPSOIL; Silty SAND; with grass roots, brown		
			0.5			NATURAL; Sandy CLAY; grey/red/orange mottled	TP115 - 0.4-0.5m, QA1	
			1.0			Borehole TP115 terminated at 0.9m		
			1.5					
			2.0					

TEST PIT NUMBER TP116

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 23/6/14 **COMPLETED** 23/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC28
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; Silty SAND; dark brown, no odour		
						FILL; slag, black, no odour, PVC pipe (irrigation)	TP116 - 0.1-0.3m	
			0.5			FILL; sandy CLAY; orange/grey mottle, broken ceramic pipe, small concrete pieces	TP116 - 0.5-0.7m	
			1.0			NATURAL; SAND; light yellow		
						NATURAL; sandy CLAY; mottled orange/grey, no odour		
			1.5			Borehole TP116 terminated at 1.3m		
			2.0					

TEST PIT NUMBER TP117

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 25/6/14 **COMPLETED** 25/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC29
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty sand, brown/black with small cobbles and gravel, large concrete pieces, old steel cable, refractory brick, metal sheet (corrugated), metal reinforcement, plastic sheeting		
			0.5				TP117 - 0.5-0.6m	
			1.0					
						NATURAL SAND; light brown		
						NATURAL Sandy CLAY; yellow/red/grey mottle, stiff		
			1.5			Borehole TP117 terminated at 1.5m		
			2.0					

TEST PIT NUMBER TP118

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 25/6/14 **COMPLETED** 25/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC29
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND; brown, large concrete pieces, metal strips, old timber, metal fence post, broken glass, refractory brick (small piece)		
			0.5				TP118 - 0.5-0.6m	
			1.0			NATURAL; Sandy CLAY; yellow, red, grey mottle, stiff, no odour		
						Borehole TP118 terminated at 1.3m		
			1.5					
			2.0					

TEST PIT NUMBER TP119

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri

PROJECT NAME Phase 2 ESA

PROJECT NUMBER AS130383

PROJECT LOCATION

DATE STARTED 25/6/14 **COMPLETED** 25/6/14

R.L. SURFACE

DATUM

EXCAVATION CONTRACTOR

SLOPE ---

BEARING ---

EQUIPMENT Backhoe

TEST PIT LOCATION AEC29

TEST PIT SIZE

LOGGED BY KW

CHECKED BY

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0–1.0			FILL; silty SAND; brown with small-medium cobbles and gravel, plastic sheeting, electrical wire, metal reinforcement, large concrete pieces, steel posts, no odour	TP119 - 0.5-0.6m	
			1.0–1.4			NATURAL; Sandy CLAY; mottled yellow, red, grey, stiff, no odour		
			1.4			Borehole TP119 terminated at 1.4m		

Depth scale: 0,5 — 1,0 — 1,5 — 2,0

TEST PIT NUMBER TP120

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 25/6/14 **COMPLETED** 25/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC29
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0–0.3			FILL; silty SAND; yellow with cobbles and gravel (small-medium), with large timber pieces, refractory bricks, metal reinforcement, concrete pieces		
			0.3–0.9			brown at 0.3m, no odour	TP120 - 0.5-0.6m	
			0.9–1.1			NATURAL; sandy CLAY; mottled yellow, grey, red, no odour		
			1.1			Borehole TP120 terminated at 1.1m		

Depth scale: 0,5 — 1,0 — 1,5 — 2,0

TEST PIT NUMBER TP121

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 25/6/14 **COMPLETED** 25/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC29
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0–1.0			FILL; silty SAND; brown with grass roots and tree timber pieces, no odour	TP121 - 0.5-0.6m	
			1.0–1.4			NATURAL; sandy CLAY; mottled yellow, red, grey, stiff, no odour		
			1.4			Borehole TP121 terminated at 1.4m		

Depth scale: 0,5 — 1,0 — 1,5 — 2,0

TEST PIT NUMBER TP122

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 25/6/14 **COMPLETED** 25/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC29
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0–0.6			FILL; silty SAND; brown with grass roots and tree timber pieces, no odour	TP122 - 0.5-0.6m	
			0.6–0.9			NATURAL; sandy CLAY; mottled yellow, red, grey, stiff, no odour		
			0.9			Borehole TP122 terminated at 0.9m		

Depth scale: 0,5; 1,0; 1,5; 2,0

TEST PIT NUMBER TP123

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 25/6/14 **COMPLETED** 25/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC29
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0			FILL; silty SAND; brown with charcoal refractory brick piece sighted, old tree timber pieces, no odour		
			0,5				TP123 - 0.5-0.6m	
			1,0					
			1,5					
						NATURAL; sandy CLAY; mottled yellow, red, grey, stiff, no odour		
						Borehole TP123 terminated at 1.9m		
			2,0					

TEST PIT NUMBER TP124

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 25/6/14 **COMPLETED** 25/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC29
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND, yellow/brown with small-medium gravel and cobbles and slag type material (black) and small concrete pieces, no odour		
			0,5				TP124 - 0.5-0.6m	
			1,0			NATURAL; sandy CLAY; mottled yellow, red, grey, stiff, no odour		
			1,5			Borehole TP124 terminated at 1.1m		
			2,0					

TEST PIT NUMBER TP125

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 25/6/14 **COMPLETED** 25/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC29
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0–1.0			FILL; silty SAND; brown, with small-medium gravel and cobbles and some metal sheet, no odour	TP125 - 0.5-0.6m	
			0.9–1.3			NATURAL; sandy CLAY; mottled yellow, red, grey, stiff, no odour		
			1.3			Borehole TP125 terminated at 1.3m		

Depth scale: 0,5 1,0 1,5 2,0

TEST PIT NUMBER TP126

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri		**PROJECT NAME** Phase 2 ESA	
PROJECT NUMBER AS130383		**PROJECT LOCATION**	
DATE STARTED 25/6/14	**COMPLETED** 25/6/14	**R.L. SURFACE**	**DATUM**
EXCAVATION CONTRACTOR		**SLOPE** ---	**BEARING** ---
EQUIPMENT Backhoe		**TEST PIT LOCATION** AEC29	
TEST PIT SIZE		**LOGGED BY** KW	**CHECKED BY**
NOTES			

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0.0–1.0			FILL; silty SAND; brown with cobbles and gravel, small-medium, large concrete pieces, metal reinforcement, metal sheet, refractory brick, no odour		
			0,5				TP126 - 0.5-0.6m	
			1,0–1.2			NATURAL; sandy CLAY; mottled yellow, red, grey, stiff, no odour		
			1.2			Borehole TP126 terminated at 1.2m		
			1,5					
			2,0					

TEST PIT NUMBER TP127

ENVIRON

CLIENT	Hydro Aluminium Kurri Kurri	**PROJECT NAME**	Phase 2 ESA
PROJECT NUMBER	AS130383	**PROJECT LOCATION**	

DATE STARTED 25/6/14	**COMPLETED** 25/6/14	**R.L. SURFACE**		**DATUM**	
EXCAVATION CONTRACTOR		**SLOPE**	---	**BEARING**	---
EQUIPMENT	Backhoe	**TEST PIT LOCATION**	AEC29		
TEST PIT SIZE		**LOGGED BY**	KW	**CHECKED BY**	
NOTES					

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND; brown/yellow with metal cable, small-large concrete pieces		
			0,5				TP127 - 0.5-0.6m	
			1,0					
						NATURAL; sandy CLAY; mottled yellow, red, grey, stiff, no odour		
						Borehole TP127 terminated at 1.4m		
			1,5					
			2,0					

TEST PIT NUMBER TP128

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 25/6/14 **COMPLETED** 25/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC31
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND; brown, with gravel	TP128 - 0.0m	
						FILL; gravelly sandy CLAY	TP128 - 0.1-0.2m TP128 - 0.2-0.3m	
			0,5			NATURAL; sandy CLAY	TP128 - 0.4-0.5m	
			1,0 1,5 2,0			Borehole TP128 terminated at 0.9m		

TEST PIT NUMBER TP129

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri

PROJECT NAME Phase 2 ESA

PROJECT NUMBER AS130383

PROJECT LOCATION

DATE STARTED 25/6/14 **COMPLETED** 25/6/14

R.L. SURFACE

DATUM

EXCAVATION CONTRACTOR

SLOPE ---

BEARING ---

EQUIPMENT Backhoe

TEST PIT LOCATION AEC31

TEST PIT SIZE

LOGGED BY KW

CHECKED BY

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			0,0–0,5			FILL; gravelly silty CLAY with metal reinforcement	TP129 - 0.0-0.3m	
			0,5–1,0			NATURAL; CLAY; red/grey mottle, moist, stiff	TP129 - 0.6-0.7m	
			1,0			Borehole TP129 terminated at 1m		

Depth scale: 0,5 1,0 1,5 2,0

TEST PIT NUMBER TP130

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 25/6/14 **COMPLETED** 25/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC31
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND; brown with small-medium gravel, no odour, medium pieces of aluminium	TP130 - 0.0-0.3m	
			0,5			NATURAL; CLAY; orange/grey mottled, no odour	TP130 - 0.6-0.7m	
			1,0			Borehole TP130 terminated at 1m		
			1,5					
			2,0					

TEST PIT NUMBER TP131

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC29
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; gravelly silty SAND and sandy CLAY; very compacted with metal scrap, tree roots, no odour	TP131 - 0.1-0.3m	
			0,5			NATURAL; sandy CLAY; grey/orange mottled, no odour	TP131 - 0.5-0.6m	
			1,0			Borehole TP131 terminated at 0.9m		
			1,5					
			2,0					

TEST PIT NUMBER TP132

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC31
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; gravelly silty SAND and sandy CLAY; very compacted with metal scrap, tree roots, with coal and road tar, slight hydrocarbon odour	TP132 - 0.1-0.2m TP132 - 0.2-0.3m	
			0,5			NATURAL; sandy CLAY; grey/orange mottled, strong hydrocarbon odour	TP132 - 0.4-0.5m TP132 - 0.8-0.9m	
			1,0 1,5 2,0			Borehole TP132 terminated at 0.9m		

TEST PIT NUMBER TP133

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC31
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND; brown with gravel, no odour	TP133 - 0.1-0.2m	
			0.5			NATURAL; CLAY; grey/red mottled, moist, stiff, no odour	TP133 - 0.4-0.5m	
			1.0			Borehole TP133 terminated at 0.9m		
			1.5					
			2.0					

TEST PIT NUMBER TP134

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14 **R.L. SURFACE** **DATUM**
EXCAVATION CONTRACTOR **SLOPE** --- **BEARING** ---
EQUIPMENT Backhoe **TEST PIT LOCATION** AEC31
TEST PIT SIZE **LOGGED BY** KW **CHECKED BY**
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						ASPHALT		
						FILL; gravelly silty SAND and sandy CLAY; very compacted with scrap, tree roots, very compacted tar layer, no odour	TP134 - 0.12-0.2m TP134 0 0.2-0.3m	
			0,5			NATURAL; sandy CLAY; grey/orange mottled, no odour	TP134 - 0.4-0.5m	
			1,0			Borehole TP134 terminated at 1m		
			1,5					
			2,0					

BOREHOLE / TEST PIT AS130383 PHASE 2 ESA AEC 12_8_26_25_28.GPJ GINT STD AUSTRALIA.GDT 30/1/15

TEST PIT NUMBER TP135

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC31
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; gravelly silty SAND and sandy CLAY; very compacted with metal scrap, tree roots, no odour	TP135 - 0.1-0.15m	
						Tar Layer	TP135 - 0.15-0.2m TP135 - 0.2-0.3m	
			0,5			NATURAL; sandy CLAY; grey/orange mottled, no odour, with gravel No gravel from 0.5m onwards	TP135 - 0.4-0.5m	
			1,0			Borehole TP135 terminated at 1m		
			1,5					
			2,0					

TEST PIT NUMBER TP136

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC31
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						ASPHALT/TAR overlying		
						FILL; gravelly silty SAND and sandy CLAY; very compacted with metal scrap, tree roots, no odour	TP136 - 0.1-0.2m, QA2a	
						NATURAL; sandy CLAY; with gravel		
						No gravel 0.4m onwards	TP136 - 0.4-0.5m	
			0,5					
						Borehole TP136 terminated at 0.8m		
			1,0					
			1,5					
			2,0					

TEST PIT NUMBER TP137

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14 **R.L. SURFACE** **DATUM**
EXCAVATION CONTRACTOR **SLOPE** --- **BEARING** ---
EQUIPMENT Backhoe **TEST PIT LOCATION** AEC31
TEST PIT SIZE **LOGGED BY** KW **CHECKED BY**
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						silty SAND; pieces of glass and concrete	TP137 - Surface	
						FILL; gravelly silty SAND, brown, no odour	TP 137 - 0.1-0.2m	
							TP137 - 0.2-0.3m	
			0,5			NATURAL; sandy CLAY; mottled red/grey/brown, very slight hydrocarbon odour, no gravel from 0.4m onwards	TP137 - 0.4-0.5m	
			1,0					
			1,5			Borehole TP137 terminated at 1.1m		
			2,0					

TEST PIT NUMBER TP138

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC31
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty sandy CLAY; brown with gravel (small)	TP138 - Surface	
							TP138 - 0.1-0.2m	
							TP138 - 0.2-0.3m	
							TP138 - 0.4-0.5m	
			0,5			NATURAL; sandy CLAY; mottled brown/red/grey, no odour		
							TP138 - 0.6-0.7m	
			1,0			Borehole TP138 terminated at 1m		
			1,5					
			2,0					

TEST PIT NUMBER TP139

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC31
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty sandy CLAY; brown with gravel (small), no odour	TP139 - Surface	
							TP139 - 0.1-0.2m	
						NATURAL; sandy CLAY; red/gre/brown mottled, no odour	TP139 - 0.2-0.3m	
			0.5				TP139 - 0.4-0.5m	
			1.0					
						Borehole TP139 terminated at 1.2m		
			1.5					
			2.0					

TEST PIT NUMBER TP140

ENVIRON

CLIENT Hydro Aluminium Kurri Kurri
PROJECT NAME Phase 2 ESA
PROJECT NUMBER AS130383
PROJECT LOCATION

DATE STARTED 26/6/14 **COMPLETED** 26/6/14
R.L. SURFACE
DATUM
EXCAVATION CONTRACTOR
SLOPE ---
BEARING ---
EQUIPMENT Backhoe
TEST PIT LOCATION AEC31
TEST PIT SIZE
LOGGED BY KW
CHECKED BY
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; gravelly sandy CLAY	TP140 - Surface	
						NATURAL; sandy CLAY; brown/orange/grey/red mottled, no odour	TP140 - 0.1-0.2m	
							TP140 - 0.2-0.3m	
							TP140 - 0.4-0.5m	
			0,5					
			1,0					
						Borehole TP140 terminated at 1m		
			1,5					
			2,0					

Appendix G

Laboratory Reports for Soil

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CHAIN OF COUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client: ENVIRON	**Client Project Name and Number:** HYDRO AS130383
Project Mgr: FIONA ROBINSON	
Sampler: KIRSTY GREENFIELD	**PO No.:**
Address: Suite 19B, Level 2, 50 Glebe Rd The Junction NSW 2291	**Envirolab Services Quote No. :**
	Date results required:
Email: kgreenfield@environcorp.com	**Or choose:** standard / 1 day / 2 day / 3 day
Phone: 4962 5444 **Fax:** 4962 5888	*Note: Inform lab in advance if urgent turnaround is required - surcharge applies*

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067

Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au

Contact: Aileen Hie

Sample information				Tests Required															Comments
Envirolab Sample ID	**Client Sample ID**	**Date sampled**	**Type of sample**	Soluble fluoride	PAHS													HOLD	**Provide as much information about the sample as you can**
1	AEC11 SB101: 0-0.1	30/6/14	SOIL	X															
2	AEC11 SB101: 0.3-0.4			X															
3	AEC2 SB103: 0-0.1			X	X														
4	AEC2 SB103: 0.3-0.4			X	X														
5	AEC2 SB104: 0-0.1			X	X														
6	AEC2 SB104: 0.3-0.4			X	X														
7	AEC2 SB105: 0-0.1			X	X														
8	AEC2 SB105: 0.3-0.4			X	X														
9	AEC26 SB106: 0-0.1			X	X														
10	AEC26 SB106: 0.3-0.4																	X	
11	AEC8 SB107: 0-0.1			X	X														
12	AEC8 SB107: 0.3-0.4																		
13	AEC8 SB108: 0-0.1			X	X														
14	AEC8 SB108: 0.3-0.4																		

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
ENVIROLAB GROUP
Job No: 112603
Date Received: 3/7/14
Time Received: 10:00
Received by: DT
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by (company): KGreenfield	**Received by (company):** ELS	**Samples Received:** Cool or Ambient (circle one)
Print Name: KIRSTY GREENFIELD	**Print Name:** Dennis	**Temperature Recieved at:** (if applicable)
Date & Time: 2/7/14 4pm	**Date & Time:** 3/7/14 10:00	**Transported by:** Hand delivered / courier
Signature: ENVIRON	**Signature:** [signature]	**Page No:**

CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Client: ENVIRON	**Client Project Name and Number:** HYDRO AS130383
Project Mgr: FIONA ROBINSON	**PO No.:**
Sampler: KIRSTY GREENFIELD	**Envirolab Services Quote No. :**
Address: Suite 19B, Level 2, 50 Glebe Rd The Junction NSW 2291	**Date results required:**
Email: kgreenfield@environcorp.com	**Or choose:** standard / 1 day / 2 day / 3 day
Phone: 4962 5444 **Fax:** 4962 5888	*Note: Inform lab in advance if urgent turnaround is required - surcharge applies*

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067
Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au
Contact: Aileen Hie

Sample information				Tests Required			Comments
Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	Soluble Fluoride	PAHs	~~TRH/BTEX~~ VOC/SVOC	Provide as much information about the sample as you can
15	AEC2 MW103:0-0.1	30/6/14	SOIL	X	X		
16	AEC2 MW103:0.3-0.4			X	X		
17	AEC2 MW104:0-0.1			X	X		
18	AEC2 MW104:0.3-0.4			X	X		
Not received	AEC8 MW105:0-0.1				X	X	
19	AEC8 MW105:0.3-0.4				X	X	
Not received	AEC8 MW105:0.9-1.0					X	
20	DUP A			X			
21	DUP B			X	X		

Relinquished by (company):	**Received by (company):** ELS	**Samples Received:** Cool or Ambient (circle one)
Print Name:	**Print Name:** Dennis	**Temperature Recieved at:** (if applicable)
Date & Time:	**Date & Time:** 3/7/14 10:00	**Transported by:** Hand delivered / courier
Signature:	**Signature:** [signature]	**Page No:**

3/8

CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client: ENVIRON **Project Mgr:** FIONA ROBINSON **Sampler:** KIRSTY GREENFIELD **Address:** Suite 19B, Level 2, 50 Glebe Rd The Junction NSW 2291 **Email:** kgreenfield@environcorp.com **Phone:** 4962 5444 **Fax:** 49625888	**Client Project Name and Number:** HYDRO AS130383 **PO No.:** **Envirolab Services Quote No. :** **Date results required:** **Or choose:** standard / 1 day / 2 day / 3 day *Note: Inform lab in advance if urgent turnaround is required - surcharge applies*	**Envirolab Services** **12 Ashley St, Chatswood, NSW, 2067** **Phone: 02 9910 6200** **Fax: 02 9910 6201** **E-mail: ahie@envirolabservices.com.au** **Contact: Aileen Hie**

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	SOLUBLE FLUORIDE	PAHS													HOLD	Comments: Provide as much information about the sample as you can
22	AEC8 MW106:0-0.1	1/7/14	SOIL	X	X														
23	AEC8 MW106:0.3-0.4	↓	↓															X	
24	AEC8 MW107:0.15-0.25			X	X														
25	AEC8 MW107:0.3-0.4																	X	
26	AEC8 SB109:0-0.1			X	X														
27	AEC8 SB109:0.3-0.4																	X	
28	AEC8 SB110:0-0.1			X	X														
29	AEC8 SB110:0.4-0.5																	X	
30	AEC4 SB111:0-0.1				X														
31	AEC4 SB111:0.4-0.5				X														
32	AEC4 SB111:0.8-0.9																	X	
33	AEC4 SB112:0-0.1				X														
34	AEC4 SB112:0.4-0.5				X														
35	AEC4 SB112:0.8-0.9				X													X	

Relinquished by (company): **Print Name:** **Date & Time:** **Signature:**	**Received by (company):** ELS **Print Name:** Deum3 **Date & Time:** 3/7/14 10:00 **Signature:**	**Samples Received: Cool or Ambient (circle one)** **Temperature Recieved at: (if applicable)** **Transported by: Hand delivered / courier** **Page No:**

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CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client:	ENVIRON
Project Mgr:	FIONA ROBINSON
Sampler:	KIRSTY GREENFIELD
Address:	Suite 9B, Level 2, 50 Glebe Rd The Junction NSW 2291
Email:	kgreenfield@environcorp.com
Phone:	49625444 **Fax:** 49625888

Client Project Name and Number:	HYDRO AS130383
PO No.:	
Envirolab Services Quote No. :	
Date results required:	
Or choose:	standard / 1 day / 2 day / 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067

Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au

Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	SOLUBLE FLUORIDE	PAHS	HOLD	Comments: Provide as much information about the sample as you can
36	AEC4SB113:0-0.1	1/7/14	SOIL		X		
37	AEC4SB113:0.4-0.5				X		
38	AEC4SB113:0.8-0.9					X	
39	AEC4SB114:0-0.1				X		
40	AEC4SB114:0.4-0.5				X		
41	AEC4SB114:0.8-0.9					X	
42	AEC12SB115:0-0.1			X			
43	AEC12SB115:0.1-0.2					X	
44	AEC12SB116:0-0.1			X			
45	AEC12SB116:0.1-0.2			X			
46	AEC25SB119:0-0.1			X			
47	AEC25SB119:0.3-0.4			X			
48	AEC25SB120:0-0.1			X			
49	AEC25SB120:0.1-0.2					X	

Relinquished by (company):	
Print Name:	
Date & Time:	
Signature:	

Received by (company):	ELS
Print Name:	Dennis
Date & Time:	3/7/14 10:00
Signature:	Dennis

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier
Page No:

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CHAIN OF COUSTODY - Client

ENVIROLAB SERVICES

Client: ENVIRON
Project Mgr: FIONA ROBINSON
Sampler: KIRSTY GREENFIELD
Address: Suite 19B, Level 2, 50 Glebe Rd The Junction NSW 2291
Email: kgreenfield@environcorp.com
Phone: 49625444 Fax: 49625888

Client Project Name and Number: HYDRO AS130383
PO No.:
Envirolab Services Quote No. :
Date results required:
Or choose: standard / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067
Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au
Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	SOLUBLE FLUORIDE	PAHS	HOLD	Comments: Provide as much information about the sample as you can
50	AEC25SB121:0-0.1	1/7/14	SOIL	X			
51	AEC25SB121:0.1-0.2	↓	↓	X			
52	AEC25SB122:0-0.1			X			
53	AEC25SB122:0.1-0.2					X	
54	AEC25SB123:0-0.1			X			
55	AEC25SB123:0.1-0.2			X			
56	AEC25SB123:0.9-1.0					X	
57	AEC25SB124:0-0.1			X			
58	AEC25SB124:0.1-0.2			X			
59	AEC25SB125:0-0.1			X			
60	AEC25SB125:0.1-0.2						
61	AEC25SB126:0-0.1			X			
62	AEC25SB126:0.2-0.3	↓	↓				

Relinquished by (company):
Print Name:
Date & Time:
Signature:

Received by (company): ELS
Print Name: Dennis
Date & Time: 3/7/14 10:00
Signature: [signature]

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier
Page No:

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CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Client: ENVIRON
Project Mgr: FIONA ROBINSON
Sampler: KIRSTY GREENFIELD
Address: Suite 19B level 2 50 Glebe Rd The Junction NSW 2291
Email: kgreenfield@environcorp.com
Phone: 4962 5444 Fax:

Client Project Name and Number: HYDRO AS130383
PO No.:
Envirolab Services Quote No. :
Date results required:
Or choose: standard / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067
Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au
Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	SOLUBLE FLUORIDE	PAHS	Comments: Provide as much information about the sample as you can
63	AEC25SB127:0-0.1	1/7/14	SOIL	X		
64	AEC25SB127:0.1-0.2			X		
65	AEC25SB127:0.4-0.6			X		
66	DUP C				X	
67	DUP D			X		
68	DUP E			X		
69	DUP F			X		
	DUP E1			X		* please send to ALS for analysis

Relinquished by (company):
Print Name:
Date & Time:
Signature:

Received by (company): ELS
Print Name: Dennis
Date & Time: 3/7/14 10:00
Signature: Denny

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier
Page No:

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CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client:	ENVIRON
Project Mgr:	FIONA ROBINSON
Sampler:	KIRSTY GREENFIELD
Address:	Suite 19B, Level 2, 50 Glebe Rd The Junction NSW 2291
Email:	kgreenfield@environcorp.com
Phone:	4962 5444
Fax:	

Client Project Name and Number:	HYDRO AS130383
PO No.:	
Envirolab Services Quote No. :	
Date results required:	
Or choose:	standard / 1 day / 2 day / 3 day

Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067

Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au

Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	Soluble fluoride	PAHs	HOLD	Comments: Provide as much information about the sample as you can
70	AEC12SB117:0-0.1	2/7/14	SOIL	X			
71	AEC12SB117:0.1-0.2			X			
72	AEC12SB118:0-0.1			X			
73	AEC12SB118:0.2-0.3			X			
74	AEC25SB129:0-0.1			X			
75	AEC25SB129:0.1-0.2			X			
76	AEC25SB129:0.9-1.0			X	X		
77	AEC25SB128:0-0.1			X			
78	AEC25SB128:0.2-0.3					X	
79	AEC25SB131:0-0.1			X			
80	AEC25SB131:0.3-0.4			X			
81	AEC25SB132:0-0.1			X			
82	AEC25SB132:0.2-0.3					X	
83	AEC25SB133:0.2-0.3			X			
84	AEC25SB133:0.3-0.4			X			

Relinquished by (company):		Received by (company):	ELS
Print Name:		Print Name:	Dennis
Date & Time:		Date & Time:	3/7/14 10:00
Signature:		Signature:	Dennis

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier
Page No:

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CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Client: ENVIRON	**Client Project Name and Number:** HYDRO AS130383	**Envirolab Services**
Project Mgr: FIONA ROBINSON		12 Ashley St, Chatswood, NSW, 2067
Sampler: KIRSTY GREENFIELD	**PO No.:**	
Address: Suite 19B, Level 2, 50 Glebe Rd The Junction NSW 2291	**Envirolab Services Quote No. :**	**Phone:** 02 9910 6200
	Date results required:	**Fax:** 02 9910 6201
Email: kgreenfield@environcorp.com	**Or choose:** standard / 1 day / 2 day / 3 day	**E-mail:** ahie@envirolabservices.com.au
Phone: 49625444 **Fax:**	*Note: Inform lab in advance if urgent turnaround is required - surcharge applies*	**Contact: Aileen Hie**

Sample information				Tests Required															Comments
Envirolab Sample ID	**Client Sample ID**	**Date sampled**	**Type of sample**	Soluble fluoride	PAHs	~~TRH/BTEX~~ VOC/SVOC												HOLD	**Provide as much information about the sample as you can**
85	AEC25SB134:0-0.1	2/7/14	SOIL	X															
86	AEC25SB134:0.2-0.3																	X	
87	AEC25SB135:0-0.1			X															
88	AEC25SB135:0.1-0.2																	X	
89	AEC25SB135:0.3-0.4			X	X														
90	DUP G			X															
91	DUP H			X															
	DUP H1			→														*	Please send to ALS for Soluble fluoride.
92	AEC2 MW105 0.9-1.0	30/6/14				X													
93	AEC6 MW105 0.15-0.25				X	X													

Extra sample

Relinquished by (company):	**Received by (company):** ELS	**Samples Received: Cool or Ambient (circle one)**
Print Name:	**Print Name:** Dennis	**Temperature Recieved at:** (if applicable)
Date & Time:	**Date & Time:** 3/7/14 10:00	**Transported by: Hand delivered / courier**
Signature:	**Signature:** [signature]	**Page No:**

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

CERTIFICATE OF ANALYSIS 112503

Client:
Environ
PO Box 560
North Sydney
NSW 2060

Attention: Fiona Robinson

Sample log in details:

Your Reference:	**Hydro AS130383**
No. of samples:	93 Soils
Date samples received / completed instructions received	03/07/2014 / 03/07/2014

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:	10/07/14 / 10/07/14
Date of Preliminary Report:	Not Issued

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

Results Approved By:

Jacinta Hurst
Laboratory Manager

VOCs in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	112503-19 AEC8 MW105 0.3-0.4 30/06/2014 Soil	112503-92 AEC 2 MW105 0.9-1.0 30/06/2014 Soil	112503-93 AEC 8 MW105 0.15-0.25 30/06/2014 Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014
Dichlorodifluoromethane	mg/kg	<1	<1	<1
Chloromethane	mg/kg	<1	<1	<1
Vinyl Chloride	mg/kg	<1	<1	<1
Bromomethane	mg/kg	<1	<1	<1
Chloroethane	mg/kg	<1	<1	<1
Trichlorofluoromethane	mg/kg	<1	<1	<1
1,1-Dichloroethene	mg/kg	<1	<1	<1
trans-1,2-dichloroethene	mg/kg	<1	<1	<1
1,1-dichloroethane	mg/kg	<1	<1	<1
cis-1,2-dichloroethene	mg/kg	<1	<1	<1
bromochloromethane	mg/kg	<1	<1	<1
chloroform	mg/kg	<1	<1	<1
2,2-dichloropropane	mg/kg	<1	<1	<1
1,2-dichloroethane	mg/kg	<1	<1	<1
1,1,1-trichloroethane	mg/kg	<1	<1	<1
1,1-dichloropropene	mg/kg	<1	<1	<1
Cyclohexane	mg/kg	<1	<1	<1
carbon tetrachloride	mg/kg	<1	<1	<1
Benzene	mg/kg	<0.2	<0.2	<0.2
dibromomethane	mg/kg	<1	<1	<1
1,2-dichloropropane	mg/kg	<1	<1	<1
trichloroethene	mg/kg	<1	<1	<1
bromodichloromethane	mg/kg	<1	<1	<1
trans-1,3-dichloropropene	mg/kg	<1	<1	<1
cis-1,3-dichloropropene	mg/kg	<1	<1	<1
1,1,2-trichloroethane	mg/kg	<1	<1	<1
Toluene	mg/kg	<0.5	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1	<1	<1
dibromochloromethane	mg/kg	<1	<1	<1
1,2-dibromoethane	mg/kg	<1	<1	<1
tetrachloroethene	mg/kg	<1	<1	<1
1,1,1,2-tetrachloroethane	mg/kg	<1	<1	<1
chlorobenzene	mg/kg	<1	<1	<1
Ethylbenzene	mg/kg	<1	<1	<1
bromoform	mg/kg	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2
styrene	mg/kg	<1	<1	<1
1,1,2,2-tetrachloroethane	mg/kg	<1	<1	<1

VOCs in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------ ------------	112503-19 AEC8 MW105 0.3-0.4 30/06/2014 Soil	112503-92 AEC 2 MW105 0.9-1.0 30/06/2014 Soil	112503-93 AEC 8 MW105 0.15-0.25 30/06/2014 Soil
o-Xylene	mg/kg	<1	<1	<1
1,2,3-trichloropropane	mg/kg	<1	<1	<1
isopropylbenzene	mg/kg	<1	<1	<1
bromobenzene	mg/kg	<1	<1	<1
n-propyl benzene	mg/kg	<1	<1	<1
2-chlorotoluene	mg/kg	<1	<1	<1
4-chlorotoluene	mg/kg	<1	<1	<1
1,3,5-trimethyl benzene	mg/kg	<1	<1	<1
tert-butyl benzene	mg/kg	<1	<1	<1
1,2,4-trimethyl benzene	mg/kg	<1	<1	<1
1,3-dichlorobenzene	mg/kg	<1	<1	<1
sec-butyl benzene	mg/kg	<1	<1	<1
1,4-dichlorobenzene	mg/kg	<1	<1	<1
4-isopropyl toluene	mg/kg	<1	<1	<1
1,2-dichlorobenzene	mg/kg	<1	<1	<1
n-butyl benzene	mg/kg	<1	<1	<1
1,2-dibromo-3-chloropropane	mg/kg	<1	<1	<1
1,2,4-trichlorobenzene	mg/kg	<1	<1	<1
hexachlorobutadiene	mg/kg	<1	<1	<1
1,2,3-trichlorobenzene	mg/kg	<1	<1	<1
Surrogate Dibromofluorometha	%	90	97	99
Surrogate aaa-Trifluorotoluene	%	103	101	102
Surrogate Toluene-d8	%	100	101	99
Surrogate 4-Bromofluorobenzene	%	102	102	106

SVOCs in Soil				
Our Reference:	UNITS	112503-19	112503-92	112503-93
Your Reference	-------------	AEC8 MW105	AEC 2 MW105	AEC 8 MW105
Depth	------------	0.3-0.4	0.9-1.0	0.15-0.25
Date Sampled		30/06/2014	30/06/2014	30/06/2014
Type of sample		Soil	Soil	Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	10/07/2014	10/07/2014	8/07/2014
Phenol	mg/kg	<1	<1	<1
Bis-(2-chloroethyl) ether	mg/kg	<1	<1	<1
2-Chlorophenol	mg/kg	<1	<1	<1
1,3-Dichlorobenzene	mg/kg	<1	<1	<1
1,4-Dichlorobenzene	mg/kg	<1	<1	<1
2-Methylphenol	mg/kg	<1	<1	<1
1,2-Dichlorobenzene	mg/kg	<1	<1	<1
Bis (2-chloroisopropyl) ether	mg/kg	<1	<1	<1
3/4-Methylphenol	mg/kg	<2	<2	<2
N-nitrosodi-n-propylamine	mg/kg	<1	<1	<1
Hexachloroethane	mg/kg	<1	<1	<1
Nitrobenzene	mg/kg	<1	<1	<1
Isophorone	mg/kg	<1	<1	<1
2,4-Dimethylphenol	mg/kg	<1	<1	<1
2-Nitrophenol	mg/kg	<1	<1	<1
Bis(2-chloroethoxy)methane	mg/kg	<1	<1	<1
2,4-Dichlorophenol	mg/kg	<1	<1	<1
1,2,4-Trichlorobenzene	mg/kg	<1	<1	<1
Naphthalene	mg/kg	<1	<1	5
4-Chloroaniline	mg/kg	<1	<1	<1
Hexachlorobutadiene	mg/kg	<1	<1	<1
2-Methylnaphthalene	mg/kg	<1	<1	3
Hexachlorocyclopentadiene	mg/kg	<1	<1	<1
2,4,6-trichlorophenol	mg/kg	<1	<1	<1
2,4,5-trichlorophenol	mg/kg	<1	<1	<1
2-Chloronaphthalene	mg/kg	<1	<1	<1
2-nitroaniline	mg/kg	<1	<1	<1
Dimethylphthalate	mg/kg	<1	<1	<1
2,6-Dinitrotoluene	mg/kg	<1	<1	<1
Acenaphthylene	mg/kg	<1	<1	<1
3-Nitroaniline	mg/kg	<1	<1	<1
Acenaphthene	mg/kg	<1	<1	9
2,4-dinitrophenol	mg/kg	<10	<10	<10
4-nitrophenol	mg/kg	<10	<10	<10
Dibenzofuran	mg/kg	<1	<1	2
diethylphthalate	mg/kg	<1	<1	<1
4-chlorophenylphenylether	mg/kg	<1	<1	<1
4-nitroaniline	mg/kg	<1	<1	<1
Fluorene	mg/kg	<1	<1	3

SVOCs in Soil				
Our Reference:	UNITS	112503-19	112503-92	112503-93
Your Reference	-------------	AEC8 MW105	AEC 2 MW105	AEC 8 MW105
Depth	------------	0.3-0.4	0.9-1.0	0.15-0.25
Date Sampled		30/06/2014	30/06/2014	30/06/2014
Type of sample		Soil	Soil	Soil
2-methyl-4,6-dinitrophenol	mg/kg	<10	<10	<10
azobenzene	mg/kg	<1	<1	<1
4-bromophenylphenylether	mg/kg	<1	<1	<1
hexachlorobenzene	mg/kg	<1	<1	<1
pentachlorophenol	mg/kg	<10	<10	<10
Phenanthrene	mg/kg	<1	<1	4
Anthracene	mg/kg	<1	<1	1
carbazole	mg/kg	<1	<1	5
di-n-butylphthalate	mg/kg	<1	<1	<1
Fluoranthene	mg/kg	<1	<1	9
Pyrene	mg/kg	<1	<1	7
butylbenzylphthalate	mg/kg	<1	<1	<1
bis(2-ethylhexyl)phthalate	mg/kg	<1	<1	<1
Benzo(a)anthracene	mg/kg	<1	<1	2
Chrysene	mg/kg	<1	<1	2
di-n-octylphthalate	mg/kg	<1	<1	<1
Benzo(b)fluoranthene	mg/kg	<1	<1	1
Benzo(k)fluoranthene	mg/kg	<1	<1	<1
Benzo(a)pyrene	mg/kg	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	mg/kg	<1	<1	<1
Dibenzo(a,h)anthracene	mg/kg	<1	<1	<1
Benzo(g,h,i)perylene	mg/kg	<1	<1	<1
ethylmethanesulfonate	mg/kg	<1	<1	<1
aniline	mg/kg	<1	<1	<1
pentachloroethane	mg/kg	<1	<1	<1
benzyl alcohol	mg/kg	<1	<1	<1
acetophenone	mg/kg	<1	<1	<1
N-nitrosomorpholine	mg/kg	<1	<1	<1
N-nitrosopiperidine	mg/kg	<1	<1	<1
2,6-dichlorophenol	mg/kg	<1	<1	<1
hexachloropropene-1	mg/kg	<1	<1	<1
N-nitroso-n-butylamine	mg/kg	<1	<1	<1
safrole	mg/kg	<1	<1	<1
1,2,4,5-tetrachlorobenzene	mg/kg	<1	<1	<1
cis and trans iso-safrole	mg/kg	<1	<1	<1
1,3-dinitrobenzene	mg/kg	<1	<1	<1
pentachlorobenzene	mg/kg	<1	<1	<1
1-naphthylamine	mg/kg	<1	<1	<1
2,3,4,6-tetrachlorophenol	mg/kg	<1	<1	<1
2-naphthylamine	mg/kg	<1	<1	<1
5-nitro-o-toluidine	mg/kg	<1	<1	<1

SVOCs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	112503-19 AEC8 MW105 0.3-0.4 30/06/2014 Soil	112503-92 AEC 2 MW105 0.9-1.0 30/06/2014 Soil	112503-93 AEC 8 MW105 0.15-0.25 30/06/2014 Soil
diphenylamine	mg/kg	<1	<1	<1
phenacetin	mg/kg	<1	<1	<1
pentachloronitrobenzene	mg/kg	<1	<1	<1
dinoseb	mg/kg	<1	<1	<1
methapyrilene	mg/kg	<1	<1	<1
p-dimethylaminoazobenzene	mg/kg	<1	<1	<1
2-acetylaminofluorene	mg/kg	<1	<1	<1
7,12-dimethylbenz(a)anthracene	mg/kg	<1	<1	<1
3-methylcholanthrene	mg/kg	<1	<1	<1
a-BHC	mg/kg	<1	<1	<1
b-BHC	mg/kg	<1	<1	<1
g-BHC	mg/kg	<1	<1	<1
d-BHC	mg/kg	<1	<1	<1
Heptachlor	mg/kg	<1	<1	<1
Aldrin	mg/kg	<1	<1	<1
Heptachlor Epoxide	mg/kg	<1	<1	<1
g-Chlordane	mg/kg	<1	<1	<1
a-Chlordane	mg/kg	<1	<1	<1
Endosulfan I	mg/kg	<1	<1	<1
p,p'-DDE	mg/kg	<1	<1	<1
Dieldrin	mg/kg	<1	<1	<1
Endrin	mg/kg	<1	<1	<1
p,p'-DDD	mg/kg	<1	<1	<1
Endosulfan II	mg/kg	<1	<1	<1
p,p'-DDT	mg/kg	<1	<1	<1
Endosulfan Sulphate	mg/kg	<1	<1	<1
Methoxychlor	mg/kg	<1	<1	<1
Surrogate 2-fluorophenol	%	125	127	131
Surrogate Phenol-d_6	%	131	136	136
Surrogate Nitrobenzene-d_5	%	101	107	112
Surrogate 2-fluorobiphenyl	%	127	125	131
Surrogate 2,4,6-Tribromophenol	%	104	109	115
Surrogate p-Terphenyl-d_{14}	%	105	107	112

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	112503-3 AEC2 SB103 0.0-0.1 30/06/2014 Soil	112503-4 AEC2 SB103 0.3-0.4 30/06/2014 Soil	112503-5 AEC2 SB104 0.0-0.1 30/06/2014 Soil	112503-6 AEC2 SB104 0.3-0.4 30/06/2014 Soil	112503-7 AEC2 SB105 0.0-0.1 30/06/2014 Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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	0.6	<0.1	0.5	0.8	1.3
Fluorene	mg/kg	0.3	<0.1	0.3	0.3	0.9
Phenanthrene	mg/kg	3.8	<0.1	4.7	7.6	11
Anthracene	mg/kg	0.7	<0.1	1.1	2.0	2.6
Fluoranthene	mg/kg	13	<0.1	14	27	29
Pyrene	mg/kg	12	<0.1	13	28	27
Benzo(a)anthracene	mg/kg	11	<0.1	11	14	28
Chrysene	mg/kg	11	<0.1	12	14	31
Benzo(b+k)fluoranthene	mg/kg	25	<0.2	32	31	68
Benzo(a)pyrene	mg/kg	15	<0.05	18	21	37
Indeno(1,2,3-c,d)pyrene	mg/kg	14	<0.1	16	18	32
Dibenzo(a,h)anthracene	mg/kg	1.4	<0.1	2.0	1.7	5.2
Benzo(g,h,i)perylene	mg/kg	12	<0.1	13	16	27
Benzo(a)pyrene TEQ NEPM B1	mg/kg	21	<0.5	26	30	55
Total +ve PAH's	mg/kg	120	NIL (+)VE	140	180	300
Surrogate p-Terphenyl-d14	%	97	98	102	99	99

PAHs in Soil						
Our Reference:	UNITS	112503-8	112503-9	112503-11	112503-13	112503-15
Your Reference	-------------	AEC2 SB105	AEC6 SB106	AEC26 SB107	AEC8 SB108	AEC2 MW103
Depth	------------	0.3-0.4	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		30/06/2014	30/06/2014	30/06/2014	30/06/2014	30/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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	0.2	<0.1	<0.1	0.1	0.8
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	0.4
Phenanthrene	mg/kg	3.3	<0.1	0.3	1.3	6.2
Anthracene	mg/kg	0.9	<0.1	<0.1	0.3	1.4
Fluoranthene	mg/kg	12	0.2	1.8	6.0	18
Pyrene	mg/kg	11	0.3	1.7	6.0	17
Benzo(a)anthracene	mg/kg	6.7	0.3	2.0	3.4	21
Chrysene	mg/kg	6.3	0.3	3.1	3.8	19
Benzo(b+k)fluoranthene	mg/kg	18	0.7	7.0	10	49
Benzo(a)pyrene	mg/kg	12	0.30	1.9	4.9	28
Indeno(1,2,3-c,d)pyrene	mg/kg	8.2	0.3	2.3	4.7	27
Dibenzo(a,h)anthracene	mg/kg	0.9	<0.1	0.4	0.5	4.1
Benzo(g,h,i)perylene	mg/kg	6.6	0.3	1.9	4.1	21
Benzo(a)pyrene TEQ NEPM B1	mg/kg	16	<0.5	3.0	7.0	42
Total +ve PAH's	mg/kg	85	2.7	22	46	210
Surrogate p-Terphenyl-d14	%	89	112	98	102	96

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ------------- ------------	112503-16 AEC2 MW103 0.3-0.4 30/06/2014 Soil	112503-17 AEC2 MW104 0.0-0.1 30/06/2014 Soil	112503-18 AEC2 MW104 0.3-0.4 30/06/2014 Soil	112503-19 AEC8 MW105 0.3-0.4 30/06/2014 Soil	112503-21 DUPB - 30/06/2014 Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
Naphthalene	mg/kg	1.7	<0.1	<0.1	0.2	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	6.3	0.4	<0.1	0.4	0.1
Fluorene	mg/kg	3.8	0.1	<0.1	0.2	<0.1
Phenanthrene	mg/kg	45	3.1	<0.1	0.2	1.2
Anthracene	mg/kg	12	0.7	<0.1	<0.1	0.3
Fluoranthene	mg/kg	140	11	0.2	0.1	5.0
Pyrene	mg/kg	140	13	0.2	0.1	5.0
Benzo(a)anthracene	mg/kg	150	11	0.2	<0.1	4.3
Chrysene	mg/kg	150	13	0.2	<0.1	5.5
Benzo(b+k)fluoranthene	mg/kg	310	42	0.4	<0.2	14
Benzo(a)pyrene	mg/kg	160	24	0.21	<0.05	6.0
Indeno(1,2,3-c,d)pyrene	mg/kg	120	18	0.2	<0.1	5.2
Dibenzo(a,h)anthracene	mg/kg	22	2.7	<0.1	<0.1	0.6
Benzo(g,h,i)perylene	mg/kg	100	15	0.2	<0.1	4.6
Benzo(a)pyrene TEQ NEPM B1	mg/kg	250	34	<0.5	<0.5	9.0
Total +ve PAH's	mg/kg	1,400	150	1.7	1.2	52
Surrogate p-Terphenyl-d14	%	107	95	107	94	95

PAHs in Soil						
Our Reference:	UNITS	112503-22	112503-24	112503-26	112503-28	112503-30
Your Reference	-------------	AEC8 MW106	AEC8 MW107	AEC8 SB109	AEC8 SB110	AEC4 SB111
Depth	------------	0.0-0.1	0.15-0.25	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		1/07/2014	1/07/2014	1/07/2014	1/07/2014	1/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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	0.7	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Fluoranthene	mg/kg	0.6	<0.1	2.2	<0.1	0.4
Pyrene	mg/kg	0.6	<0.1	2.0	<0.1	0.5
Benzo(a)anthracene	mg/kg	0.7	<0.1	0.8	<0.1	0.3
Chrysene	mg/kg	0.9	<0.1	0.8	0.1	1.0
Benzo(b+k)fluoranthene	mg/kg	2.4	<0.2	1.5	<0.2	0.9
Benzo(a)pyrene	mg/kg	0.72	<0.05	0.88	<0.05	0.48
Indeno(1,2,3-c,d)pyrene	mg/kg	0.7	<0.1	0.6	<0.1	0.3
Dibenzo(a,h)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.7	<0.1	0.6	<0.1	0.4
Benzo(a)pyrene TEQ NEPM B1	mg/kg	1.0	<0.5	1.0	<0.5	1.0
Total +ve PAH's	mg/kg	7.6	NIL (+)VE	10	0.10	4.3
Surrogate p-Terphenyl-d14	%	101	104	95	107	92

PAHs in Soil						
Our Reference:	UNITS	112503-31	112503-33	112503-34	112503-35	112503-36
Your Reference	-------------	AEC4 SB111	AEC4 SB112	AEC4 SB112	AEC4 SB112	AEC4 SB113
Depth	------------	0.4-0.5	0.0-0.1	0.4-0.5	0.8-0.9	0.0-0.1
Date Sampled		1/07/2014	1/07/2014	1/07/2014	1/07/2014	1/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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	2.0	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	0.9	<0.1	<0.1
Phenanthrene	mg/kg	0.4	<0.1	8.1	<0.1	0.2
Anthracene	mg/kg	<0.1	<0.1	1.7	<0.1	<0.1
Fluoranthene	mg/kg	1.5	<0.1	30	<0.1	0.4
Pyrene	mg/kg	1.6	<0.1	32	<0.1	0.4
Benzo(a)anthracene	mg/kg	1.2	<0.1	29	<0.1	0.3
Chrysene	mg/kg	1.1	<0.1	29	<0.1	0.6
Benzo(b+k)fluoranthene	mg/kg	2.3	<0.2	64	<0.2	0.9
Benzo(a)pyrene	mg/kg	1.5	0.06	38	<0.05	0.42
Indeno(1,2,3-c,d)pyrene	mg/kg	1.1	<0.1	28	<0.1	0.3
Dibenzo(a,h)anthracene	mg/kg	0.1	<0.1	3.8	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	1.0	<0.1	23	<0.1	0.3
Benzo(a)pyrene TEQ NEPM B1	mg/kg	2.0	<0.5	55	<0.5	1.0
Total +ve PAH's	mg/kg	12	0.060	290	NIL (+)VE	3.7
Surrogate p-Terphenyl-d14	%	98	102	98	104	80

PAHs in Soil						
Our Reference:	UNITS	112503-37	112503-39	112503-40	112503-66	112503-76
Your Reference	-------------	AEC4 SB113	AEC4 SB114	AEC4 SB114	DUPC	AEC25 SB129
Depth	------------	0.4-0.5	0.0-0.1	0.4-0.5	-	0.9-1.0
Date Sampled		1/07/2014	1/07/2014	1/07/2014	1/07/2014	2/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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	1	0.2	<0.1	<0.1
Pyrene	mg/kg	0.1	1.0	0.2	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	1.4	0.2	<0.1	<0.1
Chrysene	mg/kg	0.1	2.7	0.2	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	0.2	4.1	0.5	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.12	0.96	0.16	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.6	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	0.8	0.1	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	2.0	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	0.66	13	1.7	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	96	92	95	92	86

PAHs in Soil			
Our Reference:	UNITS	112503-89	112503-93
Your Reference	-------------	AEC25 SB135	AEC 8 MW105
Depth	------------	0.3-0.4	0.15-0.25
Date Sampled		2/07/2014	30/06/2014
Type of sample		Soil	Soil
Date extracted	-	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014
Naphthalene	mg/kg	<0.1	4.0
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	7.3
Fluorene	mg/kg	0.1	2.7
Phenanthrene	mg/kg	0.3	3.4
Anthracene	mg/kg	<0.1	0.9
Fluoranthene	mg/kg	0.3	5.9
Pyrene	mg/kg	0.2	4.6
Benzo(a)anthracene	mg/kg	0.1	0.8
Chrysene	mg/kg	0.5	0.9
Benzo(b+k)fluoranthene	mg/kg	0.2	1.3
Benzo(a)pyrene	mg/kg	0.07	0.44
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.4
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.3
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	1.0
Total +ve PAH's	mg/kg	1.9	33
Surrogate p-Terphenyl-d14	%	92	98

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112503-1	112503-2	112503-3	112503-4	112503-5
Your Reference	-------------	AEC11 SB101	AEC11 SC101	AEC2 SB103	AEC2 SB103	AEC2 SB104
Depth	------------	0.0-0.1	0.3-0.4	0.0-0.1	0.3-0.4	0.0-0.1
Date Sampled		30/06/2014	30/06/2014	30/06/2014	30/06/2014	30/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Date analysed	-	09/07/2014	09/07/2014	09/07/2014	09/07/2014	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	94	73	890	24	1,077

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112503-6	112503-7	112503-8	112503-9	112503-11
Your Reference	-------------	AEC2 SB104	AEC2 SB105	AEC2 SB105	AEC6 SB106	AEC26 SB107
Depth	------------	0.3-0.4	0.0-0.1	0.3-0.4	0.0-0.1	0.0-0.1
Date Sampled		30/06/2014	30/06/2014	30/06/2014	30/06/2014	30/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Date analysed	-	09/07/2014	09/07/2014	09/07/2014	09/07/2014	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	270	970	110	38	38

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112503-13	112503-15	112503-16	112503-17	112503-18
Your Reference	-------------	AEC8 SB108	AEC2 MW103	AEC2 MW103	AEC2 MW104	AEC2 MW104
Depth	------------	0.0-0.1	0.0-0.1	0.3-0.4	0.0-0.1	0.3-0.4
Date Sampled		30/06/2014	30/06/2014	30/06/2014	30/06/2014	30/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Date analysed	-	09/07/2014	09/07/2014	09/07/2014	09/07/2014	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	34	410	430	64	45

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112503-20	112503-21	112503-22	112503-24	112503-26
Your Reference	-------------	DUPA	DUPB	AEC8 MW106	AEC8 MW107	AEC8 SB109
Depth	------------	-	-	0.0-0.1	0.15-0.25	0.0-0.1
Date Sampled		30/06/2014	30/06/2014	1/07/2014	1/07/2014	1/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Date analysed	-	09/07/2014	09/07/2014	09/07/2014	09/07/2014	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	36	24	28	2.9	32

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112503-28	112503-42	112503-44	112503-45	112503-46
Your Reference	-------------	AEC8 SB110	AEC12 SB115	AEC12 SB116	AEC12 SB116	AEC25 SB119
Depth	------------	0.0-0.1	0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1
Date Sampled		1/07/2014	1/07/2014	1/07/2014	1/07/2014	1/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Date analysed	-	09/07/2014	09/07/2014	09/07/2014	09/07/2014	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	2.9	73	140	48	55

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112503-47	112503-48	112503-50	112503-51	112503-52
Your Reference	-------------	AEC25 SB119	AEC25 SB120	AEC25 SB121	AEC25 SB121	AEC25 SB122
Depth	------------	0.3-0.4	0.0-0.1	0.0-0.1	0.1-0.2	0.0-0.1
Date Sampled		1/07/2014	1/07/2014	1/07/2014	1/07/2014	1/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Date analysed	-	09/07/2014	09/07/2014	09/07/2014	09/07/2014	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	36	3.1	20	7.8	44

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112503-54	112503-55	112503-57	112503-58	112503-59
Your Reference	-------------	AEC25 SB123	AEC25 SB123	AEC25 SB124	AEC25 SB124	AEC25 SB125
Depth	------------	0.0-0.1	0.1-0.2	0.0-0.1	0.1-0.2	0.0-0.1
Date Sampled		1/07/2014	1/07/2014	1/07/2014	1/07/2014	1/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Date analysed	-	09/07/2014	09/07/2014	09/07/2014	09/07/2014	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	87	140	87	91	210

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112503-61	112503-63	112503-64	112503-65	112503-67
Your Reference	-------------	AEC25 SB126	AEC25 SB127	AEC25 SB127	AEC25 SB127	DUPD
Depth	------------	0.0-0.1	0.0-0.1	0.1-0.2	0.4-0.6	-
Date Sampled		1/07/2014	1/07/2014	1/07/2014	1/07/2014	1/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Date analysed	-	09/07/2014	09/07/2014	09/07/2014	09/07/2014	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	250	7.5	14	0.6	48

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112503-68	112503-69	112503-70	112503-71	112503-72
Your Reference	-------------	DUPE	DUPF	AEC12 SB117	AEC12 SB117	AEC12 SB118
Depth	------------	-	-	0.0-0.1	0.1-0.2	0.0-0.1
Date Sampled		1/07/2014	1/07/2014	2/07/2014	2/07/2014	2/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Date analysed	-	09/07/2014	09/07/2014	09/07/2014	09/07/2014	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	<0.5	130	13	24	17

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112503-73	112503-74	112503-75	112503-76	112503-77
Your Reference	-------------	AEC12 SB118	AEC25 SB129	AEC25 SB129	AEC25 SB129	AEC25 SB128
Depth	------------	0.2-0.3	0.0-0.1	0.1-0.2	0.9-1.0	0.0-0.1
Date Sampled		2/07/2014	2/07/2014	2/07/2014	2/07/2014	2/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Date analysed	-	09/07/2014	09/07/2014	09/07/2014	09/07/2014	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	29	23	16	2.7	23

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112503-79	112503-80	112503-81	112503-83	112503-84
Your Reference	-------------	AEC25 SB131	AEC25 SB131	AEC25 SB132	AEC25 SB133	AEC25 SB133
Depth	------------	0.0-0.1	0.3-0.4	0.0-0.1	0.2-0.3	0.3-0.4
Date Sampled		2/07/2014	2/07/2014	2/07/2014	2/07/2014	2/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Date analysed	-	09/07/2014	09/07/2014	09/07/2014	09/07/2014	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	10	52	2.3	5.0	27

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112503-85	112503-87	112503-89	112503-90	112503-91
Your Reference	-------------	AEC25 SB134	AEC25 SB135	AEC25 SB135	DUPG	DUPH
Depth	------------	0.0-0.1	0.0-0.1	0.3-0.4	-	-
Date Sampled		2/07/2014	2/07/2014	2/07/2014	2/07/2014	2/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Date analysed	-	09/07/2014	09/07/2014	09/07/2014	09/07/2014	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	2.3	22	36	37	25

Moisture						
Our Reference:	UNITS	112503-3	112503-4	112503-5	112503-6	112503-7
Your Reference	-------------	AEC2 SB103	AEC2 SB103	AEC2 SB104	AEC2 SB104	AEC2 SB105
Depth	------------	0.0-0.1	0.3-0.4	0.0-0.1	0.3-0.4	0.0-0.1
Date Sampled		30/06/2014	30/06/2014	30/06/2014	30/06/2014	30/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	7.7	10	10	13	7.7

Moisture						
Our Reference:	UNITS	112503-8	112503-9	112503-11	112503-13	112503-15
Your Reference	-------------	AEC2 SB105	AEC6 SB106	AEC26 SB107	AEC8 SB108	AEC2 MW103
Depth	------------	0.3-0.4	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		30/06/2014	30/06/2014	30/06/2014	30/06/2014	30/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	11	4.5	7.4	11	11

Moisture						
Our Reference:	UNITS	112503-16	112503-17	112503-18	112503-19	112503-21
Your Reference	-------------	AEC2 MW103	AEC2 MW104	AEC2 MW104	AEC8 MW105	DUPB
Depth	------------	0.3-0.4	0.0-0.1	0.3-0.4	0.3-0.4	-
Date Sampled		30/06/2014	30/06/2014	30/06/2014	30/06/2014	30/06/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	12	8.1	9.4	12	8.7

Moisture						
Our Reference:	UNITS	112503-22	112503-24	112503-26	112503-28	112503-30
Your Reference	-------------	AEC8 MW106	AEC8 MW107	AEC8 SB109	AEC8 SB110	AEC4 SB111
Depth	------------	0.0-0.1	0.15-0.25	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		1/07/2014	1/07/2014	1/07/2014	1/07/2014	1/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	10	16	5.3	3.3	12

Moisture						
Our Reference:	UNITS	112503-31	112503-33	112503-34	112503-35	112503-36
Your Reference	-------------	AEC4 SB111	AEC4 SB112	AEC4 SB112	AEC4 SB112	AEC4 SB113
Depth	------------	0.4-0.5	0.0-0.1	0.4-0.5	0.8-0.9	0.0-0.1
Date Sampled		1/07/2014	1/07/2014	1/07/2014	1/07/2014	1/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	13	12	8.5	19	9.3

Moisture						
Our Reference:	UNITS	112503-37	112503-39	112503-40	112503-66	112503-76
Your Reference	-------------	AEC4 SB113	AEC4 SB114	AEC4 SB114	DUPC	AEC25 SB129
Depth	------------	0.4-0.5	0.0-0.1	0.4-0.5	-	0.9-1.0
Date Sampled		1/07/2014	1/07/2014	1/07/2014	1/07/2014	2/07/2014
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	7.6	6.7	7.0	14	5.1

Moisture				
Our Reference:	UNITS	112503-89	112503-92	112503-93
Your Reference	-------------	AEC25 SB135	AEC 2 MW105	AEC 8 MW105
Depth	------------	0.3-0.4	0.9-1.0	0.15-0.25
Date Sampled		2/07/2014	30/06/2014	30/06/2014
Type of sample		Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014
Moisture	%	7.5	15	16

Method ID	Methodology Summary
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-012 subset	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.
Inorg-026	Fluoride determined by ion selective electrode (ISE) in accordance with APHA 22nd ED, 4500-F-C.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

QUALITY CONTROL VOCs in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/07/2014	112503-19	07/07/2014 || 07/07/2014	LCS-11	07/07/2014
Date analysed	-			08/07/2014	112503-19	08/07/2014 || 08/07/2014	LCS-11	08/07/2014
Dichlorodifluoromethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
Chloromethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
Vinyl Chloride	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
Bromomethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
Chloroethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
Trichlorofluoromethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,1-Dichloroethene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
trans-1,2-dichloroethene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,1-dichloroethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	LCS-11	114%
cis-1,2-dichloroethene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
bromochloromethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
chloroform	mg/kg	1	Org-014	<1	112503-19	<1 || <1	LCS-11	103%
2,2-dichloropropane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,2-dichloroethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	LCS-11	104%
1,1,1-trichloroethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	LCS-11	111%
1,1-dichloropropene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
Cyclohexane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
carbon tetrachloride	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
Benzene	mg/kg	0.2	Org-014	<0.2	112503-19	<0.2 || <0.2	[NR]	[NR]
dibromomethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,2-dichloropropane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
trichloroethene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	LCS-11	93%
bromodichloromethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	LCS-11	106%
trans-1,3-dichloropropene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
cis-1,3-dichloropropene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,1,2-trichloroethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
Toluene	mg/kg	0.5	Org-014	<0.5	112503-19	<0.5 || <0.5	[NR]	[NR]
1,3-dichloropropane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
dibromochloromethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	LCS-11	106%
1,2-dibromoethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
tetrachloroethene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	LCS-11	106%
1,1,1,2-tetrachloroethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
chlorobenzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
Ethylbenzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
bromoform	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
m+p-xylene	mg/kg	2	Org-014	<2	112503-19	<2 || <2	[NR]	[NR]
styrene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,1,2,2-tetrachloroethane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
o-Xylene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,2,3-trichloropropane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]

QUALITY CONTROL VOCs in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
isopropylbenzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
bromobenzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
n-propyl benzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
2-chlorotoluene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
4-chlorotoluene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,3,5-trimethyl benzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
tert-butyl benzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,2,4-trimethyl benzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,3-dichlorobenzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
sec-butyl benzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,4-dichlorobenzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
4-isopropyl toluene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,2-dichlorobenzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
n-butyl benzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,2-dibromo-3-chloropropane	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,2,4-trichlorobenzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
hexachlorobutadiene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
1,2,3-trichlorobenzene	mg/kg	1	Org-014	<1	112503-19	<1 || <1	[NR]	[NR]
Surrogate Dibromofluorometha	%		Org-014	87	112503-19	90 || 111 || RPD: 21	LCS-11	115%
Surrogate aaa-Trifluorotoluene	%		Org-014	98	112503-19	103 || 106 || RPD: 3	LCS-11	106%
Surrogate Toluene-d8	%		Org-014	99	112503-19	100 || 103 || RPD: 3	LCS-11	101%
Surrogate 4-Bromofluorobenzene	%		Org-014	105	112503-19	102 || 103 || RPD: 1	LCS-11	107%

QUALITY CONTROL SVOCs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/07/2014	112503-19	7/07/2014 || 7/07/2014	LCS-W1	07/07/2014
Date analysed	-			10/07/2014	112503-19	10/07/2014 || 10/07/2014	LCS-W1	10/07/2014
Phenol	mg/kg	1	Org-012	<1	112503-19	<1 || <1	LCS-W1	75%
Bis-(2-chloroethyl) ether	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2-Chlorophenol	mg/kg	1	Org-012	<1	112503-19	<1 || <1	LCS-W1	108%
1,3-Dichlorobenzene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
1,4-Dichlorobenzene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	LCS-W1	78%
2-Methylphenol	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
1,2-Dichlorobenzene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Bis (2-chloroisopropyl) ether	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
3/4-Methylphenol	mg/kg	2	Org-012	<2	112503-19	<2 || <2	[NR]	[NR]
N-nitrosodi-n-propylamine	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Hexachloroethane	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Nitrobenzene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Isophorone	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2,4-Dimethylphenol	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2-Nitrophenol	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Bis(2-chloroethoxy) methane	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2,4-Dichlorophenol	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
1,2,4-Trichlorobenzene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Naphthalene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
4-Chloroaniline	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Hexachlorobutadiene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2-Methylnaphthalene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Hexachlorocyclopentadiene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2,4,6-trichlorophenol	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2,4,5-trichlorophenol	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2-Chloronaphthalene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2-nitroaniline	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Dimethylphthalate	mg/kg	1	Org-012	<1	112503-19	<1 || <1	LCS-W1	67%
2,6-Dinitrotoluene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Acenaphthylene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
3-Nitroaniline	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Acenaphthene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	LCS-W1	89%
2,4-dinitrophenol	mg/kg	10	Org-012	<10	112503-19	<10 || <10	[NR]	[NR]
4-nitrophenol	mg/kg	10	Org-012	<10	112503-19	<10 || <10	LCS-W1	67%
Dibenzofuran	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
diethylphthalate	mg/kg	1	Org-012	<1	112503-19	<1 || <1	LCS-W1	87%
4-chlorophenylphenylether	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
4-nitroaniline	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]

QUALITY CONTROL SVOCs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Fluorene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2-methyl-4,6-dinitrophenol	mg/kg	10	Org-012	<10	112503-19	<10 || <10	[NR]	[NR]
azobenzene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
4-bromophenylphenylether	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
hexachlorobenzene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
pentachlorophenol	mg/kg	10	Org-012	<10	112503-19	<10 || <10	[NR]	[NR]
Phenanthrene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Anthracene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
carbazole	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
di-n-butylphthalate	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Fluoranthene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Pyrene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	LCS-W1	80%
butylbenzylphthalate	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
bis(2-ethylhexyl) phthalate	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Benzo(a)anthracene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Chrysene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
di-n-octylphthalate	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Benzo(b)fluoranthene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Benzo(k)fluoranthene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Benzo(a)pyrene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Indeno(1,2,3-c,d)pyrene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
ethylmethanesulfonate	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
aniline	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
pentachloroethane	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
benzyl alcohol	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
acetophenone	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
N-nitrosomorpholine	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
N-nitrosopiperidine	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2,6-dichlorophenol	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
hexachloropropene-1	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
N-nitroso-n-butylamine	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
safrole	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
1,2,4,5-tetrachlorobenzene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
cis and trans iso-safrole	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
1,3-dinitrobenzene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
pentachlorobenzene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
1-naphthylamine	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2,3,4,6-tetrachlorophenol	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2-naphthylamine	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
5-nitro-o-toluidine	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]

QUALITY CONTROL SVOCs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
diphenylamine	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
phenacetin	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
pentachloronitrobenzene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
dinoseb	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
methapyrilene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
p-dimethylaminoazobenzene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
2-acetylaminofluorene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
7,12-dimethylbenz(a) anthracene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
3-methylcholanthrene	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
a-BHC	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
b-BHC	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
g-BHC	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
d-BHC	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Heptachlor	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Aldrin	mg/kg	1	Org-012	<1	112503-19	<1 || <1	LCS-W1	84%
Heptachlor Epoxide	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
g-Chlordane	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
a-Chlordane	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Endosulfan I	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
p,p'-DDE	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Dieldrin	mg/kg	1	Org-012	<1	112503-19	<1 || <1	LCS-W1	74%
Endrin	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
p,p'-DDD	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Endosulfan II	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
p,p'-DDT	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Methoxychlor	mg/kg	1	Org-012	<1	112503-19	<1 || <1	[NR]	[NR]
Surrogate 2-fluorophenol	%		Org-012	122	112503-19	125 || 131 || RPD: 5	LCS-W1	124%
Surrogate Phenol-d_6	%		Org-012	133	112503-19	131 || 139 || RPD: 6	LCS-W1	131%
Surrogate Nitrobenzene-d_5	%		Org-012	116	112503-19	101 || 112 || RPD: 10	LCS-W1	69%
Surrogate 2-fluorobiphenyl	%		Org-012	124	112503-19	127 || 125 || RPD: 2	LCS-W1	115%
*Surrogate 2,4,6-*Tribromophenol	%		Org-012	78	112503-19	104 || 109 || RPD: 5	LCS-W1	78%
Surrogate p-Terphenyl-d_{14}	%		Org-012	102	112503-19	105 || 105 || RPD: 0	LCS-W1	93%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/07/2014	112503-3	7/07/2014 || 7/07/2014	LCS-11	07/07/2014
Date analysed	-			07/07/2014	112503-3	8/07/2014 || 8/07/2014	LCS-11	07/07/2014
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	<0.1 || <0.1	LCS-11	105%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	0.6 || 0.5 || RPD: 18	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	0.3 || 0.2 || RPD: 40	LCS-11	103%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	3.8 || 3.1 || RPD: 20	LCS-11	112%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	0.7 || 0.6 || RPD: 15	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	13 || 10 || RPD: 26	LCS-11	107%
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	12 || 10 || RPD: 18	LCS-11	109%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	11 || 8.4 || RPD: 27	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	11 || 9.0 || RPD: 20	LCS-11	108%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	112503-3	25 || 22 || RPD: 13	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	112503-3	15 || 12 || RPD: 22	LCS-11	113%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	14 || 12 || RPD: 15	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	1.4 || 1.4 || RPD: 0	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	112503-3	12 || 10 || RPD: 18	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	81	112503-3	97 || 105 || RPD: 8	LCS-11	99%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			09/07/2014	112503-1	08/07/2014 || 08/07/2014	LCS-1	08/07/2014
Date analysed	-			09/07/2014	112503-1	09/07/2014 || 09/07/2014	LCS-1	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	0.5	Inorg-026	<0.5	112503-1	94 || 93 || RPD: 1	LCS-1	102%

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

QUALITY CONTROL VOCs in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	112503-92	07/07/2014
Date analysed	-	[NT]	[NT]	112503-92	08/07/2014
Dichlorodifluoromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Chloromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Vinyl Chloride	mg/kg	[NT]	[NT]	[NR]	[NR]
Bromomethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Chloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Trichlorofluoromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1-Dichloroethene	mg/kg	[NT]	[NT]	[NR]	[NR]
trans-1,2-dichloroethene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1-dichloroethane	mg/kg	[NT]	[NT]	112503-92	125%
cis-1,2-dichloroethene	mg/kg	[NT]	[NT]	[NR]	[NR]
bromochloromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
chloroform	mg/kg	[NT]	[NT]	112503-92	115%
2,2-dichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dichloroethane	mg/kg	[NT]	[NT]	112503-92	117%
1,1,1-trichloroethane	mg/kg	[NT]	[NT]	112503-92	123%
1,1-dichloropropene	mg/kg	[NT]	[NT]	[NR]	[NR]
Cyclohexane	mg/kg	[NT]	[NT]	[NR]	[NR]
carbon tetrachloride	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
dibromomethane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
trichloroethene	mg/kg	[NT]	[NT]	112503-92	103%
bromodichloromethane	mg/kg	[NT]	[NT]	112503-92	116%
trans-1,3-dichloropropene	mg/kg	[NT]	[NT]	[NR]	[NR]
cis-1,3-dichloropropene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1,2-trichloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Toluene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3-dichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL VOCs in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
dibromochloromethane	mg/kg	[NT]	[NT]	112503-92	116%
1,2-dibromoethane	mg/kg	[NT]	[NT]	[NR]	[NR]
tetrachloroethene	mg/kg	[NT]	[NT]	112503-92	122%
1,1,1,2-tetrachloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
chlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
Ethylbenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
bromoform	mg/kg	[NT]	[NT]	[NR]	[NR]
m+p-xylene	mg/kg	[NT]	[NT]	[NR]	[NR]
styrene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1,2,2-tetrachloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
o-Xylene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,3-trichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
isopropylbenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
bromobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
n-propyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
2-chlorotoluene	mg/kg	[NT]	[NT]	[NR]	[NR]
4-chlorotoluene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3,5-trimethyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
tert-butyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,4-trimethyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3-dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
sec-butyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,4-dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
4-isopropyl toluene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
n-butyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dibromo-3-chloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,4-trichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
hexachlorobutadiene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,3-trichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluorometha	%	[NT]	[NT]	112503-92	120%
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	112503-92	104%
Surrogate Toluene-d_8	%	[NT]	[NT]	112503-92	101%
Surrogate 4-Bromofluorobenzene	%	[NT]	[NT]	112503-92	104%

QUALITY CONTROL SVOCs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	112503-93	07/07/2014
Date analysed	-	[NT]	[NT]	112503-93	10/07/2014
Phenol	mg/kg	[NT]	[NT]	112503-93	90%
Bis-(2-chloroethyl) ether	mg/kg	[NT]	[NT]	[NR]	[NR]
2-Chlorophenol	mg/kg	[NT]	[NT]	112503-93	118%
1,3-Dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,4-Dichlorobenzene	mg/kg	[NT]	[NT]	112503-93	84%
2-Methylphenol	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-Dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
Bis (2-chloroisopropyl) ether	mg/kg	[NT]	[NT]	[NR]	[NR]
3/4-Methylphenol	mg/kg	[NT]	[NT]	[NR]	[NR]
N-nitrosodi-n-propylamine	mg/kg	[NT]	[NT]	[NR]	[NR]
Hexachloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Nitrobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
Isophorone	mg/kg	[NT]	[NT]	[NR]	[NR]
2,4-Dimethylphenol	mg/kg	[NT]	[NT]	[NR]	[NR]
2-Nitrophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
Bis(2-chloroethoxy) methane	mg/kg	[NT]	[NT]	[NR]	[NR]
2,4-Dichlorophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,4-Trichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
Naphthalene	mg/kg	[NT]	[NT]	[NR]	[NR]
4-Chloroaniline	mg/kg	[NT]	[NT]	[NR]	[NR]
Hexachlorobutadiene	mg/kg	[NT]	[NT]	[NR]	[NR]
2-Methylnaphthalene	mg/kg	[NT]	[NT]	[NR]	[NR]
Hexachlorocyclopentadiene	mg/kg	[NT]	[NT]	[NR]	[NR]
2,4,6-trichlorophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
2,4,5-trichlorophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
2-Chloronaphthalene	mg/kg	[NT]	[NT]	[NR]	[NR]
2-nitroaniline	mg/kg	[NT]	[NT]	[NR]	[NR]
Dimethylphthalate	mg/kg	[NT]	[NT]	112503-93	81%
2,6-Dinitrotoluene	mg/kg	[NT]	[NT]	[NR]	[NR]
Acenaphthylene	mg/kg	[NT]	[NT]	[NR]	[NR]
3-Nitroaniline	mg/kg	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	[NT]	[NT]	112503-93	80%
2,4-dinitrophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
4-nitrophenol	mg/kg	[NT]	[NT]	112503-93	76%
Dibenzofuran	mg/kg	[NT]	[NT]	[NR]	[NR]
diethylphthalate	mg/kg	[NT]	[NT]	112503-93	93%
4-chlorophenylphenylether	mg/kg	[NT]	[NT]	[NR]	[NR]
4-nitroaniline	mg/kg	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL SVOCs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Fluorene	mg/kg	[NT]	[NT]	[NR]	[NR]
2-methyl-4,6-dinitrophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
azobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
4-bromophenylphenylether	mg/kg	[NT]	[NT]	[NR]	[NR]
hexachlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
pentachlorophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
Phenanthrene	mg/kg	[NT]	[NT]	[NR]	[NR]
Anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
carbazole	mg/kg	[NT]	[NT]	[NR]	[NR]
di-n-butylphthalate	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Pyrene	mg/kg	[NT]	[NT]	112503-93	75%
butylbenzylphthalate	mg/kg	[NT]	[NT]	[NR]	[NR]
bis(2-ethylhexyl)phthalate	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	[NT]	[NT]	[NR]	[NR]
di-n-octylphthalate	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(b)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(k)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	[NT]	[NT]	[NR]	[NR]
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]
ethylmethanesulfonate	mg/kg	[NT]	[NT]	[NR]	[NR]
aniline	mg/kg	[NT]	[NT]	[NR]	[NR]
pentachloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
benzyl alcohol	mg/kg	[NT]	[NT]	[NR]	[NR]
acetophenone	mg/kg	[NT]	[NT]	[NR]	[NR]
N-nitrosomorpholine	mg/kg	[NT]	[NT]	[NR]	[NR]
N-nitrosopiperidine	mg/kg	[NT]	[NT]	[NR]	[NR]
2,6-dichlorophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
hexachloropropene-1	mg/kg	[NT]	[NT]	[NR]	[NR]
N-nitroso-n-butylamine	mg/kg	[NT]	[NT]	[NR]	[NR]
safrole	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,4,5-tetrachlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
cis and trans iso-safrole	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3-dinitrobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
pentachlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1-naphthylamine	mg/kg	[NT]	[NT]	[NR]	[NR]
2,3,4,6-tetrachlorophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
2-naphthylamine	mg/kg	[NT]	[NT]	[NR]	[NR]
5-nitro-o-toluidine	mg/kg	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL SVOCs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
diphenylamine	mg/kg	[NT]	[NT]	[NR]	[NR]
phenacetin	mg/kg	[NT]	[NT]	[NR]	[NR]
pentachloronitrobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
dinoseb	mg/kg	[NT]	[NT]	[NR]	[NR]
methapyrilene	mg/kg	[NT]	[NT]	[NR]	[NR]
p-dimethylaminoazobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
2-acetylaminofluorene	mg/kg	[NT]	[NT]	[NR]	[NR]
7,12-dimethylbenz(a) anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
3-methylcholanthrene	mg/kg	[NT]	[NT]	[NR]	[NR]
a-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
b-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
g-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
d-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
Heptachlor	mg/kg	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	[NT]	[NT]	112503-93	88%
Heptachlor Epoxide	mg/kg	[NT]	[NT]	[NR]	[NR]
g-Chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
a-Chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	[NT]	[NT]	[NR]	[NR]
p,p'-DDE	mg/kg	[NT]	[NT]	[NR]	[NR]
Dieldrin	mg/kg	[NT]	[NT]	112503-93	82%
Endrin	mg/kg	[NT]	[NT]	[NR]	[NR]
p,p'-DDD	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan II	mg/kg	[NT]	[NT]	[NR]	[NR]
p,p'-DDT	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	[NT]	[NT]	[NR]	[NR]
Methoxychlor	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate 2-fluorophenol	%	[NT]	[NT]	112503-93	119%
Surrogate Phenol-d_6	%	[NT]	[NT]	112503-93	128%
Surrogate Nitrobenzene-d_5	%	[NT]	[NT]	112503-93	109%
Surrogate 2-fluorobiphenyl	%	[NT]	[NT]	112503-93	121%
*Surrogate 2,4,6-*Tribromophenol	%	[NT]	[NT]	112503-93	113%
Surrogate p-Terphenyl-d_{14}	%	[NT]	[NT]	112503-93	102%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112503-19	7/07/2014 || 7/07/2014	LCS-12	07/07/2014
Date analysed	-	112503-19	8/07/2014 || 8/07/2014	LCS-12	07/07/2014
Naphthalene	mg/kg	112503-19	0.2 || 0.2 || RPD: 0	LCS-12	107%
Acenaphthylene	mg/kg	112503-19	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	112503-19	0.4 || 0.4 || RPD: 0	[NR]	[NR]
Fluorene	mg/kg	112503-19	0.2 || 0.1 || RPD: 67	LCS-12	107%
Phenanthrene	mg/kg	112503-19	0.2 || 0.1 || RPD: 67	LCS-12	114%
Anthracene	mg/kg	112503-19	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	112503-19	0.1 || 0.1 || RPD: 0	LCS-12	110%
Pyrene	mg/kg	112503-19	0.1 || <0.1	LCS-12	112%
Benzo(a)anthracene	mg/kg	112503-19	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	112503-19	<0.1 || <0.1	LCS-12	106%
Benzo(b+k)fluoranthene	mg/kg	112503-19	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	112503-19	<0.05 || <0.05	LCS-12	116%
Indeno(1,2,3-c,d)pyrene	mg/kg	112503-19	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	112503-19	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	112503-19	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	112503-19	94 || 95 || RPD: 1	LCS-12	101%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112503-13	08/07/2014 || 08/07/2014	LCS-2	08/07/2014
Date analysed	-	112503-13	09/07/2014 || 09/07/2014	LCS-2	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	112503-13	34 || 27 || RPD: 23	LCS-2	104%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112503-28	7/07/2014 || 7/07/2014	112503-4	07/07/2014
Date analysed	-	112503-28	8/07/2014 || 8/07/2014	112503-4	07/07/2014
Naphthalene	mg/kg	112503-28	<0.1 || <0.1	112503-4	87%
Acenaphthylene	mg/kg	112503-28	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	112503-28	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	112503-28	<0.1 || <0.1	112503-4	100%
Phenanthrene	mg/kg	112503-28	<0.1 || <0.1	112503-4	107%
Anthracene	mg/kg	112503-28	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	112503-28	<0.1 || <0.1	112503-4	106%
Pyrene	mg/kg	112503-28	<0.1 || <0.1	112503-4	108%
Benzo(a)anthracene	mg/kg	112503-28	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	112503-28	0.1 || 0.1 || RPD: 0	112503-4	101%
Benzo(b+k)fluoranthene	mg/kg	112503-28	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	112503-28	<0.05 || <0.05	112503-4	114%
Indeno(1,2,3-c,d)pyrene	mg/kg	112503-28	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	112503-28	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	112503-28	<0.1 || <0.1	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Surrogate p-Terphenyl-d14	%	112503-28	107 || 109 || RPD: 2	112503-4	100%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112503-28	08/07/2014 || 08/07/2014	LCS-3	08/07/2014
Date analysed	-	112503-28	09/07/2014 || 09/07/2014	LCS-3	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	112503-28	2.9 || 3.1 || RPD: 7	LCS-3	102%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	112503-93	07/07/2014
Date analysed	-	[NT]	[NT]	112503-93	07/07/2014
Naphthalene	mg/kg	[NT]	[NT]	112503-93	94%
Acenaphthylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	[NT]	[NT]	112503-93	101%
Phenanthrene	mg/kg	[NT]	[NT]	112503-93	86%
Anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	[NT]	[NT]	112503-93	#
Pyrene	mg/kg	[NT]	[NT]	112503-93	64%
Benzo(a)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	[NT]	[NT]	112503-93	#
Benzo(b+k)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	[NT]	[NT]	112503-93	#
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-d14	%	[NT]	[NT]	112503-93	98%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112503-54	08/07/2014 || 08/07/2014	112503-2	08/07/2014
Date analysed	-	112503-54	09/07/2014 || 09/07/2014	112503-2	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	112503-54	87 || 88 || RPD: 1	112503-2	#

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112503-68	08/07/2014 || 08/07/2014	112503-69	08/07/2014
Date analysed	-	112503-68	09/07/2014 || 09/07/2014	112503-69	09/07/2014
Fluoride (1:5 soil:water)	mg/kg	112503-68	<0.5 || <0.5	112503-69	#

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	112503-81	08/07/2014 || 08/07/2014
Date analysed	-	112503-81	09/07/2014 || 09/07/2014
Fluoride (1:5 soil:water)	mg/kg	112503-81	2.3 || 2.2 || RPD: 4

Report Comments:

PAH (IN SOIL) # Percent recovery is not possible to report as the high concentration of analytes in the sample/s have caused interference.

Fluoride(1:5 soil:water): # Percent recovery is not possible to report as the high concentration of analytes in the sample/s have caused interference.

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
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

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Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

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Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <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 and 10-140% for SVOC and speciated phenols is acceptable.

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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.

Aileen Hie

From: Kirsty Greenfield [kgreenfield@environcorp.com]
Sent: Monday, 14 July 2014 10:51 AM
To: Aileen Hie
Subject: Your reference 112590

Hi Aileen,

Based on the results in your batch 112590, I'd like to organise additional PAH analysis for the following samples (currently on hold):

HA106 0.15 - 99
HA107 0.2 - 104
HA115 0.2-0.3 - 121
HA116 0.3-0.4 - 124
HA117 0.25-0.35 - 126

112590A
Std T/A
due 21/7

Thanks,

ENVIRON

Kirsty Greenfield | Environmental Consultant
ENVIRON Australia Pty Ltd
Eastpoint Complex | Suite 19B, Level 2
50 Glebe Road | The Junction, NSW 2291
T: 02 4962 5444| F: 02 4962 5888 | M: 0407 149 176
kgreenfield@environcorp.com

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

CERTIFICATE OF ANALYSIS 112590-A

Client:
Environ (Newcastle)
Suite 19B, Level 2
50 Glebe Rd
The Junction
NSW 2291

Attention: Kate Woods, Kirsty Greenfield

Sample log in details:

Your Reference:	**AS 130383**
No. of samples:	Additional testing on soils
Date samples received / completed instructions received	4/7/2014 / 14/07/14

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:	21/07/14 / 17/07/14
Date of Preliminary Report:	Not Issued

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

Results Approved By:

Jacinta Hurst
Laboratory Manager

PAHs in Soil						
Our Reference:	UNITS	112590-A-99	112590-A-104	112590-A-121	112590-A-124	112590-A-126
Your Reference	-------------	HA106	HA107	HA115	HA116	HA117
Depth	------------	0.15	0.2	0.2-0.3	0.3-0.4	0.25-0.35
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Date analysed	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
Naphthalene	mg/kg	<0.1	0.4	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.7	8.3	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.3	3.6	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	6.3	68	2.2	0.2	<0.1
Anthracene	mg/kg	1.3	11	0.6	<0.1	<0.1
Fluoranthene	mg/kg	20	220	40	3.4	0.3
Pyrene	mg/kg	19	220	50	3.4	0.3
Benzo(a)anthracene	mg/kg	14	150	61	3.1	0.2
Chrysene	mg/kg	13	130	110	5.8	0.3
Benzo(b+k)fluoranthene	mg/kg	30	290	230	12	0.8
Benzo(a)pyrene	mg/kg	18	180	44	1.7	0.26
Indeno(1,2,3-c,d)pyrene	mg/kg	15	150	44	2.9	0.3
Dibenzo(a,h)anthracene	mg/kg	2.0	16	15	0.7	<0.1
Benzo(g,h,i)perylene	mg/kg	14	130	42	2.9	0.3
Benzo(a)pyrene TEQ NEPM B1	mg/kg	26	260	94	4.0	<0.5
Total +ve PAH's	mg/kg	150	1,600	640	37	2.8
Surrogate p-Terphenyl-d14	%	95	96	98	105	96

Moisture						
Our Reference:	UNITS	112590-A-99	112590-A-104	112590-A-121	112590-A-124	112590-A-126
Your Reference	-------------	HA106	HA107	HA115	HA116	HA117
Depth	------------	0.15	0.2	0.2-0.3	0.3-0.4	0.25-0.35
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Date analysed	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
Moisture	%	6.2	14	7.5	6.3	8.0

Method ID	Methodology Summary
Org-012 subset	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.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/07/2014	[NT]	[NT]	LCS-2	16/07/2014
Date analysed	-			16/07/2014	[NT]	[NT]	LCS-2	16/07/2014
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-2	94%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-2	89%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-2	91%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-2	92%
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-2	93%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-2	87%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	[NT]	[NT]	LCS-2	98%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	111	[NT]	[NT]	LCS-2	92%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			16/07/2014
Date analysed	-			16/07/2014
Moisture	%	0.1	Inorg-008	[NT]

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

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19
8x
152

CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client: ENVIRON	Client Project Name and Number: AS130383
Project Mgr: Kirsty Greenfield	
Sampler: Kate Woods	PO No.:
Address: Level 2, Suite 19B, 50 Glebe Rd, The Junction	Envirolab Services Quote No.:
Email: kgreenfield@environcorp.com	Date results required: Or choose: standard / 1 day / 2 day / 3 day. Note: Inform lab in advance if urgent turnaround is required - surcharge applies
Phone: (02) 49625444 Fax:	

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067
Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au
Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	8 metals	TPH (Combo 3)	BTEX (Combo 3)	PAHs (Combo 3)	fluoride	Comments: Provide as much information about the sample as you can
1	TP101			X	X	X	X	X	
2	TP102								HOLD
3	TP103								HOLD
4	TP104 0-0.2			X	X	X	X	X	
5	TP105								HOLD
6	TP106								HOLD
7	TP107			X	X	X	X	X	
8	TP108								HOLD
9	TP109								HOLD
10	TP110			~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	
11	TP111 0-0.3			X	X	X	X	X	
12	TP112								HOLD
13	TP113			X	X	X	X	X	
14	TP114								HOLD
15	TP115			X	X	X	X	X	

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 112590
Date Received: 4/7/14
Time Received: 12.00
Received by: LSB
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by (company):	Received by (company): ELS	Samples Received: Cool or Ambient (circle one)
Print Name: Kate Woods	Print Name: LSB	Temperature Recieved at: (if applicable)
Date & Time: 12pm 2/7/14	Date & Time: 4/7/14 12.00	Transported by: Hand delivered / courier
Signature: KWoods	Signature:	Page No:

CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client:	ENVIRON
Project Mgr:	Kirsty Greenfield
Sampler:	Kate Woods
Address:	Level 2, Suite 19B, 50 Glebe Rd The Junction
Email:	kgreenfield@environcorp.com
Phone:	(02) 49625444
Fax:	

Client Project Name and Number:	AS130383
PO No.:	
Envirolab Services Quote No. :	
Date results required:	
Or choose: standard / 1 day / 2 day / 3 day	standard (circled)

Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067

Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au

Contact: Aileen Hie

Sample information				Tests Required (Combo 3)					Comments
Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	8 metals	TPH	BTEX	PAHs	Fluoride	Provide as much information about the sample as you can
16	TP116 0.1-0.3			X	X	X	X	X	
17	TP117			X	X	X	X	X	
18	QA1			X	X	X	X	X	
19	TP118			X	X	X	X	X	
20	TP119			X	X	X	X	X	
21	TP120			X	X	X	X	X	
22	TP121								HOLD
23	TP122			X	X	X	X	X	
24	TP123			X	X	X	X	X	
25	TP124			X	X	X	X	X	
26	TP125			X	X	X	X	X	
27	TP126			X	X	X	X	X	
28	TP127			X	X	X	X	X	112590
29	TP128 surface								HOLD
30	TP128 - 0.1			X	X	X	X	X	

Relinquished by (company):	
Print Name:	Kate Woods
Date & Time:	12PM 2/7/14
Signature:	K Woods

Received by (company):	ELS
Print Name:	LSB
Date & Time:	4/7/14 12.00
Signature:	

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier
Page No:

CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Client: ENVIRON
Project Mgr: Kirsty Greenfield
Sampler: Kate Woods
Address: Level 2, Suite 19B, 50 Glebe Rd, The Junction
Email: kgreenfield@environcorp.com
Phone: (02) 49625444 Fax:

Client Project Name and Number: AS130383
PO No.:
Envirolab Services Quote No. :
Date results required:
Or choose: standard / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067
Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au
Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	Tests Required: Combo 3 – 8 metals	TPH	BTEX	PAH	Fluoride	Comments – Provide as much information about the sample as you can
31	TP128-0.2			X	X	X	X	X	
32	TP128-0.4								HOLD
33	TP129 0-0.3			X	X	X	X	X	
34	TP129 0.6-0.7								HOLD
35	QA1a			X	X	X	X	X	
36	TP130 0-0.3			X	X	X	X	X	
37	TP130 0.6-0.7			X	X	X	X	X	
38	TP131 0.1-0.3			X	X	X	X	X	
39	TP131 0.5-0.6								HOLD
40	TP132 surface								HOLD
41	TP132 0.1			X	X	X	X	X	
42	TP132 0.2								HOLD
43	TP132 0.4			X	X	X	X	X	112590
44	TP132 0.8								HOLD
45	TP133 surface								HOLD

Relinquished by (company):
Print Name: Kate Woods
Date & Time: 12pm 2/7/14
Signature: KWoods

Received by (company): ELS
Print Name: LSB
Date & Time: 4/7/14 12.00
Signature:

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier
Page No:

CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client: ENVIRON
Project Mgr: Kirsty Greenfield
Sampler: Kate Woods
Address: Level 2, Suite 19B, 50 Glebe Rd, The Junction
Email: kgreenfield@environcorp.com
Phone: (02) 49625444 **Fax:**

Client Project Name and Number: AS130383
PO No.:
Envirolab Services Quote No. :
Date results required:
Or choose: standard / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067
Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au
Contact: Aileen Hie

Sample information | **Tests Required** (combo 3) | **Comments**

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	8 metals	TPH	BTEX	PAH	Fluoride	Comments (Provide as much information about the sample as you can)
46	TP133 0.1-0.2			X	X	X	X	X	
47	TP133 0.4								HOLD
48	TP134 0.12								HOLD
49	TP134 0.2			X	X	X	X	X	
50	TP134 0.4								HOLD
51	TP135 Surface								HOLD
52	TP135 0.1			X	X	X	X	X	
53	TP135 0.15								HOLD
54	TP135 0.2								HOLD
55	TP135 0.4			X	X	X	X	X	
56	TP136 0.1			X	X	X	X	X	
57	TP136 0.2								HOLD
58	TP136 0.4								HOLD
59	~~TP~~ QA2a			X	X	X	X	X	112590
60	TP137 Surface								HOLD

Relinquished by (company):
Print Name: Kate Woods
Date & Time: 12PM 2/7/14
Signature: KWoods

Received by (company): ELS
Print Name: LSB
Date & Time: 4/7/14 12.00
Signature:

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: **(if applicable)**
Transported by: Hand delivered / courier
Page No:

CHAIN OF COUSTODY - Client

ENVIROLAB SERVICES

Client: ENVIRON
Project Mgr: Kirsty Greenfield
Sampler: Kate Woods
Address: Level 2, Suite 19B, 50 Glebe Rd, The Junction
Email: kgreenfield@environcorp.com
Phone: (02) 49625444 Fax:

Client Project Name and Number: AS130383
PO No.:
Envirolab Services Quote No. :
Date results required:
Or choose: standard / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067
Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au
Contact: Aileen Hie

Sample information				Tests Required (combo 3)					Comments
Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	8metals	TPH	BTEX	PAH	Fluoride	Provide as much information about the sample as you can
61	TP137 0.1			X	X	X	X	X	
62	TP137 0.2								HOLD
63	TP137 0.4			X	X	X	X	X	
64	TP138 Surface								HOLD
65	TP138 0.1								HOLD
66	TP138 0.2			X	X	X	X	X	
67	TP138 0.4								HOLD
68	TP138 0.6								HOLD
69	TP139 surface								HOLD
70	TP139 0.1			X	X	X	X	X	
71	TP139 0.2								HOLD
72	TP139 0.4								HOLD
73	TP140 surface								HOLD
74	TP140 0.1			X	X	X	X	X	112590
75	TP140 0.2								HOLD

Relinquished by (company):
Print Name: Kate Woods
Date & Time: 12pm 2/7/14
Signature: KWoods

Received by (company): ELS
Print Name: LSB
Date & Time: 4/7/14 12.00
Signature:

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier
Page No:

CHAIN OF CUSTODY - Client

Envirolab

ENVIROLAB SERVICES

Client: ENVIRON	**Client Project Name and Number:** AS130383	**Envirolab Services**
Project Mgr: Kirsty Greenfield		12 Ashley St, Chatswood, NSW, 2067
Sampler: Kate Woods	**PO No.:**	
Address: Level 2, Suite 19B, 50 Glebe Rd. The Junction	**Envirolab Services Quote No. :**	**Phone:** 02 9910 6200
	Date results required:	**Fax:** 02 9910 6201
Email: kgreenfield@environcorp.com	**Or choose:** standard / 1 day / 2 day / 3 day	**E-mail:** ahie@envirolabservices.com.au
Phone: (02) 49625444 **Fax:**	*Note: Inform lab in advance if urgent turnaround is required - surcharge applies*	**Contact: Aileen Hie**

Sample information				Tests Required		Comments
Envirolab Sample ID	**Client Sample ID**	**Date sampled**	**Type of sample**	Soluble Fluoride	PAHS	**Provide as much information about the sample as you can**
76	TP140 0.4					HOLD
77	HA101 surface			X		
78	HA101 0.1			X		
79	HA101 0.15					HOLD
80	HA101 0.2			X		
81	HA102 surface			X		
82	HA102 0.1			X		
83	HA102 0.15			X		
84	HA102 0.2					HOLD
85	HA103 surface			X		
86	HA103 0.1			X		
87	HA103 0.15					HOLD
88	HA103 0.2					HOLD
89	HA104 surface			X		
90	HA104 0.1			X		

Relinquished by (company):	**Received by (company):** ELS	**Samples Received:** Cool or Ambient (circle one)
Print Name: Kate Woods	**Print Name:** LSB	**Temperature Recieved at:** (if applicable)
Date & Time: 12pm 2/7/14	**Date & Time:** 4/7/14 12.00	**Transported by:** Hand delivered / courier
Signature: K Woods	**Signature:**	**Page No:**

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CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client: ENVIRON	Client Project Name and Number: AS130383
Project Mgr: Kirsty Greenfield	
Sampler: Kate Woods	PO No.:
Address: Level 2, Suite 19B, 50 Glebe Rd The Junction	Envirolab Services Quote No. :
	Date results required:
Email: kgreenfield@environcorp.com	Or choose: standard / 1 day / 2 day / 3 day
Phone: (02) 49625444 Fax:	Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067

Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au

Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	Soluble Fluoride	PAHs														Comments: Provide as much information about the sample as you can
91	HA104 0.15																		HOLD
92	HA104 0.2																		HOLD
93	HA105 Surface			X															
94	HA105 0.1			X															
95	HA105 0.15																		HOLD
96	HA105 0.2			X															
97	HA 106 Surface																		HOLD
98	HA 106 0.1				X														
99	HA 106 0.15																		HOLD
100	HA 106 0.2																		HOLD
101	HA 107 Surface																		HOLD
102	HA 107 0.1				X														
103	HA 107 0.15																		HOLD
104	HA 107 0.2																		HOLD
105	HA 108 0-0.1				X														

Relinquished by (company):	Received by (company): ELS	Samples Received: Cool or Ambient (circle one)
Print Name: Kate Woods	Print Name: LSB	Temperature Recieved at: (if applicable)
Date & Time: 12pm 2/7/14	Date & Time: 4/7/14 12.00	Transported by: Hand delivered / courier
Signature: KWoods	Signature:	Page No:

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CHAIN OF COUNTRY - Client

ENVIROLAB SERVICES

Client:	ENVIRON
Project Mgr:	Kirsty Greenfield
Sampler:	Kate Woods
Address:	Level 2, Suite 19B, 50 Glebe Rd The Junction
Email:	kgreenfield@environcorp.com
Phone:	(02) 49625444
Fax:	

Client Project Name and Number:	AS130383
PO No.:	
Envirolab Services Quote No. :	
Date results required:	
Or choose: standard / 1 day / 2 day / 3 day	

Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067

Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au

Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	Soluble Fluoride	PAHs	Comments (Provide as much information about the sample as you can)
106	HA108 0.3-0.4					HOLD
107	HA109 0-0.1				X	
108	HA109 0.3-0.4				X	
109	HA110 0-0.1				X	
110	HA110 0.3-0.4				X	
111	HA111 0-0.1				X	
112	QA 3a				X	
113	HA111 0.3-0.4				X	
114	HA112 0-0.1				X	
115	HA112 0.3-0.4					HOLD
116	HA113 0-0.1			X	X	
117	HA113 0.3-0.4			X	X	
118	HA114 0-0.1			X	X	
119	HA114 0.3-0.4					HOLD
120	HA115 0-0.1			X	X	

Relinquished by (company):	
Print Name:	Kate Woods
Date & Time:	12pm 2/7/14
Signature:	K Woods

Received by (company):	ELS
Print Name:	LSB
Date & Time:	4/7/14 12.00
Signature:	

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier
Page No:

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CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client: ENVIRON	Client Project Name and Number: AS130383	**Envirolab Services**
Project Mgr: Kirsty Greenfield		12 Ashley St, Chatswood, NSW, 2067
Sampler: Kate Woods	PO No.:	
Address: Level 2, Suite 19B, 50 Glebe Rd, The Junction	Envirolab Services Quote No. :	Phone: 02 9910 6200
	Date results required:	Fax: 02 9910 6201
Email: kgreenfield@environcorp.com	Or choose: standard / 1 day / 2 day / 3 day	E-mail: ahie@envirolabservices.com.au
Phone: (02) 49625444 Fax:	*Note: Inform lab in advance if urgent turnaround is required - surcharge applies*	Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	Soluble fluoride	PAH's	Comments (Provide as much information about the sample as you can)
121	HA115 0.2-0.3					HOLD
122	HA116 0-0.1			X	X	
123	HA116 0.2-0.25					HOLD
124	HA116 0.3-0.4					HOLD
125	HA117 0-0.1			X	X	
126	HA117 0.25-0.35					HOLD
127	HA117 0.3-0.4					HOLD
128	HA119 0-0.1			X	X	
129	QA49			X	X	
130	HA119 0.3-0.4			X	X	
131	HA120 0-0.1			X	X	
132	HA120 0.3-0.4					HOLD
133	HA121 0-0.1			X	X	
134	HA121 0.2-0.3					HOLD
135	HA122 0-0.1			X	X	

Relinquished by (company):	Received by (company): ELS	Samples Received: Cool or Ambient (circle one)
Print Name: Kate Woods	Print Name: LSB	Temperature Recieved at: (if applicable)
Date & Time: 12pm 2/7/14	Date & Time: 4/7/14 12.00	Transported by: Hand delivered / courier
Signature: K Woods	Signature: [signature]	Page No:

112590

CHAIN OF COUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client: ENVIRON	**Client Project Name and Number:** AS130383
Project Mgr: Kirsty Greenfield	**PO No.:**
Sampler: Kate Woods	**Envirolab Services Quote No. :**
Address: Level 2, Suite 19B, 50 Glebe Rd, The Junction	**Date results required:**
Email: kgreenfield@environcorp.com	**Or choose:** standard / 1 day / 2 day / 3 day
Phone: (02) 49625444 **Fax:**	*Note: Inform lab in advance if urgent turnaround is required - surcharge applies*

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067

Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au

Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	8 metals	TPH	BTEX	PAHs	Soluble fluoride	Comments: Provide as much information about the sample as you can
136	HA122 0.3-0.4						X	X	
137	QA5a						X	X	
138	HA123 Surface							X	
139	HA123 0.1							X	
140	HA123 0.2							X	
141	HA124 Surface							X	
142	HA124 0.1							X	
143	HA124 0.15								HOLD
144	HA124 0.2								HOLD
145	HA125 Surface							X	
146	HA125 0.1							X	
147	HA125 0.15							X	
148	HA125 0.2								HOLD
149	TP104 0.5								HOLD
150	TP104 0.7-0.9								HOLD

Relinquished by (company):	Received by (company): ELS
Print Name: Kate Woods	Print Name: LSB
Date & Time: 12pm 2/7/14	Date & Time: 4/7/14 12.00
Signature: KWoods	Signature: [signature]

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier
Page No:

112590

CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Client: ENVIRON	**Client Project Name and Number:** AS130383
Project Mgr: Kirsty Greenfield	**PO No.:**
Sampler: Kate Woods	**Envirolab Services Quote No. :**
Address: Level 2, Suite 19B, 50 Glebe Rd The Junction	**Date results required:**
Email: kgreenfield@environcorp.com	**Or choose:** standard / 1 day / 2 day / 3 day
Phone: (02) 49625444 **Fax:**	*Note: Inform lab in advance if urgent turnaround is required - surcharge applies*

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067

Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au

Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	8 metals	TPH	BTEX	PAH	Fluoride										Comments: Provide as much information about the sample as you can
151	TP111-0.5																	
152	TP116-0.5-0.7			X	X	X	X	X										HOLD

Relinquished by (company):	Received by (company): ELS	
Print Name: Kate Woods	**Print Name:** LSB	**Samples Received:** Cool or Ambient (circle one)
Date & Time: 12pm 2/7/14	**Date & Time:** 4/7/14 12.00	**Temperature Recieved at:** (if applicable)
Signature: KWoods	**Signature:**	**Transported by:** Hand delivered / courier
		Page No:

112590

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

CERTIFICATE OF ANALYSIS 112590

Client:
Environ (Newcastle)
Suite 19B, Level 2
50 Glebe Rd
The Junction
NSW 2291

Attention: Kate Woods, Kirsty Greenfield

Sample log in details:

Your Reference:	**AS 130383**	
No. of samples:	152 Soils	
Date samples received / completed instructions received	4/7/2014	/ 4/7/2014

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:	11/07/14	/ 11/07/14
Date of Preliminary Report:	Not Issued	

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

Results Approved By:

Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	112590-1	112590-4	112590-7	112590-11	112590-13
Your Reference	-------------	TP101	TP104	TP107	TP111	TP113
Depth	------------	-	0-0.2	-	0-0.3	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	86	100	100	96	98

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	112590-15	112590-16	112590-17	112590-18	112590-19
Your Reference	-------------	TP115	TP116	TP117	QA1	TP118
Depth	------------	-	0.1-0.3	-	-	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	106	88	108	100	91

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	112590-20	112590-21	112590-23	112590-24	112590-25
Your Reference	-------------	TP119	TP120	TP122	TP123	TP124
Depth	------------	-	-	-	-	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	96	96	97	96	95

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	112590-26	112590-27	112590-28	112590-30	112590-31
Your Reference	-------------	TP125	TP126	TP127	TP128	TP128
Depth	------------	-	-	-	0.1	0.2
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	97	94	94	97	96

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	112590-33	112590-35	112590-36	112590-37	112590-38
Your Reference	-------------	TP129	QA1a	TP130	TP130	TP131
Depth	------------	0-0.3	-	0-0.3	0.6-0.7	0.1-0.3
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	94	94	99	95	98

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	112590-41	112590-43	112590-46	112590-49	112590-52
Your Reference	-------------	TP132	TP132	TP133	TP134	TP135
Depth	------------	0.1	0.4	0.1-0.2	0.2	0.1
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	96	96	100	97	96

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	112590-55	112590-56	112590-59	112590-61	112590-63
Your Reference	-------------	TP135	TP136	QA2a	TP137	TP137
Depth	------------	0.4	0.1	-	0.1	0.4
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	92	92	90	94	93

vTRH(C6-C10)/BTEXN in Soil					
Our Reference:	UNITS	112590-66	112590-70	112590-74	112590-152
Your Reference	-------------	TP138	TP139	TP140	TP116
Depth	------------	0.2	0.1	0.1	0.5-0.7
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	95	93	92	91

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	112590-1	112590-4	112590-7	112590-11	112590-13
Your Reference	------------	TP101	TP104	TP107	TP111	TP113
Depth	------------	-	0-0.2	-	0-0.3	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
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
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
Surrogate o-Terphenyl	%	96	96	96	96	96

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	112590-15	112590-16	112590-17	112590-18	112590-19
Your Reference	------------	TP115	TP116	TP117	QA1	TP118
Depth	------------	-	0.1-0.3	-	-	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
TRHC $_{10}$ - C $_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC $_{15}$ - C $_{28}$	mg/kg	<100	<100	3,200	<100	<100
TRHC $_{29}$ - C $_{36}$	mg/kg	<100	<100	2,200	<100	<100
TRH>C $_{10}$-C $_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C $_{16}$-C $_{34}$	mg/kg	<100	<100	5,100	<100	<100
TRH>C $_{34}$-C $_{40}$	mg/kg	<100	<100	1,000	<100	<100
Surrogate o-Terphenyl	%	92	92	107	97	92

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	112590-20	112590-21	112590-23	112590-24	112590-25
Your Reference	------------	TP119	TP120	TP122	TP123	TP124
Depth	------------	-	-	-	-	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
TRHC $_{10}$ - C $_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC $_{15}$ - C $_{28}$	mg/kg	<100	<100	<100	120	<100
TRHC $_{29}$ - C $_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C $_{10}$-C $_{16}$	mg/kg	<50	<50	<50	61	<50
TRH>C $_{10}$ - C $_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	61	<50
TRH>C $_{16}$-C $_{34}$	mg/kg	<100	<100	<100	150	<100
TRH>C $_{34}$-C $_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	95	96	93	96	88

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	112590-26	112590-27	112590-28	112590-30	112590-31
Your Reference	------------	TP125	TP126	TP127	TP128	TP128
Depth	------------	-	-	-	0.1	0.2
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	08/07/2014	08/07/2014	08/07/2014
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
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
Surrogate o-Terphenyl	%	92	95	91	89	95

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	112590-33	112590-35	112590-36	112590-37	112590-38
Your Reference	------------	TP129	QA1a	TP130	TP130	TP131
Depth	------------	0-0.3	-	0-0.3	0.6-0.7	0.1-0.3
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
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
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
Surrogate o-Terphenyl	%	93	111	92	94	92

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	112590-41	112590-43	112590-46	112590-49	112590-52
Your Reference	------------	TP132	TP132	TP133	TP134	TP135
Depth	------------	0.1	0.4	0.1-0.2	0.2	0.1
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
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
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	120	<100	<100
Surrogate o-Terphenyl	%	90	92	93	93	91

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	112590-55	112590-56	112590-59	112590-61	112590-63
Your Reference	------------	TP135	TP136	QA2a	TP137	TP137
Depth	------------	0.4	0.1	-	0.1	0.4
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
TRHC_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRHC_{15} - C_{28}	mg/kg	<100	<100	<100	540	<100
TRHC_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH>C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH>C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C_{16}-C_{34}	mg/kg	<100	<100	<100	590	<100
TRH>C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	93	97	109	#	92

svTRH (C10-C40) in Soil					
Our Reference:	UNITS	112590-66	112590-70	112590-74	112590-152
Your Reference	------------	TP138	TP139	TP140	TP116
Depth	------------	0.2	0.1	0.1	0.5-0.7
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	08/07/2014
TRHC_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRHC_{15} - C_{28}	mg/kg	<100	<100	<100	<100
TRHC_{29} - C_{36}	mg/kg	<100	<100	<100	<100
TRH>C_{10}-C_{16}	mg/kg	<50	<50	<50	<50
TRH>C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH>C_{16}-C_{34}	mg/kg	<100	<100	<100	<100
TRH>C_{34}-C_{40}	mg/kg	<100	<100	<100	<100
Surrogate o-Terphenyl	%	92	96	92	91

PAHs in Soil						
Our Reference:	UNITS	112590-1	112590-4	112590-7	112590-11	112590-13
Your Reference	-------------	TP101	TP104	TP107	TP111	TP113
Depth	------------	-	0-0.2	-	0-0.3	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.07	0.12	<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
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	0.35	0.69	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	101	102	102	104	103

PAHs in Soil						
Our Reference:	UNITS	112590-15	112590-16	112590-17	112590-18	112590-19
Your Reference	-------------	TP115	TP116	TP117	QA1	TP118
Depth	------------	-	0.1-0.3	-	-	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Naphthalene	mg/kg	<0.1	<0.1	1.6	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	7.6	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	2.5	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	130	<0.1	0.2
Anthracene	mg/kg	<0.1	<0.1	33	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	390	<0.1	0.5
Pyrene	mg/kg	<0.1	<0.1	380	<0.1	0.4
Benzo(a)anthracene	mg/kg	<0.1	<0.1	180	<0.1	0.2
Chrysene	mg/kg	<0.1	<0.1	170	<0.1	0.2
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	320	<0.2	0.4
Benzo(a)pyrene	mg/kg	<0.05	<0.05	220	<0.05	0.23
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	120	<0.1	0.2
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	26	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	120	<0.1	0.2
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	310	<0.5	<0.5
Total +ve PAH's	mg/kg	NIL (+)VE	NIL (+)VE	2,100	NIL (+)VE	2.5
Surrogate p-Terphenyl-d14	%	96	98	110	110	100

PAHs in Soil Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-20 TP119 - Soil	112590-21 TP120 - Soil	112590-23 TP122 - Soil	112590-24 TP123 - Soil	112590-25 TP124 - Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
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	0.2	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.5	0.2	0.5	0.7	0.1
Pyrene	mg/kg	0.5	0.2	0.5	0.7	<0.1
Benzo(a)anthracene	mg/kg	0.4	0.1	0.3	0.4	<0.1
Chrysene	mg/kg	0.4	0.1	0.4	0.4	<0.1
Benzo(b+k)fluoranthene	mg/kg	1.2	0.2	0.8	1	<0.2
Benzo(a)pyrene	mg/kg	0.58	0.13	0.47	0.56	0.06
Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	0.1	0.4	0.5	<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	0.4	0.1	0.4	0.4	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	1.0	<0.5	1.0	1.0	<0.5
Total +ve PAH's	mg/kg	4.8	1.0	4.0	4.8	0.18
Surrogate p-Terphenyl-d14	%	102	104	100	99	96

PAHs in Soil						
Our Reference:	UNITS	112590-26	112590-27	112590-28	112590-30	112590-31
Your Reference	-------------	TP125	TP126	TP127	TP128	TP128
Depth	------------	-	-	-	0.1	0.2
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	7/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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	0.2	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.4	0.4	0.6	<0.1	<0.1
Pyrene	mg/kg	0.4	0.4	0.5	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.3	0.2	0.2	<0.1	<0.1
Chrysene	mg/kg	0.3	0.2	0.2	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	0.8	0.4	0.3	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.41	0.21	0.17	0.08	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.4	0.2	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	0.3	0.1	0.1	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	1.0	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	3.5	2.3	2.2	0.080	NIL (+)VE
Surrogate p-Terphenyl-d14	%	100	103	99	97	104

PAHs in Soil						
Our Reference:	UNITS	112590-33	112590-35	112590-36	112590-37	112590-38
Your Reference	-------------	TP129	QA1a	TP130	TP130	TP131
Depth	------------	0-0.3	-	0-0.3	0.6-0.7	0.1-0.3
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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	0.4	0.2	0.3	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	1	0.5	1.0	<0.1	0.2
Pyrene	mg/kg	0.9	0.4	1	<0.1	0.1
Benzo(a)anthracene	mg/kg	0.5	0.2	0.4	<0.1	<0.1
Chrysene	mg/kg	0.5	0.2	0.6	<0.1	0.1
Benzo(b+k)fluoranthene	mg/kg	1.1	0.5	1.0	<0.2	0.2
Benzo(a)pyrene	mg/kg	0.64	0.23	0.56	<0.05	0.11
Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	0.2	0.4	<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	0.5	0.2	0.4	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	1.0	<0.5	1.0	<0.5	<0.5
Total +ve PAH's	mg/kg	6.2	2.6	5.7	NIL (+)VE	0.76
Surrogate p-Terphenyl-d14	%	100	97	100	100	99

PAHs in Soil Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-41 TP132 0.1 Soil	112590-43 TP132 0.4 Soil	112590-46 TP133 0.1-0.2 Soil	112590-49 TP134 0.2 Soil	112590-52 TP135 0.1 Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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+k)fluoranthene	mg/kg	<0.2	<0.2	0.3	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.06	<0.05	0.11	<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
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	0.060	0.13	0.84	NIL (+)VE	0.05
Surrogate p-Terphenyl-d14	%	97	101	101	101	99

PAHs in Soil Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-55 TP135 0.4 Soil	112590-56 TP136 0.1 Soil	112590-59 QA2a - Soil	112590-61 TP137 0.1 Soil	112590-63 TP137 0.4 Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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+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	0.08	<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
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	NIL (+)VE	NIL (+)VE	NIL (+)VE	0.18	NIL (+)VE
Surrogate p-Terphenyl-d14	%	104	107	120	111	101

PAHs in Soil Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-66 TP138 0.2 Soil	112590-70 TP139 0.1 Soil	112590-74 TP140 0.1 Soil	112590-98 HA106 0.1 Soil	112590-102 HA107 0.1 Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
Naphthalene	mg/kg	<0.1	0.4	<0.1	<0.1	1.0
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.6
Acenaphthene	mg/kg	<0.1	0.6	<0.1	0.6	4.3
Fluorene	mg/kg	<0.1	0.6	<0.1	0.3	2.6
Phenanthrene	mg/kg	<0.1	2.3	<0.1	5.5	24
Anthracene	mg/kg	<0.1	0.3	<0.1	1.2	5.7
Fluoranthene	mg/kg	<0.1	3.8	<0.1	19	76
Pyrene	mg/kg	<0.1	3.4	<0.1	19	72
Benzo(a)anthracene	mg/kg	<0.1	2.4	<0.1	18	70
Chrysene	mg/kg	<0.1	2.7	<0.1	19	70
Benzo(b+k)fluoranthene	mg/kg	<0.2	5.6	<0.2	46	170
Benzo(a)pyrene	mg/kg	<0.05	2.9	<0.05	25	98
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	2.1	<0.1	19	63
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.3	<0.1	2.7	15
Benzo(g,h,i)perylene	mg/kg	<0.1	1.9	<0.1	18	59
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	4.0	<0.5	36	140
Total +ve PAH's	mg/kg	NIL (+)VE	29	NIL (+)VE	190	730
Surrogate p-Terphenyl-d14	%	101	116	105	105	103

PAHs in Soil Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-105 HA108 0-0.1 Soil	112590-107 HA109 0-0.1 Soil	112590-108 HA109 0.3-0.4 Soil	112590-109 HA110 0-0.1 Soil	112590-110 HA110 0.3-0.4 Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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	0.4	0.4	0.2	1.5	0.1
Fluorene	mg/kg	0.2	0.2	<0.1	1.0	<0.1
Phenanthrene	mg/kg	3.5	3.4	1.5	15	1.8
Anthracene	mg/kg	0.8	0.9	0.4	3.8	0.5
Fluoranthene	mg/kg	12	11	4.5	43	7.8
Pyrene	mg/kg	12	10	4.5	40	7.8
Benzo(a)anthracene	mg/kg	9.0	10	2.6	40	5.5
Chrysene	mg/kg	9.3	10	2.5	41	5.5
Benzo(b+k)fluoranthene	mg/kg	22	25	5.6	96	13
Benzo(a)pyrene	mg/kg	13	14	3.7	55	8.1
Indeno(1,2,3-c,d)pyrene	mg/kg	9.1	10	2.4	41	5.8
Dibenzo(a,h)anthracene	mg/kg	0.9	1.7	0.3	9.4	0.7
Benzo(g,h,i)perylene	mg/kg	8.9	9.7	2.3	37	5.5
Benzo(a)pyrene TEQ NEPM B1	mg/kg	18	21	5.0	82	11
Total +ve PAH's	mg/kg	100	110	30	420	63
Surrogate p-Terphenyl-d14	%	100	108	102	105	101

PAHs in Soil Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-111 HA111 0-0.1 Soil	112590-112 QA3a - Soil	112590-113 HA111 0.3-0.4 Soil	112590-114 HA112 0-0.1 Soil	112590-116 HA113 0-0.1 Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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	1.2	0.2	1.1	0.2	<0.1
Fluorene	mg/kg	0.8	0.1	0.4	0.1	<0.1
Phenanthrene	mg/kg	12	3.1	12	2.4	2.7
Anthracene	mg/kg	3.1	0.8	3.7	0.6	0.7
Fluoranthene	mg/kg	37	14	46	9.3	15
Pyrene	mg/kg	35	14	46	9.0	14
Benzo(a)anthracene	mg/kg	36	8.3	34	9.3	9.5
Chrysene	mg/kg	37	8.2	34	9.8	12
Benzo(b+k)fluoranthene	mg/kg	86	20	76	25	28
Benzo(a)pyrene	mg/kg	50	13	47	14	8.6
Indeno(1,2,3-c,d)pyrene	mg/kg	38	10	36	10	7.4
Dibenzo(a,h)anthracene	mg/kg	8.4	1.0	4.4	1.4	1.4
Benzo(g,h,i)perylene	mg/kg	33	9.4	32	9.2	7.5
Benzo(a)pyrene TEQ NEPM B1	mg/kg	75	18	67	20	15
Total +ve PAH's	mg/kg	380	100	370	100	110
Surrogate p-Terphenyl-d14	%	99	106	100	101	102

PAHs in Soil						
Our Reference:	UNITS	112590-117	112590-118	112590-120	112590-122	112590-125
Your Reference	-------------	HA113	HA114	HA115	HA116	HA117
Depth	------------	0.3-0.4	0-0.1	0-0.1	0-0.1	0-0.1
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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	0.9	0.4	16	4.2	4.0
Anthracene	mg/kg	0.3	<0.1	3.5	0.8	1.3
Fluoranthene	mg/kg	3.2	3.1	210	41	38
Pyrene	mg/kg	3.1	3.0	240	41	38
Benzo(a)anthracene	mg/kg	1.5	4.4	300	57	52
Chrysene	mg/kg	1.6	8.1	490	110	110
Benzo(b+k)fluoranthene	mg/kg	3.6	18	990	240	300
Benzo(a)pyrene	mg/kg	1.9	3.7	230	42	47
Indeno(1,2,3-c,d)pyrene	mg/kg	1.3	3.1	190	48	76
Dibenzo(a,h)anthracene	mg/kg	0.2	0.8	60	12	25
Benzo(g,h,i)perylene	mg/kg	1.2	3.3	190	53	81
Benzo(a)pyrene TEQ NEPM B1	mg/kg	3.0	7.0	440	90	120
Total +ve PAH's	mg/kg	19	47	2,900	640	770
Surrogate p-Terphenyl-d14	%	98	99	120	120	104

PAHs in Soil Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-128 HA119 0-0.1 Soil	112590-129 QA4a - Soil	112590-130 HA119 0.3-0.4 Soil	112590-131 HA120 0-0.1 Soil	112590-133 HA121 0-0.1 Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014	8/07/2014
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	0.9	<0.1	0.1	<0.1	<0.1
Fluorene	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	5.6	0.9	1.5	1.4	0.1
Anthracene	mg/kg	1.0	0.2	0.4	0.4	<0.1
Fluoranthene	mg/kg	17	3.4	5.8	12	1.2
Pyrene	mg/kg	16	3.4	5.6	11	1.2
Benzo(a)anthracene	mg/kg	16	2.3	3.2	14	1.5
Chrysene	mg/kg	21	2.9	3.3	26	2.8
Benzo(b+k)fluoranthene	mg/kg	53	7.0	7.4	69	7.4
Benzo(a)pyrene	mg/kg	19	2.8	4.3	12	1.4
Indeno(1,2,3-c,d)pyrene	mg/kg	17	2.4	3.1	20	2.2
Dibenzo(a,h)anthracene	mg/kg	3.0	0.3	0.3	4.9	0.5
Benzo(g,h,i)perylene	mg/kg	16	2.3	2.9	21	2.4
Benzo(a)pyrene TEQ NEPM B1	mg/kg	31	4.0	6.0	28	3.0
Total +ve PAH's	mg/kg	190	28	38	190	21
Surrogate p-Terphenyl-d14	%	102	102	102	102	102

PAHs in Soil					
Our Reference:	UNITS	112590-135	112590-136	112590-137	112590-152
Your Reference	-------------	HA122	HA122	QA5a	TP116
Depth	------------	0-0.1	0.3-0.4	-	0.5-0.7
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	7/07/2014	7/07/2014	7/07/2014	7/07/2014
Date analysed	-	8/07/2014	8/07/2014	8/07/2014	8/07/2014
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.4	0.7	0.9	<0.1
Anthracene	mg/kg	<0.1	0.2	0.2	<0.1
Fluoranthene	mg/kg	2.4	2.6	3.5	<0.1
Pyrene	mg/kg	2.3	2.5	3.4	<0.1
Benzo(a)anthracene	mg/kg	2.4	1.4	2.0	<0.1
Chrysene	mg/kg	4.2	1.7	2.4	<0.1
Benzo(b+k)fluoranthene	mg/kg	8.8	3.8	5.3	<0.2
Benzo(a)pyrene	mg/kg	2.2	1.7	2.6	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	2.1	1.2	1.8	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.4	0.2	0.2	<0.1
Benzo(g,h,i)perylene	mg/kg	2.1	1.3	1.8	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	4.0	3.0	4.0	<0.5
Total +ve PAH's	mg/kg	27	17	24	NIL (+)VE
Surrogate p-Terphenyl-d14	%	95	77	103	100

Acid Extractable metals in soil						
Our Reference:	UNITS	112590-1	112590-4	112590-7	112590-11	112590-13
Your Reference	-------------	TP101	TP104	TP107	TP111	TP113
Depth	------------	-	0-0.2	-	0-0.3	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	3	12	<1	23	17
Copper	mg/kg	2	2	<1	2	<1
Lead	mg/kg	5	10	1	12	24
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	8	5	1	6	3
Zinc	mg/kg	32	36	3	35	5

Acid Extractable metals in soil						
Our Reference:	UNITS	112590-15	112590-16	112590-17	112590-18	112590-19
Your Reference	-------------	TP115	TP116	TP117	QA1	TP118
Depth	------------	-	0.1-0.3	-	-	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Arsenic	mg/kg	<4	63	<4	<4	<4
Cadmium	mg/kg	<0.4	0.5	<0.4	<0.4	<0.4
Chromium	mg/kg	11	12	11	12	5
Copper	mg/kg	<1	590	17	<1	4
Lead	mg/kg	4	1,600	23	5	7
Mercury	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Nickel	mg/kg	1	5	18	1	6
Zinc	mg/kg	2	5,600	51	2	41

Acid Extractable metals in soil						
Our Reference:	UNITS	112590-20	112590-21	112590-23	112590-24	112590-25
Your Reference	-------------	TP119	TP120	TP122	TP123	TP124
Depth	------------	-	-	-	-	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	3	3	5	7	7
Copper	mg/kg	3	2	1	2	3
Lead	mg/kg	8	18	6	9	7
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	4	4	3	7	5
Zinc	mg/kg	20	22	14	26	12

Acid Extractable metals in soil						
Our Reference:	UNITS	112590-26	112590-27	112590-28	112590-30	112590-31
Your Reference	-------------	TP125	TP126	TP127	TP128	TP128
Depth	------------	-	-	-	0.1	0.2
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Arsenic	mg/kg	<4	<4	<4	30	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	5	6	17	8
Copper	mg/kg	2	5	3	94	12
Lead	mg/kg	8	6	6	120	8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	4	4	18	14
Zinc	mg/kg	57	23	13	510	48

Acid Extractable metals in soil						
Our Reference:	UNITS	112590-33	112590-35	112590-36	112590-37	112590-38
Your Reference	-------------	TP129	QA1a	TP130	TP130	TP131
Depth	------------	0-0.3	-	0-0.3	0.6-0.7	0.1-0.3
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Arsenic	mg/kg	6	20	<4	<4	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	4.3
Chromium	mg/kg	15	15	9	29	29
Copper	mg/kg	8	11	12	1	48
Lead	mg/kg	9	9	11	8	23
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	47	65	54	8	130
Zinc	mg/kg	47	50	86	15	240

Acid Extractable metals in soil						
Our Reference:	UNITS	112590-41	112590-43	112590-46	112590-49	112590-52
Your Reference	-------------	TP132	TP132	TP133	TP134	TP135
Depth	------------	0.1	0.4	0.1-0.2	0.2	0.1
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Arsenic	mg/kg	20	<4	8	7	9
Cadmium	mg/kg	<0.4	<0.4	<0.4	0.4	0.6
Chromium	mg/kg	33	15	11	10	19
Copper	mg/kg	44	2	22	28	140
Lead	mg/kg	13	10	21	47	38
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	27	3	16	21	17
Zinc	mg/kg	130	8	140	220	210

Acid Extractable metals in soil Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-55 TP135 0.4 Soil	112590-56 TP136 0.1 Soil	112590-59 QA2a - Soil	112590-61 TP137 0.1 Soil	112590-63 TP137 0.4 Soil
Date digested	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Arsenic	mg/kg	6	6	10	<4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	13	6	8	20	18
Copper	mg/kg	12	10	13	24	<1
Lead	mg/kg	16	7	8	29	17
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	10	13	12	4
Zinc	mg/kg	47	42	41	76	22

Acid Extractable metals in soil Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-66 TP138 0.2 Soil	112590-70 TP139 0.1 Soil	112590-74 TP140 0.1 Soil	112590-152 TP116 0.5-0.7 Soil	112590-153 TP135 - TRIPLICATE 0.4 Soil
Date digested	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Arsenic	mg/kg	<4	4	<4	100	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	0.5	<0.4
Chromium	mg/kg	7	17	7	20	13
Copper	mg/kg	<1	26	1	580	12
Lead	mg/kg	8	33	13	1,800	23
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	15	5	6	7
Zinc	mg/kg	41	280	7	6,000	81

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-1	112590-4	112590-7	112590-11	112590-13
Your Reference	-------------	TP101	TP104	TP107	TP111	TP113
Depth	------------	-	0-0.2	-	0-0.3	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	45	16	19	22	<0.5

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-15	112590-16	112590-17	112590-18	112590-19
Your Reference	-------------	TP115	TP116	TP117	QA1	TP118
Depth	------------	-	0.1-0.3	-	-	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	2.1	31	340	1.6	22

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-20	112590-21	112590-23	112590-24	112590-25
Your Reference	-------------	TP119	TP120	TP122	TP123	TP124
Depth	------------	-	-	-	-	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	28	17	26	23	17

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-26	112590-27	112590-28	112590-30	112590-31
Your Reference	-------------	TP125	TP126	TP127	TP128	TP128
Depth	------------	-	-	-	0.1	0.2
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	27	15	19	220	800

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-33	112590-35	112590-36	112590-37	112590-38
Your Reference	-------------	TP129	QA1a	TP130	TP130	TP131
Depth	------------	0-0.3	-	0-0.3	0.6-0.7	0.1-0.3
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	200	1,098	1,463	120	87

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-41	112590-43	112590-46	112590-49	112590-52
Your Reference	-------------	TP132	TP132	TP133	TP134	TP135
Depth	------------	0.1	0.4	0.1-0.2	0.2	0.1
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	58	0.9	1.1	110	110

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-55	112590-56	112590-59	112590-61	112590-63
Your Reference	-------------	TP135	TP136	QA2a	TP137	TP137
Depth	------------	0.4	0.1	-	0.1	0.4
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	4.6	13	6.0	2.2	7.0

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-66	112590-70	112590-74	112590-77	112590-78
Your Reference	-------------	TP138	TP139	TP140	HA101	HA101
Depth	------------	0.2	0.1	0.1	Surface	0.1
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	5.5	79	50	28	180

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-80	112590-81	112590-82	112590-83	112590-85
Your Reference	-------------	HA101	HA102	HA102	HA102	HA103
Depth	------------	0.2	Surface	0.1	0.15	Surface
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	62	53	78	120	140

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-86	112590-89	112590-90	112590-93	112590-94
Your Reference	-------------	HA103	HA104	HA104	HA105	HA105
Depth	------------	0.1	Surface	0.1	Surface	0.1
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	180	90	82	100	120

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-96	112590-116	112590-117	112590-118	112590-120
Your Reference	-------------	HA105	HA113	HA113	HA114	HA115
Depth	------------	0.2	0-0.1	0.3-0.4	0-0.1	0-0.1
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	67	40	130	29	7.9

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-122	112590-125	112590-128	112590-129	112590-130
Your Reference	-------------	HA116	HA117	HA119	QA4a	HA119
Depth	------------	0-0.1	0-0.1	0-0.1	-	0.3-0.4
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	28	13	76	130	130

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-131	112590-133	112590-135	112590-136	112590-137
Your Reference	-------------	HA120	HA121	HA122	HA122	QA5a
Depth	------------	0-0.1	0-0.1	0-0.1	0.3-0.4	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	13	17	39	68	74

Miscellaneous Inorg - soil						
Our Reference:	UNITS	112590-138	112590-139	112590-140	112590-141	112590-142
Your Reference	-------------	HA123	HA123	HA123	HA124	HA124
Depth	------------	Surface	0.1	0.2	Surface	0.1
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	29	62	81	170	110

Miscellaneous Inorg - soil					
Our Reference:	UNITS	112590-145	112590-146	112590-147	112590-152
Your Reference	-------------	HA125	HA125	HA125	TP116
Depth	------------	Surface	0.1	0.15	0.5-0.7
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	37	41	75	37

Moisture						
Our Reference:	UNITS	112590-1	112590-4	112590-7	112590-11	112590-13
Your Reference	-------------	TP101	TP104	TP107	TP111	TP113
Depth	------------	-	0-0.2	-	0-0.3	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	12	11	11	13	17

Moisture						
Our Reference:	UNITS	112590-15	112590-16	112590-17	112590-18	112590-19
Your Reference	-------------	TP115	TP116	TP117	QA1	TP118
Depth	------------	-	0.1-0.3	-	-	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	16	19	17	16	12

Moisture						
Our Reference:	UNITS	112590-20	112590-21	112590-23	112590-24	112590-25
Your Reference	-------------	TP119	TP120	TP122	TP123	TP124
Depth	------------	-	-	-	-	-
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	10	9.6	12	15	11

Moisture						
Our Reference:	UNITS	112590-26	112590-27	112590-28	112590-30	112590-31
Your Reference	-------------	TP125	TP126	TP127	TP128	TP128
Depth	------------	-	-	-	0.1	0.2
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	12	6.4	11	8.4	2.6

Moisture						
Our Reference:	UNITS	112590-33	112590-35	112590-36	112590-37	112590-38
Your Reference	-------------	TP129	QA1a	TP130	TP130	TP131
Depth	------------	0-0.3	-	0-0.3	0.6-0.7	0.1-0.3
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	12	11	4.3	15	5.9

Moisture Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-41 TP132 0.1 Soil	112590-43 TP132 0.4 Soil	112590-46 TP133 0.1-0.2 Soil	112590-49 TP134 0.2 Soil	112590-52 TP135 0.1 Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	5.1	15	6.6	3.7	7.0

Moisture Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-55 TP135 0.4 Soil	112590-56 TP136 0.1 Soil	112590-59 QA2a - Soil	112590-61 TP137 0.1 Soil	112590-63 TP137 0.4 Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	20	4.4	5.7	3.6	22

Moisture Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-66 TP138 0.2 Soil	112590-70 TP139 0.1 Soil	112590-74 TP140 0.1 Soil	112590-98 HA106 0.1 Soil	112590-102 HA107 0.1 Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	8.4	17	10	12	22

Moisture Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-105 HA108 0-0.1 Soil	112590-107 HA109 0-0.1 Soil	112590-108 HA109 0.3-0.4 Soil	112590-109 HA110 0-0.1 Soil	112590-110 HA110 0.3-0.4 Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	18	23	15	24	29

Moisture Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-111 HA111 0-0.1 Soil	112590-112 QA3a - Soil	112590-113 HA111 0.3-0.4 Soil	112590-114 HA112 0-0.1 Soil	112590-116 HA113 0-0.1 Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	25	21	15	15	8.9

Moisture Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-117 HA113 0.3-0.4 Soil	112590-118 HA114 0-0.1 Soil	112590-120 HA115 0-0.1 Soil	112590-122 HA116 0-0.1 Soil	112590-125 HA117 0-0.1 Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	12	7.9	10	12	19

Moisture Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-128 HA119 0-0.1 Soil	112590-129 QA4a - Soil	112590-130 HA119 0.3-0.4 Soil	112590-131 HA120 0-0.1 Soil	112590-133 HA121 0-0.1 Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	13	10	8.6	16	12

Moisture Our Reference: Your Reference Depth Type of sample	UNITS ------------- ------------	112590-135 HA122 0-0.1 Soil	112590-136 HA122 0.3-0.4 Soil	112590-137 QA5a - Soil	112590-152 TP116 0.5-0.7 Soil
Date prepared	-	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Date analysed	-	08/07/2014	08/07/2014	08/07/2014	08/07/2014
Moisture	%	7.9	11	12	19

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.
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.
Org-012 subset	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.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-026	Fluoride determined by ion selective electrode (ISE) in accordance with APHA 22nd ED, 4500-F-C.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/07/2014	112590-1	07/07/2014 || 07/07/2014	LCS-8	07/07/2014
Date analysed	-			08/07/2014	112590-1	08/07/2014 || 08/07/2014	LCS-8	08/07/2014
TRHC_6 - C_9	mg/kg	25	Org-016	<25	112590-1	<25 || <25	LCS-8	119%
TRHC_6 - C_{10}	mg/kg	25	Org-016	<25	112590-1	<25 || <25	LCS-8	119%
Benzene	mg/kg	0.2	Org-016	<0.2	112590-1	<0.2 || <0.2	LCS-8	116%
Toluene	mg/kg	0.5	Org-016	<0.5	112590-1	<0.5 || <0.5	LCS-8	126%
Ethylbenzene	mg/kg	1	Org-016	<1	112590-1	<1 || <1	LCS-8	118%
m+p-xylene	mg/kg	2	Org-016	<2	112590-1	<2 || <2	LCS-8	116%
o-Xylene	mg/kg	1	Org-016	<1	112590-1	<1 || <1	LCS-8	121%
naphthalene	mg/kg	1	Org-014	<1	112590-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	101	112590-1	86 || 99 || RPD: 14	LCS-8	97%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/07/2014	112590-1	07/07/2014 || 07/07/2014	LCS-8	07/07/2014
Date analysed	-			07/07/2014	112590-1	07/07/2014 || 07/07/2014	LCS-8	07/07/2014
TRHC_{10} - C_{14}	mg/kg	50	Org-003	<50	112590-1	<50 || <50	LCS-8	123%
TRHC_{15} - C_{28}	mg/kg	100	Org-003	<100	112590-1	<100 || <100	LCS-8	117%
TRHC_{29} - C_{36}	mg/kg	100	Org-003	<100	112590-1	<100 || <100	LCS-8	96%
TRH>C_{10}-C_{16}	mg/kg	50	Org-003	<50	112590-1	<50 || <50	LCS-8	123%
TRH>C_{16}-C_{34}	mg/kg	100	Org-003	<100	112590-1	<100 || <100	LCS-8	117%
TRH>C_{34}-C_{40}	mg/kg	100	Org-003	<100	112590-1	<100 || <100	LCS-8	96%
Surrogate o-Terphenyl	%		Org-003	99	112590-1	96 || 96 || RPD: 0	LCS-8	112%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/07/2014	112590-1	7/07/2014 || 7/07/2014	LCS-8	07/07/2014
Date analysed	-			07/07/2014	112590-1	7/07/2014 || 7/07/2014	LCS-8	07/07/2014
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	<0.1 || <0.1	LCS-8	117%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	<0.1 || <0.1	LCS-8	124%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	<0.1 || 0.1	LCS-8	123%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	0.1 || 0.4 || RPD: 120	LCS-8	122%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	0.1 || 0.4 || RPD: 120	LCS-8	124%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	<0.1 || 0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	<0.1 || 0.2	LCS-8	113%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	112590-1	<0.2 || 0.4	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	112590-1	0.07 || 0.21 || RPD: 100	LCS-8	121%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	<0.1 || 0.2	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	112590-1	<0.1 || 0.2	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	97	112590-1	101 || 102 || RPD: 1	LCS-8	103%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			07/07/2014	112590-1	07/07/2014 || 07/07/2014	LCS-1	07/07/2014
Date analysed	-			07/07/2014	112590-1	07/07/2014 || 07/07/2014	LCS-1	07/07/2014
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	112590-1	<4 || <4	LCS-1	90%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	112590-1	<0.4 || <0.4	LCS-1	96%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	112590-1	3 || 3 || RPD: 0	LCS-1	95%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	112590-1	2 || 2 || RPD: 0	LCS-1	95%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	112590-1	5 || 6 || RPD: 18	LCS-1	94%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	112590-1	<0.1 || <0.1	LCS-1	80%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	112590-1	8 || 10 || RPD: 22	LCS-1	95%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	112590-1	32 || 35 || RPD: 9	LCS-1	95%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			07/07/2014	112590-1	07/07/2014 || 07/07/2014	LCS-1	07/07/2014
Date analysed	-			10/07/2014	112590-1	10/07/2014 || 10/07/2014	LCS-1	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	0.5	Inorg-026	<0.5	112590-1	45 || 47 || RPD: 4	LCS-1	99%

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

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112590-20	07/07/2014 || 07/07/2014	LCS-9	07/07/2014
Date analysed	-	112590-20	08/07/2014 || 08/07/2014	LCS-9	09/07/2014
TRHC $_{6}$ - C $_{9}$	mg/kg	112590-20	<25 || <25	LCS-9	126%
TRHC $_{6}$ - C $_{10}$	mg/kg	112590-20	<25 || <25	LCS-9	126%
Benzene	mg/kg	112590-20	<0.2 || <0.2	LCS-9	123%
Toluene	mg/kg	112590-20	<0.5 || <0.5	LCS-9	123%
Ethylbenzene	mg/kg	112590-20	<1 || <1	LCS-9	126%
m+p-xylene	mg/kg	112590-20	<2 || <2	LCS-9	126%
o-Xylene	mg/kg	112590-20	<1 || <1	LCS-9	129%
naphthalene	mg/kg	112590-20	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	112590-20	96 || 97 || RPD: 1	LCS-9	100%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112590-20	07/07/2014 || 07/07/2014	LCS-9	07/07/2014
Date analysed	-	112590-20	07/07/2014 || 07/07/2014	LCS-9	07/07/2014
TRHC $_{10}$ - C $_{14}$	mg/kg	112590-20	<50 || <50	LCS-9	132%
TRHC $_{15}$ - C $_{28}$	mg/kg	112590-20	<100 || <100	LCS-9	131%
TRHC $_{29}$ - C $_{36}$	mg/kg	112590-20	<100 || <100	LCS-9	98%
TRH>C $_{10}$-C $_{16}$	mg/kg	112590-20	<50 || <50	LCS-9	132%
TRH>C $_{16}$-C $_{34}$	mg/kg	112590-20	<100 || <100	LCS-9	131%
TRH>C $_{34}$-C $_{40}$	mg/kg	112590-20	<100 || <100	LCS-9	98%
Surrogate o-Terphenyl	%	112590-20	95 || 93 || RPD: 2	LCS-9	119%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112590-20	7/07/2014 || 7/07/2014	LCS-9	07/07/2014
Date analysed	-	112590-20	7/07/2014 || 7/07/2014	LCS-9	07/07/2014
Naphthalene	mg/kg	112590-20	<0.1 || <0.1	LCS-9	116%
Acenaphthylene	mg/kg	112590-20	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	112590-20	0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	112590-20	<0.1 || <0.1	LCS-9	123%
Phenanthrene	mg/kg	112590-20	0.1 || 0.1 || RPD: 0	LCS-9	123%
Anthracene	mg/kg	112590-20	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	112590-20	0.5 || 0.5 || RPD: 0	LCS-9	122%
Pyrene	mg/kg	112590-20	0.5 || 0.5 || RPD: 0	LCS-9	123%
Benzo(a)anthracene	mg/kg	112590-20	0.4 || 0.3 || RPD: 29	[NR]	[NR]
Chrysene	mg/kg	112590-20	0.4 || 0.4 || RPD: 0	LCS-9	111%
Benzo(b+k)fluoranthene	mg/kg	112590-20	1.2 || 1 || RPD: 18	[NR]	[NR]
Benzo(a)pyrene	mg/kg	112590-20	0.58 || 0.54 || RPD: 7	LCS-9	121%
Indeno(1,2,3-c,d)pyrene	mg/kg	112590-20	0.5 || 0.4 || RPD: 22	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	112590-20	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	112590-20	0.4 || 0.4 || RPD: 0	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	112590-20	102 || 99 || RPD: 3	LCS-9	103%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	112590-20	07/07/2014 || 07/07/2014	LCS-2	07/07/2014
Date analysed	-	112590-20	07/07/2014 || 07/07/2014	LCS-2	07/07/2014
Arsenic	mg/kg	112590-20	<4 || <4	LCS-2	91%
Cadmium	mg/kg	112590-20	<0.4 || <0.4	LCS-2	95%
Chromium	mg/kg	112590-20	3 || 3 || RPD: 0	LCS-2	95%
Copper	mg/kg	112590-20	3 || 3 || RPD: 0	LCS-2	95%
Lead	mg/kg	112590-20	8 || 7 || RPD: 13	LCS-2	94%
Mercury	mg/kg	112590-20	<0.1 || <0.1	LCS-2	85%
Nickel	mg/kg	112590-20	4 || 4 || RPD: 0	LCS-2	93%
Zinc	mg/kg	112590-20	20 || 19 || RPD: 5	LCS-2	94%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112590-20	07/07/2014 || 07/07/2014	LCS-2	07/07/2014
Date analysed	-	112590-20	10/07/2014 || 10/07/2014	LCS-2	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	112590-20	28 || 28 || RPD: 0	LCS-2	102%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112590-33	07/07/2014 || 07/07/2014	112590-4	07/07/2014
Date analysed	-	112590-33	08/07/2014 || 08/07/2014	112590-4	08/07/2014
TRH C_6 - C_9	mg/kg	112590-33	<25 || <25	112590-4	98%
TRH C_6 - C_{10}	mg/kg	112590-33	<25 || <25	112590-4	98%
Benzene	mg/kg	112590-33	<0.2 || <0.2	112590-4	96%
Toluene	mg/kg	112590-33	<0.5 || <0.5	112590-4	105%
Ethylbenzene	mg/kg	112590-33	<1 || <1	112590-4	96%
m+p-xylene	mg/kg	112590-33	<2 || <2	112590-4	95%
o-Xylene	mg/kg	112590-33	<1 || <1	112590-4	98%
naphthalene	mg/kg	112590-33	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	112590-33	94 || 100 || RPD: 6	112590-4	99%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112590-33	07/07/2014 || 07/07/2014	112590-4	07/07/2014
Date analysed	-	112590-33	08/07/2014 || 08/07/2014	112590-4	07/07/2014
TRH C_{10} - C_{14}	mg/kg	112590-33	<50 || <50	112590-4	124%
TRH C_{15} - C_{28}	mg/kg	112590-33	<100 || <100	112590-4	120%
TRH C_{29} - C_{36}	mg/kg	112590-33	<100 || <100	112590-4	117%
TRH >C_{10}-C_{16}	mg/kg	112590-33	<50 || <50	112590-4	124%
TRH >C_{16}-C_{34}	mg/kg	112590-33	<100 || <100	112590-4	120%
TRH >C_{34}-C_{40}	mg/kg	112590-33	<100 || <100	112590-4	117%
Surrogate o-Terphenyl	%	112590-33	93 || 105 || RPD: 12	112590-4	110%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112590-33	7/07/2014 || 7/07/2014	LCS-10	07/07/2014
Date analysed	-	112590-33	8/07/2014 || 8/07/2014	LCS-10	07/07/2014
Naphthalene	mg/kg	112590-33	<0.1 || <0.1	LCS-10	117%
Acenaphthylene	mg/kg	112590-33	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	112590-33	0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	112590-33	<0.1 || <0.1	LCS-10	124%
Phenanthrene	mg/kg	112590-33	0.4 || <0.1	LCS-10	123%
Anthracene	mg/kg	112590-33	0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	112590-33	1 || 0.3 || RPD: 108	LCS-10	123%
Pyrene	mg/kg	112590-33	0.9 || 0.3 || RPD: 100	LCS-10	125%
Benzo(a)anthracene	mg/kg	112590-33	0.5 || 0.2 || RPD: 86	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Chrysene	mg/kg	112590-33	0.5 || 0.2 || RPD: 86	LCS-10	111%
Benzo(b+k)fluoranthene	mg/kg	112590-33	1.1 || 0.4 || RPD: 93	[NR]	[NR]
Benzo(a)pyrene	mg/kg	112590-33	0.64 || 0.19 || RPD: 108	LCS-10	125%
Indeno(1,2,3-c,d)pyrene	mg/kg	112590-33	0.5 || 0.2 || RPD: 86	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	112590-33	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	112590-33	0.5 || 0.2 || RPD: 86	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	112590-33	100 || 100 || RPD: 0	LCS-10	103%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	112590-33	07/07/2014 || 07/07/2014	LCS-3	07/07/2014
Date analysed	-	112590-33	07/07/2014 || 07/07/2014	LCS-3	07/07/2014
Arsenic	mg/kg	112590-33	6 || 6 || RPD: 0	LCS-3	91%
Cadmium	mg/kg	112590-33	<0.4 || <0.4	LCS-3	96%
Chromium	mg/kg	112590-33	15 || 21 || RPD: 33	LCS-3	97%
Copper	mg/kg	112590-33	8 || 9 || RPD: 12	LCS-3	95%
Lead	mg/kg	112590-33	9 || 7 || RPD: 25	LCS-3	95%
Mercury	mg/kg	112590-33	<0.1 || <0.1	LCS-3	87%
Nickel	mg/kg	112590-33	47 || 49 || RPD: 4	LCS-3	95%
Zinc	mg/kg	112590-33	47 || 39 || RPD: 19	LCS-3	96%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112590-35	07/07/2014 || 07/07/2014	LCS-3	07/07/2014
Date analysed	-	112590-35	10/07/2014 || 10/07/2014	LCS-3	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	112590-35	1098 || 1127 || RPD: 3	LCS-3	99%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112590-55	07/07/2014 || 07/07/2014	112590-35	07/07/2014
Date analysed	-	112590-55	08/07/2014 || 08/07/2014	112590-35	09/07/2014
TRH C_6 - C_9	mg/kg	112590-55	<25 || <25	112590-35	98%
TRH C_6 - C_{10}	mg/kg	112590-55	<25 || <25	112590-35	98%
Benzene	mg/kg	112590-55	<0.2 || <0.2	112590-35	96%
Toluene	mg/kg	112590-55	<0.5 || <0.5	112590-35	103%
Ethylbenzene	mg/kg	112590-55	<1 || <1	112590-35	97%
m+p-xylene	mg/kg	112590-55	<2 || <2	112590-35	96%
o-Xylene	mg/kg	112590-55	<1 || <1	112590-35	99%
naphthalene	mg/kg	112590-55	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	112590-55	92 || 92 || RPD: 0	112590-35	93%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112590-55	07/07/2014 || 07/07/2014	112590-35	07/07/2014
Date analysed	-	112590-55	07/07/2014 || 07/07/2014	112590-35	07/07/2014
TRHC $_{10}$ - C $_{14}$	mg/kg	112590-55	<50 || <50	112590-35	98%
TRHC $_{15}$ - C $_{28}$	mg/kg	112590-55	<100 || <100	112590-35	114%
TRHC $_{29}$ - C $_{36}$	mg/kg	112590-55	<100 || <100	112590-35	87%
TRH>C $_{10}$-C $_{16}$	mg/kg	112590-55	<50 || <50	112590-35	98%
TRH>C $_{16}$-C $_{34}$	mg/kg	112590-55	<100 || <100	112590-35	114%
TRH>C $_{34}$-C $_{40}$	mg/kg	112590-55	<100 || <100	112590-35	87%
Surrogate o-Terphenyl	%	112590-55	93 || 91 || RPD: 2	112590-35	108%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112590-55	7/07/2014 || 7/07/2014	LCS-11	07/07/2014
Date analysed	-	112590-55	8/07/2014 || 8/07/2014	LCS-11	07/07/2014
Naphthalene	mg/kg	112590-55	<0.1 || <0.1	LCS-11	115%
Acenaphthylene	mg/kg	112590-55	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	112590-55	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	112590-55	<0.1 || <0.1	LCS-11	114%
Phenanthrene	mg/kg	112590-55	<0.1 || <0.1	LCS-11	120%
Anthracene	mg/kg	112590-55	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	112590-55	<0.1 || <0.1	LCS-11	118%
Pyrene	mg/kg	112590-55	<0.1 || <0.1	LCS-11	118%
Benzo(a)anthracene	mg/kg	112590-55	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	112590-55	<0.1 || <0.1	LCS-11	105%
Benzo(b+k)fluoranthene	mg/kg	112590-55	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	112590-55	<0.05 || <0.05	LCS-11	114%
Indeno(1,2,3-c,d)pyrene	mg/kg	112590-55	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	112590-55	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	112590-55	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	112590-55	104 || 100 || RPD: 4	LCS-11	108%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	112590-55	07/07/2014 || 07/07/2014	112590-4	07/07/2014
Date analysed	-	112590-55	07/07/2014 || 07/07/2014	112590-4	07/07/2014
Arsenic	mg/kg	112590-55	6 || 5 || RPD: 18	112590-4	84%
Cadmium	mg/kg	112590-55	<0.4 || <0.4	112590-4	92%
Chromium	mg/kg	112590-55	13 || 14 || RPD: 7	112590-4	91%
Copper	mg/kg	112590-55	12 || 9 || RPD: 29	112590-4	101%
Lead	mg/kg	112590-55	16 || 31 || RPD: 64	112590-4	90%
Mercury	mg/kg	112590-55	<0.1 || <0.1	112590-4	88%
Nickel	mg/kg	112590-55	6 || 6 || RPD: 0	112590-4	90%
Zinc	mg/kg	112590-55	47 || 120 || RPD: 87	112590-4	83%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112590-59	07/07/2014 || 07/07/2014	112590-4	07/07/2014
Date analysed	-	112590-59	10/07/2014 || 10/07/2014	112590-4	07/07/2014
Fluoride (1:5 soil:water)	mg/kg	112590-59	6.0 || 7.0 || RPD: 15	112590-4	#

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112590-105	7/07/2014 || 7/07/2014	112590-4	07/07/2014
Date analysed	-	112590-105	8/07/2014 || 8/07/2014	112590-4	07/07/2014
Naphthalene	mg/kg	112590-105	<0.1 || <0.1	112590-4	118%
Acenaphthylene	mg/kg	112590-105	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	112590-105	0.4 || 0.4 || RPD: 0	[NR]	[NR]
Fluorene	mg/kg	112590-105	0.2 || 0.2 || RPD: 0	112590-4	126%
Phenanthrene	mg/kg	112590-105	3.5 || 4.1 || RPD: 16	112590-4	126%
Anthracene	mg/kg	112590-105	0.8 || 1.0 || RPD: 22	[NR]	[NR]
Fluoranthene	mg/kg	112590-105	12 || 15 || RPD: 22	112590-4	127%
Pyrene	mg/kg	112590-105	12 || 15 || RPD: 22	112590-4	129%
Benzo(a)anthracene	mg/kg	112590-105	9.0 || 11 || RPD: 20	[NR]	[NR]
Chrysene	mg/kg	112590-105	9.3 || 11 || RPD: 17	112590-4	116%
Benzo(b+k)fluoranthene	mg/kg	112590-105	22 || 26 || RPD: 17	[NR]	[NR]
Benzo(a)pyrene	mg/kg	112590-105	13 || 16 || RPD: 21	112590-4	126%
Indeno(1,2,3-c,d)pyrene	mg/kg	112590-105	9.1 || 11 || RPD: 19	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	112590-105	0.9 || 1.4 || RPD: 43	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	112590-105	8.9 || 11 || RPD: 21	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	112590-105	100 || 102 || RPD: 2	112590-4	102%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	112590-35	07/07/2014
Date analysed	-	[NT]	[NT]	112590-35	07/07/2014
Arsenic	mg/kg	[NT]	[NT]	112590-35	87%
Cadmium	mg/kg	[NT]	[NT]	112590-35	93%
Chromium	mg/kg	[NT]	[NT]	112590-35	107%
Copper	mg/kg	[NT]	[NT]	112590-35	71%
Lead	mg/kg	[NT]	[NT]	112590-35	86%
Mercury	mg/kg	[NT]	[NT]	112590-35	95%
Nickel	mg/kg	[NT]	[NT]	112590-35	79%
Zinc	mg/kg	[NT]	[NT]	112590-35	113%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	112590-33	07/07/2014
Date analysed	-	[NT]	[NT]	112590-33	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	[NT]	[NT]	112590-33	108%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112590-117	7/07/2014 || 7/07/2014	112590-35	07/07/2014
Date analysed	-	112590-117	8/07/2014 || 8/07/2014	112590-35	07/07/2014
Naphthalene	mg/kg	112590-117	<0.1 || <0.1	112590-35	107%
Acenaphthylene	mg/kg	112590-117	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	112590-117	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	112590-117	<0.1 || <0.1	112590-35	114%
Phenanthrene	mg/kg	112590-117	0.9 || 0.8 || RPD: 12	112590-35	115%
Anthracene	mg/kg	112590-117	0.3 || 0.2 || RPD: 40	[NR]	[NR]
Fluoranthene	mg/kg	112590-117	3.2 || 3.3 || RPD: 3	112590-35	117%
Pyrene	mg/kg	112590-117	3.1 || 3.3 || RPD: 6	112590-35	118%
Benzo(a)anthracene	mg/kg	112590-117	1.5 || 1.9 || RPD: 24	[NR]	[NR]
Chrysene	mg/kg	112590-117	1.6 || 2.1 || RPD: 27	112590-35	105%
Benzo(b+k)fluoranthene	mg/kg	112590-117	3.6 || 5.0 || RPD: 33	[NR]	[NR]
Benzo(a)pyrene	mg/kg	112590-117	1.9 || 2.5 || RPD: 27	112590-35	113%
Indeno(1,2,3-c,d)pyrene	mg/kg	112590-117	1.3 || 1.7 || RPD: 27	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	112590-117	0.2 || 0.2 || RPD: 0	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	112590-117	1.2 || 1.7 || RPD: 34	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	112590-117	98 || 106 || RPD: 8	112590-35	103%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	112590-74	07/07/2014
Date analysed	-	[NT]	[NT]	112590-74	07/07/2014
Arsenic	mg/kg	[NT]	[NT]	112590-74	87%
Cadmium	mg/kg	[NT]	[NT]	112590-74	94%
Chromium	mg/kg	[NT]	[NT]	112590-74	95%
Copper	mg/kg	[NT]	[NT]	112590-74	100%
Lead	mg/kg	[NT]	[NT]	112590-74	86%
Mercury	mg/kg	[NT]	[NT]	112590-74	83%
Nickel	mg/kg	[NT]	[NT]	112590-74	90%
Zinc	mg/kg	[NT]	[NT]	112590-74	89%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	112590-90	07/07/2014
Date analysed	-	[NT]	[NT]	112590-90	10/07/2014
Fluoride (1:5 soil:water)	mg/kg	[NT]	[NT]	112590-90	95%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	112590-136	7/07/2014 || 7/07/2014	112590-107	07/07/2014
Date analysed	-	112590-136	8/07/2014 || 8/07/2014	112590-107	07/07/2014
Naphthalene	mg/kg	112590-136	<0.1 || <0.1	112590-107	105%
Acenaphthylene	mg/kg	112590-136	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	112590-136	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	112590-136	<0.1 || <0.1	112590-107	115%
Phenanthrene	mg/kg	112590-136	0.7 || 0.7 || RPD: 0	112590-107	113%
Anthracene	mg/kg	112590-136	0.2 || 0.2 || RPD: 0	[NR]	[NR]
Fluoranthene	mg/kg	112590-136	2.6 || 2.7 || RPD: 4	112590-107	107%
Pyrene	mg/kg	112590-136	2.5 || 2.7 || RPD: 8	112590-107	108%
Benzo(a)anthracene	mg/kg	112590-136	1.4 || 1.5 || RPD: 7	[NR]	[NR]
Chrysene	mg/kg	112590-136	1.7 || 1.8 || RPD: 6	112590-107	105%
Benzo(b+k)fluoranthene	mg/kg	112590-136	3.8 || 4.2 || RPD: 10	[NR]	[NR]
Benzo(a)pyrene	mg/kg	112590-136	1.7 || 2.0 || RPD: 16	112590-107	117%
Indeno(1,2,3-c,d)pyrene	mg/kg	112590-136	1.2 || 1.4 || RPD: 15	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	112590-136	0.2 || 0.2 || RPD: 0	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	112590-136	1.3 || 1.4 || RPD: 7	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	112590-136	77 || 102 || RPD: 28	112590-107	97%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	112590-89	07/07/2014 || 07/07/2014
Date analysed	-	112590-89	10/07/2014 || 10/07/2014
Fluoride (1:5 soil:water)	mg/kg	112590-89	90 || 92 || RPD: 2

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	112590-129	07/07/2014 || 07/07/2014
Date analysed	-	112590-129	10/07/2014 || 10/07/2014
Fluoride (1:5 soil:water)	mg/kg	112590-129	130 || 130 || RPD: 0

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	112590-141	07/07/2014 || 07/07/2014
Date analysed	-	112590-141	10/07/2014 || 10/07/2014
Fluoride (1:5 soil:water)	mg/kg	112590-141	170 || 160 || RPD: 6

Report Comments:

Total Recoverable Hydrocarbons in soil:# Percent recovery is not possible to report as the high concentration of analytes in the sa
have caused interference.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteriae has been exceeded for 112590-55 for Pb and Zn. Therefore a triplicate result has been issued as laboratory sample number 112590-153.

PAH's in soil: The RPD for duplicate results is accepted due to the non homogenous nature of the sample/s.

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
NA: 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 batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <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 and 10-140% for SVOC 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.

6/8
11/07/14

CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client: ENVIRON
Project Mgr: FIONA ROBINSON
Sampler: KIRSTY GREENFIELD
Address: Suite 19B level 2 50 Glebe Rd The Junction NSW 2291
Email: kgreenfield@environcorp.com
Phone: 49625444 Fax:

Client Project Name and Number: HYDRO AS130383
PO No.: -
Envirolab Services Quote No. :
Date results required:
Or choose: standard / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067

Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au

Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	SOLUBLE FLUORIDE	PAHS	Comments: Provide as much information about the sample as you can
63	AEC25SB127:0-0.1	1/7/14	SOIL	X		
64	AEC25SB127:0.1-0.2			X		112503
65	AEC25SB127:0.4-0.6			X		
66	DUP C				X	
67	DUP D			X		
68	DUP E			X		
69	DUP F			X		
	DUP E1			X		* please send to ALS for analysis

Environmental Division
Sydney
Work Order
ES1414732
Telephone : +61-2-8784 8555

Relinquished by (company): ELS
Print Name: PT
Date & Time: 4/7/14 11:30
Signature: PT

Received by (company):
Print Name: [illegible]
Date & Time: 04/7/14 18:35
Signature: [illegible] 8.9C

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier
Page No:

CERTIFICATE OF ANALYSIS

Work Order	: **ES1414732**	Page	: 1 of 3
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: FIONA ROBINSON	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: frobinson@environcorp.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO AS130383	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 04-JUL-2014
Sampler	: KG	Issue Date	: 11-JUL-2014
Site	: ----		
		No. of samples received	: 1
Quote number	: EN/072/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Nanthini Coilparampil	Laboratory Manager - Inorganics	Sydney Inorganics

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

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Client sample ID*	**DUP E1**	----	----	----	----
			Client sampling date / time	01-JUL-2014 15:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES1414732-001**	**----**	**----**	**----**	**----**
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	**16.1**	----	----	----	----
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	<1	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: **ES1414732**	Page	: 1 of 4
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: FIONA ROBINSON	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: frobinson@environcorp.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO AS130383	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 04-JUL-2014
Sampler	: KG	Issue Date	: 11-JUL-2014
Order number	: ----		
		No. of samples received	: 1
Quote number	: EN/072/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Nanthini Coilparampil	Laboratory Manager - Inorganics	Sydney Inorganics

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.

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: 3532612)									
ES1414733-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	18.0	18.1	0.0	0% - 50%
ES1414866-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	14.0	14.8	5.6	0% - 50%
EK040S: Fluoride Soluble (QC Lot: 3530034)									
ES1414732-001	DUP E1	EK040S: Fluoride	16984-48-8	1	mg/kg	<1	<1	0.0	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
EK040S: Fluoride Soluble (QCLot: 3530034)								
EK040S: Fluoride	16984-48-8	1.0	mg/kg	<1	25.0 mg/kg	103	69	117

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK040S: Fluoride Soluble (QCLot: 3530034)							
ES1414732-001	DUP E1	EK040S: Fluoride	16984-48-8	125 mg/kg	106	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK040S: Fluoride Soluble (QCLot: 3530034)										
ES1414732-001	DUP E1	EK040S: Fluoride	16984-48-8	125 mg/kg	106	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1414732**	Page	: 1 of 5
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: FIONA ROBINSON	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: frobinson@environcorp.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO AS130383	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 04-JUL-2014
Sampler	: KG	Issue Date	: 11-JUL-2014
Order number	: ----		
		No. of samples received	: 1
Quote number	: EN/072/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (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)							
DUP E1	**01-JUL-2014**	**----**	----	----	**09-JUL-2014**	15-JUL-2014	✓
EK040S: Fluoride Soluble							
Soil Glass Jar - Unpreserved (EK040S)							
DUP E1	**01-JUL-2014**	**08-JUL-2014**	08-JUL-2014	✓	**08-JUL-2014**	05-AUG-2014	✓

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(where) 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)							
Fluoride - Soluble	EK040S	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Fluoride - Soluble	EK040S	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Fluoride - Soluble	EK040S	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Fluoride - Soluble	EK040S	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

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	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).
Fluoride - Soluble	EK040S	SOIL	APHA 21st ed., 4500 F--C Soluble Fluoride is determined after a 1:5 soil/water extract using an ion selective electrode.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of 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.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

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

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

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

8/8

CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Client: ENVIRON
Project Mgr: FIONA ROBINSON
Sampler: KIRSTY GREENFIELD
Address: Suite 19B, Level 2, 50 Glebe Rd The Junction NSW 2291
Email: kgreenfield@environcorp.com
Phone: 49625444 Fax:

Client Project Name and Number: HYDRO AS130383
PO No.:
Envirolab Services Quote No. :
Date results required:
Or choose: standard / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharge applies

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067
Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au
Contact: Aileen Hie

Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	Soluble fluoride	PAHs	HOLD	Comments: Provide as much information about the sample as you can
85	AEC2SSB134:0-0.1	2/7/14	SOIL	X			
86	AEC2SSB134:0.2-0.3					X	
87	AEC2SSB135:0-0.1			X			
88	AEC2SSB135:0.1-0.2					X	
89	AEC2SSB135:0.3-0.4			X	X		
90	DUP G			X			
91	DUP H			X			
	DUP H1			→		*	Please send to ALS for Soluble fluoride.
92	AEC2 MW105 0.9-1.0	30/6/14					
93	AEC6 MW105 0.15-0.25						

Extra sample

Environmental Division
Sydney
Work Order
ES1414735
Telephone : +61-2-8784 8555

Relinquished by (company): ELS
Print Name: PT
Date & Time: 4/7/14 11:30
Signature: PT

Received by (company): ALS
Print Name: Scott [illegible]
Date & Time: 04/7/14 1435
Signature: 8.9C

Samples Received: Cool or Ambient (circle one)
Temperature Recieved at: (if applicable)
Transported by: Hand delivered / courier
Page No:

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1414735**	Page	: 1 of 3
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: FIONA ROBINSON	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: frobinson@environcorp.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO AS130383	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 04-JUL-2014
Sampler	: KG	Issue Date	: 11-JUL-2014
Site	: ----		
		No. of samples received	: 1
Quote number	: EN/072/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Nanthini Coilparampil	Laboratory Manager - Inorganics	Sydney Inorganics

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

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Client sample ID	DUP H1	----	----	----	----
			Client sampling date / time	02-JUL-2014 15:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES1414735-001**	**----**	**----**	**----**	**----**
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	**13.6**	----	----	----	----
EK040S: Fluoride Soluble								
Fluoride	16984-48-8	1	mg/kg	**27**	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: **ES1414735**	Page	: 1 of 4
Client	: **ENVIRON AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: FIONA ROBINSON	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: frobinson@environcorp.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO AS130383	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 04-JUL-2014
Sampler	: KG	Issue Date	: 11-JUL-2014
Order number	: ----		
		No. of samples received	: 1
Quote number	: EN/072/14	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Nanthini Coilparampil	Laboratory Manager - Inorganics	Sydney Inorganics

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.

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: 3535469)									
ES1414892-002	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	10.7	9.8	8.4	0% - 50%
EK040S: Fluoride Soluble (QC Lot: 3536676)									
ES1414735-001	DUP H1	EK040S: Fluoride	16984-48-8	1	mg/kg	27	26	0.0	0% - 20%

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
EK040S: Fluoride Soluble (QCLot: 3536676)								
EK040S: Fluoride	16984-48-8	1.0	mg/kg	<1	25.0 mg/kg	103	69	117

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK040S: Fluoride Soluble (QCLot: 3536676)							
ES1414735-001	DUP H1	EK040S: Fluoride	16984-48-8	25.0 mg/kg	105	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EK040S: Fluoride Soluble (QCLot: 3536676)										
ES1414735-001	DUP H1	EK040S: Fluoride	16984-48-8	25.0 mg/kg	105	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1414735**	Page	: 1 of 5
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: FIONA ROBINSON	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: frobinson@environcorp.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 49344354	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project	: HYDRO AS130383	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 04-JUL-2014
Sampler	: KG	Issue Date	: 11-JUL-2014
Order number	: ----		
		No. of samples received	: 1
Quote number	: EN/072/14	No. of samples analysed	: 1

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This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (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)							
DUP H1	**02-JUL-2014**	**----**	----	----	**10-JUL-2014**	16-JUL-2014	✓
EK040S: Fluoride Soluble							
Soil Glass Jar - Unpreserved (EK040S)							
DUP H1	**02-JUL-2014**	**11-JUL-2014**	09-JUL-2014	×	**11-JUL-2014**	08-AUG-2014	✓

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(where) 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)							
Fluoride - Soluble	EK040S	1	1	**100.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Fluoride - Soluble	EK040S	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Fluoride - Soluble	EK040S	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Fluoride - Soluble	EK040S	1	1	**100.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

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	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).
Fluoride - Soluble	EK040S	SOIL	APHA 21st ed., 4500 F--C Soluble Fluoride is determined after a 1:5 soil/water extract using an ion selective electrode.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of 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.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)	*Date extracted*	*Due for extraction*	***Days overdue***	*Date analysed*	*Due for analysis*	***Days overdue***
EK040S: Fluoride Soluble						
Soil Glass Jar - Unpreserved						
DUP H1	11-JUL-2014	09-JUL-2014	**2**	----	----	----

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

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

Appendix H

Laboratory Reports for Groundwater

1/2

CHAIN OF CUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client: ENVIRON	**Client Project Name and Number:** AS130383
Project Mgr: KIRSTY GREENFIELD	**PO No.:**
Sampler: KIRSTY GREENFIELD	**Envirolab Services Quote No. :**
Address: Suite 19B, Level 2, 50 Glebe Rd The Junction NSW 2291	**Date results required:**
Email: kgreenfield@environcorp.com	**Or choose:** standard / 1 day / 2 day / 3 day
Phone: 49625444 **Fax:** 49625888	*Note: Inform lab in advance if urgent turnaround is required - surcharge applies*

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067

Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au

Contact: Aileen Hie

Sample information				Tests Required						Comments
Envirolab Sample ID	Client Sample ID	Date sampled	Type of sample	8 Metals	Aluminium	Fluoride	TPH	PAH (ANZECC)	HOLD	Provide as much information about the sample as you can
1	MW07	10/7/14	WATER	X	X	X	X			Please filter metals samples
2	MW08	↓	↓	X	X	X	X			
3	MW101			X	X	X	X			
4	MW102			X	X	X	X			
5	MW10			X	X	X				
6	MW09			X	X	X				
7	MW11			X	X	X				
8	MW12			X	X	X		X		
9	MW103			X	X	X		X		
10	MW104			X	X	X		X		
11	MW13			X	X	X		X		
12	MW14			X	X	X		X		
13	DUP A			X	X	X	X	X		
14	DUP B			X	X	X		X		
	DUP B1	↓	↓	X	X	X			X	please send to ALS for same analysis as DUP B

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

Job No: 112983
Date Received: 11/7/14
Time Received: 10:00
Received by: K
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by (company): ENVIRON	**Received by (company):** ELS	**Samples Received:** Cool or Ambient (circle one)
Print Name: KIRSTY GREENFIELD	**Print Name:** Kevin Wang	**Temperature Recieved at:** (if applicable)
Date & Time: 10/7/14 4:45pm	**Date & Time:** 11/7/14 10:00	**Transported by:** Hand delivered / courier
Signature: KGreenfield	**Signature:** K.W	**Page No:**

CHAIN OF CUSTODY - Client

Envirolab

ENVIROLAB SERVICES

Client: ENVIRON	Client Project Name and Number: AS130383	Envirolab Services
Project Mgr: KIRSTY GREENFIELD		12 Ashley St, Chatswood, NSW, 2067
Sampler: KIRSTY GREENFIELD	PO No.:	
Address: Suite 19B, Level 2, 50 Glebe Rd The Junction NSW 2291	Envirolab Services Quote No.:	Phone: 02 9910 6200
	Date results required:	Fax: 02 9910 6201
Email: kgreenfield@environcorp.com	Or choose: standard / 1 day / 2 day / 3 day	E-mail: ahie@envirolabservices.com.au
Phone: 49625444 Fax: 4962 5888	Note: Inform lab in advance if urgent turnaround is required - surcharge applies	Contact: Aileen Hie

Sample information				Tests Required							Comments
Envirolab Sample ID	Client Sample ID 112983	Date sampled	Type of sample	8 Metals *	Aluminium	Fluoride	TPH	PAHs (Anbeec)	VOCs	SVOCs	Provide as much information about the sample as you can
15	MW18	10/7/14	WATER	X	X	X		X			
16	MW105			X	X	X	X	X	X	X	* please filter
17	MW17			X	X	X		X			metals samples
18	MWA			X	X	X					
19	MWB			X	X	X					
20	MW16			X	X	X	X	X			
21	MW106			X	X	X		X			
22	MW19			X	X	X					
23	MW20			X	X	X					
24	MW06 *			X	X	X					
25	MW15	11/7/14		X	X	X					
26	MW107			X	X	X			X	X	* will arrive
											* on Tuesday

Relinquished by (company): ENVIRON	Received by (company): Tels	Samples Received: Cool or Ambient (circle one)
Print Name: KIRSTY GREENFIELD	Print Name: Kevin Wang	Temperature Recieved at: (If applicable)
Date & Time: 10/7/14 4:45pm	Date & Time: 11/7/14 10:00	Transported by: Hand delivered / courier
Signature: KGreenfield	Signature: KW	Page No:

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

CERTIFICATE OF ANALYSIS 112983

Client:
Environ
PO Box 560
North Sydney
NSW 2060

Attention: Kirsty Greenfield

Sample log in details:

Your Reference:	**AS130383**
No. of samples:	26 Waters
Date samples received / completed instructions received	11/07/14, 15/07/1/ 11/07/14, 14/07/14

This report replaces the one dated 21/07/2014 due to changing of results between MW101 and MW102 (ELS -3 and -4) for vTRH and sTRH as requested by Kirsty due to labelling error.

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:	21/07/14 / 22/07/14
Date of Preliminary Report:	None Issued

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Results Approved By:

Jacinta Hurst
Laboratory Manager

VOCs in water			
Our Reference:	UNITS	112983-16	112983-26
Your Reference	-------------	MW105	MW107
Date Sampled	------------	10/07/2014	11/07/2014
Type of sample		Water	Water
Date extracted	-	16/07/2014	16/07/2014
Date analysed	-	16/07/2014	16/07/2014
Dichlorodifluoromethane	µg/L	<10	<10
Chloromethane	µg/L	<10	<10
Vinyl Chloride	µg/L	<10	<10
Bromomethane	µg/L	<10	<10
Chloroethane	µg/L	<10	<10
Trichlorofluoromethane	µg/L	<10	<10
1,1-Dichloroethene	µg/L	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1
1,1-dichloroethane	µg/L	<1	<1
Cis-1,2-dichloroethene	µg/L	1	<1
Bromochloromethane	µg/L	<1	<1
Chloroform	µg/L	5	<1
2,2-dichloropropane	µg/L	<1	<1
1,2-dichloroethane	µg/L	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1
1,1-dichloropropene	µg/L	<1	<1
Cyclohexane	µg/L	<1	<1
Carbon tetrachloride	µg/L	<1	<1
Benzene	µg/L	1	<1
Dibromomethane	µg/L	<1	<1
1,2-dichloropropane	µg/L	<1	<1
Trichloroethene	µg/L	<1	<1
Bromodichloromethane	µg/L	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1
Toluene	µg/L	<1	<1
1,3-dichloropropane	µg/L	<1	<1
Dibromochloromethane	µg/L	<1	<1
1,2-dibromoethane	µg/L	<1	<1
Tetrachloroethene	µg/L	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1
Chlorobenzene	µg/L	150	<1
Ethylbenzene	µg/L	<1	<1
Bromoform	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
Styrene	µg/L	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1
o-xylene	µg/L	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1

VOCs in water			
Our Reference:	UNITS	112983-16	112983-26
Your Reference	-------------	MW105	MW107
Date Sampled	------------	10/07/2014	11/07/2014
Type of sample		Water	Water
Isopropylbenzene	µg/L	<1	<1
Bromobenzene	µg/L	<1	<1
n-propyl benzene	µg/L	<1	<1
2-chlorotoluene	µg/L	<1	<1
4-chlorotoluene	µg/L	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1
Tert-butyl benzene	µg/L	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1
Sec-butyl benzene	µg/L	<1	<1
1,4-dichlorobenzene	µg/L	9	<1
4-isopropyl toluene	µg/L	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1
n-butyl benzene	µg/L	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1
Hexachlorobutadiene	µg/L	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	101	97
Surrogate toluene-d8	%	88	86
Surrogate 4-BFB	%	103	99

vTRH in Water (C6-C9) NEPM	UNITS	112983-1	112983-2	112983-3	112983-4	112983-13
Your Reference	-------------	MW07	MW08	MW101	MW102	DUP A
Date Sampled	------------	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Date analysed	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
TRH C_6 - C_9	µg/L	<10	<10	<10	18	22
TRH C_6 - C_{10}	µg/L	<10	<10	<10	18	22
Surrogate Dibromofluoromethane	%	100	102	102	100	100
Surrogate toluene-d8	%	100	99	100	99	97
Surrogate 4-BFB	%	96	97	97	98	98

vTRH in Water (C6-C9) NEPM	UNITS	112983-16	112983-20
Your Reference	-------------	MW105	MW16
Date Sampled	------------	10/07/2014	10/07/2014
Type of sample		Water	Water
Date extracted	-	16/07/2014	16/07/2014
Date analysed	-	16/07/2014	16/07/2014
TRH C_6 - C_9	µg/L	240	<10
TRH C_6 - C_{10}	µg/L	240	<10
Surrogate Dibromofluoromethane	%	101	101
Surrogate toluene-d8	%	88	101
Surrogate 4-BFB	%	103	99

svTRH (C10-C40) in Water						
Our Reference:	UNITS	112983-1	112983-2	112983-3	112983-4	112983-13
Your Reference	-------------	MW07	MW08	MW101	MW102	DUP A
Date Sampled	------------	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Date analysed	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
TRH C_{10} - C_{14}	µg/L	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100	<100
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	123	105	101	113	125

svTRH (C10-C40) in Water			
Our Reference:	UNITS	112983-16	112983-20
Your Reference	-------------	MW105	MW16
Date Sampled	------------	10/07/2014	10/07/2014
Type of sample		Water	Water
Date extracted	-	16/07/2014	16/07/2014
Date analysed	-	18/07/2014	17/07/2014
TRH C_{10} - C_{14}	µg/L	180	<50
TRH C_{15} - C_{28}	µg/L	1,400	<100
TRH C_{29} - C_{36}	µg/L	<100	<100
TRH >C_{10} - C_{16}	µg/L	300	<50
TRH >C_{16} - C_{34}	µg/L	1,200	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100
Surrogate o-Terphenyl	%	137	92

PAHs in Water - Low Level						
Our Reference:	UNITS	112983-8	112983-9	112983-10	112983-11	112983-14
Your Reference	-------------	MW12	MW103	MW104	MW13	DUPB
Date Sampled	------------	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Date analysed	-	16/07/201	16/07/201	16/07/201	16/07/201	16/07/201
Naphthalene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	0.1	<0.1	0.1
Pyrene	µg/L	<0.1	<0.1	0.2	<0.1	0.2
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	0.3
Benzo(a)pyrene	µg/L	<0.1	<0.1	0.1	<0.1	0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	0.1	<0.1	0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	0.1	<0.1	0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	0.77	NIL (+)VE	0.97
Surrogate p-Terphenyl-d14	%	107	103	80	103	80

PAHs in Water - Low Level					
Our Reference:	UNITS	112983-15	112983-17	112983-20	112983-21
Your Reference	-------------	MW18	MW17	MW16	MW106
Date Sampled	------------	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Type of sample		Water	Water	Water	Water
Date extracted	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Date analysed	-	16/07/201	16/07/201	16/07/201	16/07/201
Naphthalene	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	92	86	112	101

SVOC's in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------ ------------	112983-16 MW105 10/07/2014 Water	112983-26 MW107 11/07/2014 Water
Date extracted	-	16/07/2014	16/07/2014
Date analysed	-	19/07/2014	19/07/2014
Phenol	µg/L	<10	<10
Bis (2-chloroethyl) ether	µg/L	<10	<10
2-Chlorophenol	µg/L	<10	<10
1,3-Dichlorobenzene	µg/L	<10	<10
1,4-Dichlorobenzene	µg/L	<10	<10
2-Methylphenol	µg/L	<10	<10
1,2-Dichlorobenzene	µg/L	<10	<10
bis-(2-Chloroisopropyl) ether	µg/L	<10	<10
3/4-Methylphenol	µg/L	<20	<20
N-nitrosodi-n-propylamine	µg/L	<10	<10
Hexachloroethane	µg/L	<10	<10
Nitrobenzene	µg/L	<10	<10
Isophorone	µg/L	<10	<10
2,4-Dimethylphenol	µg/L	<10	<10
2-Nitrophenol	µg/L	<10	<10
bis (2-Chloroethoxy) methane	µg/L	<10	<10
2,4-Dichlorophenol	µg/L	<10	<10
1,2,4-Trichlorobenzene	µg/L	<10	<10
Naphthalene	µg/L	<10	<10
4-Chloroaniline	µg/L	<10	<10
Hexachlorobutadiene	µg/L	<10	<10
2-Methylnaphthalene	µg/L	<10	<10
Hexachlorocyclopentadiene	µg/L	<10	<10
2,4,6-Trichlorophenol	µg/L	<10	<10
2,4,5-Trichlorophenol	µg/L	<10	<10
2-Chloronaphthalene	µg/L	<10	<10
2-Nitroaniline	µg/L	<10	<10
Dimethyl phthalate	µg/L	<10	<10
2,6-Dinitrotoluene	µg/L	<10	<10
Acenaphthylene	µg/L	<10	<10
3-Nitroaniline	µg/L	<10	<10
Acenaphthene	µg/L	<10	<10
2,4-Dinitrophenol	µg/L	<100	<100
4-Nitrophenol	µg/L	<100	<100
Dibenzofuran	µg/L	<10	<10
Diethylphthalate	µg/L	<10	<10
4-Chlorophenylphenylether	µg/L	<10	<10
4-Nitroaniline	µg/L	<10	<10
Fluorene	µg/L	<10	<10
2-methyl-4,6-dinitrophenol	µg/L	<100	<100
Azobenzene	µg/L	<10	<10

SVOC's in water			
Our Reference:	UNITS	112983-16	112983-26
Your Reference	------------	MW105	MW107
Date Sampled	------------	10/07/2014	11/07/2014
Type of sample		Water	Water
4-Bromophenylphenylether	µg/L	<10	<10
Hexachlorobenzene	µg/L	<10	<10
Pentachlorophenol	µg/L	<100	<100
Phenanthrene	µg/L	<10	<10
Anthracene	µg/L	<10	<10
Carbazole	µg/L	<10	<10
Di-n-butylphthalate	µg/L	<10	<10
Fluoranthene	µg/L	<10	<10
Pyrene	µg/L	<10	<10
Butylbenzylphthalate	µg/L	<10	<10
Bis(2-ethylhexyl) phthalate	µg/L	<10	<10
Benzo(a)anthracene	µg/L	<10	<10
Chrysene	µg/L	<10	<10
Di-n-octylphthalate	µg/L	<10	<10
Benzo(b)fluoranthene	µg/L	<10	<10
Benzo(k)fluoranthene	µg/L	<10	<10
Benzo(a)pyrene	µg/L	<10	<10
Indeno(1,2,3-c,d)pyrene	µg/L	<10	<10
Dibenzo(a,h)anthracene	µg/L	<10	<10
Benzo(g,h,i)perylene	µg/L	<10	<10
Ethylmethanesulfonate	µg/L	<10	<10
Aniline	µg/L	<10	<10
Pentachloroethane	µg/L	<10	<10
Benzyl alcohol	µg/L	<10	<10
Acetophenone	µg/L	<10	<10
N-nitrosomorpholine	µg/L	<10	<10
N-nitrosopiperidine	µg/L	<10	<10
2,6-Dichlorophenol	µg/L	<10	<10
Hexachloropropene-1	µg/L	<10	<10
N-nitroso-n-butylamine	µg/L	<10	<10
Safrole	µg/L	<10	<10
1,2,4,5-Tetrachlorobenzene	µg/L	<10	<10
Trans-iso-safrole	µg/L	<10	<10
1,3-Dinitrobenzene	µg/L	<10	<10
Pentachlorobenzene	µg/L	<10	<10
1-Naphthylamine	µg/L	<10	<10
2,3,4,6-Tetrachlorophenol	µg/L	<10	<10
2-Naphthylamine	µg/L	<10	<10
5-Nitro-o-toluidine	µg/L	<10	<10
Diphenylamine	µg/L	<10	<10
Phenacetin	µg/L	<10	<10
Pentachloronitrobenzene	µg/L	<10	<10
Dinoseb	µg/L	<10	<10

SVOC's in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	112983-16 MW105 10/07/2014 Water	112983-26 MW107 11/07/2014 Water
Methapyrilene	µg/L	<10	<10
p-Dimethylaminoazobenzene	µg/L	<10	<10
2-Acetylaminofluorene	µg/L	<10	<10
7,12-Dimethylbenz(a)anthracene	µg/L	<10	<10
3-Methylcholanthrene	µg/L	<10	<10
a-BHC	µg/L	<10	<10
b-BHC	µg/L	<10	<10
g-BHC	µg/L	<10	<10
d-BHC	µg/L	<10	<10
Heptachlor	µg/L	<10	<10
Aldrin	µg/L	<10	<10
Heptachlor Epoxide	µg/L	<10	<10
g-Chlordane	µg/L	<10	<10
a-Chlordane	µg/L	<10	<10
Endosulfan I	µg/L	<10	<10
p,p'-DDE	µg/L	<10	<10
Dieldrin	µg/L	<10	<10
Endrin	µg/L	<10	<10
p,p'-DDD	µg/L	<10	<10
Endosulfan II	µg/L	<10	<10
Endrin Aldehyde	µg/L	<10	<10
p,p'-DDT	µg/L	<10	<10
Endosulfan Sulphate	µg/L	<10	<10
Surrogate 2-fluorophenol	%	57	53
Surrogate Phenol-d_6	%	42	35
Surrogate Nitrobenzene-d_5	%	91	87
Surrogate 2-fluorobiphenyl	%	91	89
Surrogate 2,4,6-Tribromophenol	%	107	88
Surrogate *p*-Terphenyl-d_{14}	%	108	102

HM in water - dissolved Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	112983-1 MW07 07/07/2014 Water	112983-2 MW08 07/07/2014 Water	112983-3 MW101 07/07/2014 Water	112983-4 MW102 07/07/2014 Water	112983-5 MW10 07/07/2014 Water
Date prepared	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Date analysed	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Arsenic-Dissolved	µg/L	6	<1	2	1	3
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	1	<1	<1	3
Copper-Dissolved	µg/L	<1	<1	4	2	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1	1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	2	<1	9	2	24
Zinc-Dissolved	µg/L	3	<1	10	4	9
Aluminium-Dissolved	µg/L	<10	1,200	<10	<10	2,900

HM in water - dissolved Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	112983-6 MW09 07/07/2014 Water	112983-7 MW11 07/07/2014 Water	112983-8 MW12 07/07/2014 Water	112983-9 MW103 07/07/2014 Water	112983-10 MW104 07/07/2014 Water
Date prepared	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Date analysed	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Arsenic-Dissolved	µg/L	2	1	<1	1	2
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	0.2	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1	6
Copper-Dissolved	µg/L	1	2	<1	<1	3
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	14	6	15	18	5
Zinc-Dissolved	µg/L	1	2	8	92	8
Aluminium-Dissolved	µg/L	30	390	<10	7,700	1,300

HM in water - dissolved Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	112983-11 MW13 07/07/2014 Water	112983-12 MW14 07/07/2014 Water	112983-13 DUP A 07/07/2014 Water	112983-14 DUP B 07/07/2014 Water	112983-15 MW18 10/07/2014 Water
Date prepared	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Date analysed	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Arsenic-Dissolved	µg/L	2	2	3	1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	6	<1	11	6	<1
Copper-Dissolved	µg/L	<1	3	3	3	<1
Lead-Dissolved	µg/L	<1	<1	4	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	<1	7	6	5	<1
Zinc-Dissolved	µg/L	2	7	14	8	4
Aluminium-Dissolved	µg/L	2,500	<10	8,900	1,300	750

HM in water - dissolved Our Reference: Your Reference Date Sampled Type of sample	UNITS ------------- ------------	112983-16 MW105 10/07/2014 Water	112983-17 MW17 10/07/2014 Water	112983-18 MWA 10/07/2014 Water	112983-19 MWB 10/07/2014 Water	112983-20 MW16 10/07/2014 Water
Date prepared	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Date analysed	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Arsenic-Dissolved	µg/L	1	12	1	5	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	0.2	0.2	<0.1
Chromium-Dissolved	µg/L	2	4	1	2	<1
Copper-Dissolved	µg/L	1	1	<1	3	2
Lead-Dissolved	µg/L	<1	1	1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	4	8	2	7	<1
Zinc-Dissolved	µg/L	4	6	64	13	1
Aluminium-Dissolved	µg/L	20	3,800	630	1,400	<10

HM in water - dissolved						
Our Reference:	UNITS	112983-21	112983-22	112983-23	112983-24	112983-25
Your Reference	-------------	MW106	MW19	MW20	MW06	MW15
Date Sampled	------------	10/07/2014	10/07/2014	10/07/2014	10/07/2014	11/07/2014
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Date analysed	-	16/07/2014	16/07/2014	16/07/2014	16/07/2014	16/07/2014
Arsenic-Dissolved	µg/L	2	8	2	1	2
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	1	2	<1	<1
Copper-Dissolved	µg/L	5	<1	<1	1	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	2	7	4	20	9
Zinc-Dissolved	µg/L	15	2	6	16	2
Aluminium-Dissolved	µg/L	50	680	1,500	180	180

HM in water - dissolved		
Our Reference:	UNITS	112983-26
Your Reference	-------------	MW107
Date Sampled	------------	11/07/2014
Type of sample		Water
Date prepared	-	16/07/2014
Date analysed	-	16/07/2014
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	2
Copper-Dissolved	µg/L	<1
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	2
Zinc-Dissolved	µg/L	7
Aluminium-Dissolved	µg/L	5,000

Miscellaneous Inorganics						
Our Reference:	UNITS	112983-1	112983-2	112983-3	112983-4	112983-5
Your Reference	-------------	MW07	MW08	MW101	MW102	MW10
Date Sampled	------------	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
Date analysed	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
Fluoride, F	mg/L	1.4	6.7	0.46	3.2	2.1

Miscellaneous Inorganics						
Our Reference:	UNITS	112983-6	112983-7	112983-8	112983-9	112983-10
Your Reference	-------------	MW09	MW11	MW12	MW103	MW104
Date Sampled	------------	07/07/2014	07/07/2014	07/07/2014	07/07/2014	07/07/2014
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
Date analysed	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
Fluoride, F	mg/L	0.56	8.3	0.22	12	13

Miscellaneous Inorganics						
Our Reference:	UNITS	112983-11	112983-12	112983-13	112983-14	112983-15
Your Reference	-------------	MW13	MW14	DUP A	DUP B	MW18
Date Sampled	------------	07/07/2014	07/07/2014	07/07/2014	07/07/2014	10/07/2014
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
Date analysed	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
Fluoride, F	mg/L	40	0.85	3.4	14	17

Miscellaneous Inorganics						
Our Reference:	UNITS	112983-16	112983-17	112983-18	112983-19	112983-20
Your Reference	-------------	MW105	MW17	MWA	MWB	MW16
Date Sampled	------------	10/07/2014	10/07/2014	10/07/2014	10/07/2014	10/07/2014
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
Date analysed	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
Fluoride, F	mg/L	1.1	1.1	8.2	12	2.3

Miscellaneous Inorganics						
Our Reference:	UNITS	112983-21	112983-22	112983-23	112983-24	112983-25
Your Reference	-------------	MW106	MW19	MW20	MW06	MW15
Date Sampled	------------	10/07/2014	10/07/2014	10/07/2014	10/07/2014	11/07/2014
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
Date analysed	-	17/07/2014	17/07/2014	17/07/2014	17/07/2014	17/07/2014
Fluoride, F	mg/L	7.4	0.37	0.67	0.22	2.7

Miscellaneous Inorganics		
Our Reference:	UNITS	112983-26
Your Reference	-------------	MW107
Date Sampled	------------	11/07/2014
Type of sample		Water
Date prepared	-	17/07/2014
Date analysed	-	17/07/2014
Fluoride, F	mg/L	10

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.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012 subset	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-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-026	Fluoride determined by ion selective electrode (ISE) in accordance with APHA 22nd ED, 4500-F-C.

QUALITY CONTROL VOCs in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/07/2014	[NT]	[NT]	LCS-W1	16/07/2014
Date analysed	-			16/07/2014	[NT]	[NT]	LCS-W1	16/0/7/2014
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]	LCS-W1	83%
1,1-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
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-W1	84%
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-W1	84%
1,1,1-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	83%
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-W1	91%
Bromodichloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	86%
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-W1	88%
1,2-dibromoethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Tetrachloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	78%
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]
o-xylene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL VOCs in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
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	95	[NT]	[NT]	LCS-W1	93%
Surrogate toluene-d8	%		Org-013	89	[NT]	[NT]	LCS-W1	87%
Surrogate 4-BFB	%		Org-013	98	[NT]	[NT]	LCS-W1	104%

QUALITY CONTROL vTRH in Water (C6-C9) NEPM	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/07/2014	[NT]	[NT]	LCS-W1	16/07/2014
Date analysed	-			16/07/2014	[NT]	[NT]	LCS-W1	16/07/2014
TRH C_6 - C_9	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	96%
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	96%
Surrogate Dibromofluoromethane	%		Org-013	93	[NT]	[NT]	LCS-W1	103%
Surrogate toluene-d8	%		Org-013	87	[NT]	[NT]	LCS-W1	87%
Surrogate 4-BFB	%		Org-013	104	[NT]	[NT]	LCS-W1	102%

QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/07/2014	[NT]	[NT]	LCS-W1	16/07/2014
Date analysed	-			16/07/2014	[NT]	[NT]	LCS-W1	16/07/2014
TRH C_{10} - C_{14}	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	100%
TRH C_{15} - C_{28}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	102%
TRH C_{29} - C_{36}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	79%
TRH >C_{10} - C_{16}	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	100%
TRH >C_{16} - C_{34}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	102%
TRH >C_{34} - C_{40}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	79%
Surrogate o-Terphenyl	%		Org-003	125	[NT]	[NT]	LCS-W1	88%

QUALITY CONTROL PAHs in Water - Low Level	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/07/2014	[NT]	[NT]	LCS-W1	16/07/2014
Date analysed	-			16/07/2014	[NT]	[NT]	LCS-W1	16/07/2014
Naphthalene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	83%
Acenaphthylene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	86%
Phenanthrene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	86%
Anthracene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	85%
Pyrene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	85%

QUALITY CONTROL PAHs in Water - Low Level	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(a)anthracene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	84%
Benzo(b+k)fluoranthene	µg/L	0.2	Org-012 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	95%
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	87	[NT]	[NT]	LCS-W1	113%

QUALITY CONTROL SVOC's in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/07/2014	[NT]	[NT]	LCS-W1	16/07/2014
Date analysed	-			19/07/2014	[NT]	[NT]	LCS-W1	19/07/2014
Phenol	µg/L	10	Org-012	<10	[NT]	[NT]	LCS-W1	31%
Bis (2-chloroethyl) ether	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2-Chlorophenol	µg/L	10	Org-012	<10	[NT]	[NT]	LCS-W1	82%
1,3-Dichlorobenzene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
1,4-Dichlorobenzene	µg/L	10	Org-012	<10	[NT]	[NT]	LCS-W1	53%
2-Methylphenol	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
1,2-Dichlorobenzene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
bis-(2-Chloroisopropyl) ether	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
3/4-Methylphenol	µg/L	20	Org-012	<20	[NT]	[NT]	[NR]	[NR]
N-nitrosodi-n-propylamine	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Hexachloroethane	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Nitrobenzene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Isophorone	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2,4-Dimethylphenol	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2-Nitrophenol	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
bis (2-Chloroethoxy) methane	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2,4-Dichlorophenol	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
1,2,4-Trichlorobenzene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Naphthalene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
4-Chloroaniline	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Hexachlorobutadiene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2-Methylnaphthalene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL SVOC's in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Hexachlorocyclopentadiene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2,4,6-Trichlorophenol	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2,4,5-Trichlorophenol	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2-Chloronaphthalene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2-Nitroaniline	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Dimethyl phthalate	µg/L	10	Org-012	<10	[NT]	[NT]	LCS-W1	118%
2,6-Dinitrotoluene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Acenaphthylene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
3-Nitroaniline	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	10	Org-012	<10	[NT]	[NT]	LCS-W1	60%
2,4-Dinitrophenol	µg/L	100	Org-012	<100	[NT]	[NT]	[NR]	[NR]
4-Nitrophenol	µg/L	100	Org-012	<100	[NT]	[NT]	LCS-W1	31%
Dibenzofuran	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Diethylphthalate	µg/L	10	Org-012	<10	[NT]	[NT]	LCS-W1	66%
4-Chlorophenylphenylether	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
4-Nitroaniline	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2-methyl-4,6-dinitrophenol	µg/L	100	Org-012	<100	[NT]	[NT]	[NR]	[NR]
Azobenzene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
4-Bromophenylphenylether	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Hexachlorobenzene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Pentachlorophenol	µg/L	100	Org-012	<100	[NT]	[NT]	[NR]	[NR]
Phenanthrene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Anthracene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Carbazole	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Di-n-butylphthalate	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Pyrene	µg/L	10	Org-012	<10	[NT]	[NT]	LCS-W1	68%
Butylbenzylphthalate	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Bis(2-ethylhexyl) phthalate	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Benzo(a)anthracene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Di-n-octylphthalate	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Benzo(b)fluoranthene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Benzo(k)fluoranthene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Indeno(1,2,3-c,d)pyrene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Ethylmethanesulfonate	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Aniline	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Pentachloroethane	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL SVOC's in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzyl alcohol	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Acetophenone	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
N-nitrosomorpholine	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
N-nitrosopiperidine	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2,6-Dichlorophenol	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Hexachloropropene-1	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
N-nitroso-n-butylamine	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Safrole	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
1,2,4,5-Tetrachlorobenzene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Trans-iso-safrole	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
1,3-Dinitrobenzene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Pentachlorobenzene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
1-Naphthylamine	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2,3,4,6-Tetrachlorophenol	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2-Naphthylamine	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
5-Nitro-o-toluidine	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Diphenylamine	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Phenacetin	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Pentachloronitrobenzene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Dinoseb	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Methapyrilene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
p-Dimethylaminoazobenzene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
2-Acetylaminofluorene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
7,12-Dimethylbenz(a) anthracene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
3-Methylcholanthrene	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
a-BHC	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
b-BHC	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
g-BHC	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
d-BHC	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Heptachlor	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Aldrin	µg/L	10	Org-012	<10	[NT]	[NT]	LCS-W1	97%
Heptachlor Epoxide	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
g-Chlordane	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
a-Chlordane	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Endosulfan I	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
p,p'-DDE	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Dieldrin	µg/L	10	Org-012	<10	[NT]	[NT]	LCS-W1	87%
Endrin	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
p,p'-DDD	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Endosulfan II	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
p,p'-DDT	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL SVOC's in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Endosulfan Sulphate	µg/L	10	Org-012	<10	[NT]	[NT]	[NR]	[NR]
Surrogate 2-fluorophenol	%		Org-012	71	[NT]	[NT]	LCS-W1	63%
Surrogate Phenol-d_6	%		Org-012	55	[NT]	[NT]	LCS-W1	48%
Surrogate Nitrobenzene-d_5	%		Org-012	86	[NT]	[NT]	LCS-W1	83%
Surrogate 2-fluorobiphenyl	%		Org-012	92	[NT]	[NT]	LCS-W1	92%
Surrogate 2,4,6-Tribromophenol	%		Org-012	86	[NT]	[NT]	LCS-W1	106%
Surrogate *p*-Terphenyl-d_{14}	%		Org-012	105	[NT]	[NT]	LCS-W1	110%

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	-			16/07/2014	112983-3	16/07/2014 || 16/07/2014	LCS-W2	16/07/2014
Date analysed	-			16/07/2014	112983-3	16/07/2014 || 16/07/2014	LCS-W2	16/07/2014
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	112983-3	2 || 2 || RPD: 0	LCS-W2	110%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	112983-3	<0.1 || <0.1	LCS-W2	102%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	112983-3	<1 || <1	LCS-W2	109%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	112983-3	4 || 4 || RPD: 0	LCS-W2	107%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	112983-3	<1 || <1	LCS-W2	102%
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	112983-3	<0.05 || [N/T]	LCS-W2	100%
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	112983-3	9 || 9 || RPD: 0	LCS-W2	111%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	112983-3	10 || 9 || RPD: 11	LCS-W2	111%
Aluminium-Dissolved	µg/L	10	Metals-022 ICP-MS	<10	112983-3	<10 || <10	LCS-W2	112%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			17/07/2014	112983-1	17/07/2014 || 17/07/2014	LCS-W1	17/07/2014
Date analysed	-			17/07/2014	112983-1	17/07/2014 || 17/07/2014	LCS-W1	17/07/2014
Fluoride, F	mg/L	0.1	Inorg-026	<0.1	112983-1	1.4 || 1.4 || RPD: 0	LCS-W1	102%

QUALITY CONTROL HM in water - dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112983-13	16/07/2014 || 16/07/2014	LCS-3	16/07/2014
Date analysed	-	112983-13	16/07/2014 || 16/07/2014	LCS-3	16/07/2014
Arsenic-Dissolved	µg/L	112983-13	3 || 3 || RPD: 0	LCS-3	99%
Cadmium-Dissolved	µg/L	112983-13	<0.1 || <0.1	LCS-3	105%
Chromium-Dissolved	µg/L	112983-13	11 || 11 || RPD: 0	LCS-3	97%
Copper-Dissolved	µg/L	112983-13	3 || 3 || RPD: 0	LCS-3	96%
Lead-Dissolved	µg/L	112983-13	4 || 4 || RPD: 0	LCS-3	104%
Mercury-Dissolved	µg/L	112983-13	<0.05 || [N/T]	LCS-3	108%
Nickel-Dissolved	µg/L	112983-13	6 || 5 || RPD: 18	LCS-3	99%
Zinc-Dissolved	µg/L	112983-13	14 || 15 || RPD: 7	LCS-3	99%
Aluminium-Dissolved	µg/L	112983-13	8900 || 9000 || RPD: 1	LCS-3	96%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112983-11	17/07/2014 || 17/07/2014	112983-2	17/07/2014
Date analysed	-	112983-11	17/07/2014 || 17/07/2014	112983-2	17/07/2014
Fluoride, F	mg/L	112983-11	40 || 39 || RPD: 3	112983-2	89%

QUALITY CONTROL HM in water - dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112983-23	16/07/2014 || 16/07/2014	112983-4	16/07/2014
Date analysed	-	112983-23	16/07/2014 || 16/07/2014	112983-4	16/07/2014
Arsenic-Dissolved	µg/L	112983-23	2 || 2 || RPD: 0	112983-4	96%
Cadmium-Dissolved	µg/L	112983-23	<0.1 || <0.1	112983-4	102%
Chromium-Dissolved	µg/L	112983-23	2 || 2 || RPD: 0	112983-4	93%
Copper-Dissolved	µg/L	112983-23	<1 || <1	112983-4	91%
Lead-Dissolved	µg/L	112983-23	<1 || <1	112983-4	102%
Nickel-Dissolved	µg/L	112983-23	4 || 4 || RPD: 0	112983-4	94%
Zinc-Dissolved	µg/L	112983-23	6 || 6 || RPD: 0	112983-4	97%
Aluminium-Dissolved	µg/L	112983-23	1500 || 1400 || RPD: 7	112983-4	96%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	LCS-W2	17/07/2014
Date analysed	-	[NT]	[NT]	LCS-W2	17/07/2014
Fluoride, F	mg/L	[NT]	[NT]	LCS-W2	104%

QUALITY CONTROL HM in water - dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112983-1	16/07/2014 || 16/07/2014	112983-14	16/07/2014
Date analysed	-	112983-1	16/07/2014 || 16/07/2014	112983-14	16/07/2014
Arsenic-Dissolved	µg/L	112983-1	6 || [N/T]	112983-14	97%
Cadmium-Dissolved	µg/L	112983-1	<0.1 || [N/T]	112983-14	100%
Chromium-Dissolved	µg/L	112983-1	<1 || [N/T]	112983-14	91%
Copper-Dissolved	µg/L	112983-1	<1 || [N/T]	112983-14	87%
Lead-Dissolved	µg/L	112983-1	<1 || [N/T]	112983-14	100%
Mercury-Dissolved	µg/L	112983-1	<0.05 || <0.05	[NR]	[NR]
Nickel-Dissolved	µg/L	112983-1	2 || [N/T]	112983-14	90%
Zinc-Dissolved	µg/L	112983-1	3 || [N/T]	112983-14	94%
Aluminium-Dissolved	µg/L	112983-1	<10 || [N/T]	112983-14	99%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	112983-22	17/07/2014
Date analysed	-	[NT]	[NT]	112983-22	17/07/2014
Fluoride, F	mg/L	[NT]	[NT]	112983-22	97%

QUALITY CONTROL HM in water - dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112983-10	16/07/2014 || 16/07/2014	112983-2	16/07/2014
Date analysed	-	112983-10	16/07/2014 || 16/07/2014	112983-2	16/07/2014
Mercury-Dissolved	µg/L	112983-10	<0.05 || <0.05	112983-2	104%

QUALITY CONTROL HM in water - dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	112983-20	16/07/2014 || 16/07/2014	112983-21	16/07/2014
Date analysed	-	112983-20	16/07/2014 || 16/07/2014	112983-21	16/07/2014
Mercury-Dissolved	µg/L	112983-20	<0.05 || <0.05	112983-21	104%

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
NA: 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 batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <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 and 10-140% for SVOC 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.

1/2

CHAIN OF COUSTODY - Client

ENVIROLAB SERVICES

Envirolab

Client: ENVIRON	**Client Project Name and Number:** AS130383
Project Mgr: KIRSTY GREENFIELD	**PO No.:**
Sampler: KIRSTY GREENFIELD	**Envirolab Services Quote No. :**
Address: Suite 19B, Level 2, 50 Glebe Rd The Junction NSW 2291	**Date results required:**
Email: kgreenfield@environcorp.com	Or choose: (standard) 1 day / 2 day / 3 day *Note: Inform lab in advance if urgent turnaround is required - surcharge applies*
Phone: 49625444 **Fax:** 49625888	

Envirolab Services
12 Ashley St, Chatswood, NSW, 2067
Phone: 02 9910 6200
Fax: 02 9910 6201
E-mail: ahie@envirolabservices.com.au
Contact: Aileen Hie

Sample information — **Tests Required** — **Comments**

Envirolab Sample ID	Client Sample ID 112983	Date sampled	Type of sample	⊗ 8 Metals	Aluminium	Fluoride	TPH	PAH (ANZECC)	Hold	Comments: Provide as much information about the sample as you can
1	MW07	10/7/14	WATER	X	X	X	X			⊗ Please filter metals samples
2	MW08	↓	↓	X	X	X	X			
3	MW101			X	X	X	X			
4	MW102			X	X	X	X			
5	MW10			X	X	X				
6	MW09			X	X	X				
7	MW11			X	X	X				
8	MW12			X	X	X		X		
9	MW103			X	X	X		X		
10	MW104			X	X	X		X		
11	MW13			X	X	X		X		
12	MW14			X	X	X		X		
13	DUP A			X	X	X	X			
14	DUP B			X	X	X		X		
~~#~~	DUP B1	↓	↓	~~X~~	~~X~~	~~X~~			X	please send to ALS for same analysis as DUP B

①

Relinquished by (company): ENVIRON	ELS	**Received by (company):** ELS	**Samples Received:** Cool or Ambient (circle one)
Print Name: KIRSTY GREENFIELD	JYH	**Print Name:** Kevin Wang	**Temperature Recieved at:** (if applicable)
Date & Time: 10/7/14 4:45pm	14/7/14 0900	**Date & Time:** 11/7/14 10:00	**Transported by:** Hand delivered / courier
Signature: KGreenfield	JH	**Signature:** K.W	**Page No:**

Environmental Division
Sydney
Work Order
ES1415361
Telephone : +61-2-8784 8555

Received by: Frsi ALS 14/7/14 1:30pm

CERTIFICATE OF ANALYSIS

Work Order	: **ES1415361**	Page	: 1 of 5
Client	: **ENVIRON**	Laboratory	: Environmental Division Sydney
Contact	: MS KIRSTY GREENFIELD	Contact	: Client Services
Address	: PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: kgreenfield@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130383	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 14-JUL-2014
Sampler	: KG	Issue Date	: 21-JUL-2014
Site	: ----		
		No. of samples received	: 1
Quote number	: SY/433/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics

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

- **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.**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	DUP B1	----	----	----	----
			Client sampling date / time	09-JUL-2014 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1415361-001	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	**41.6**	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	**0.008**	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	**0.048**	----	----	----	----
Copper	7440-50-8	0.001	mg/L	**0.007**	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	**0.020**	----	----	----	----
Lead	7439-92-1	0.001	mg/L	**0.008**	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	**0.047**	----	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	**15.4**	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.2	µg/L	<0.2	----	----	----	----
Acenaphthylene	208-96-8	0.2	µg/L	<0.2	----	----	----	----
Acenaphthene	83-32-9	0.2	µg/L	<0.2	----	----	----	----
Fluorene	86-73-7	0.2	µg/L	<0.2	----	----	----	----
Phenanthrene	85-01-8	0.2	µg/L	<0.2	----	----	----	----
Anthracene	120-12-7	0.2	µg/L	<0.2	----	----	----	----
Fluoranthene	206-44-0	0.2	µg/L	<0.2	----	----	----	----
Pyrene	129-00-0	0.2	µg/L	<0.2	----	----	----	----
Benz(a)anthracene	56-55-3	0.2	µg/L	<0.2	----	----	----	----
Chrysene	218-01-9	0.2	µg/L	<0.2	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2	0.2	µg/L	<0.2	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<0.2	----	----	----	----
Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.2	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<0.2	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<0.2	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<0.2	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.2	µg/L	<0.2	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	**27.6**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	**50.6**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	DUP B1	----	----	----	----
			Client sampling date / time	09-JUL-2014 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1415361-001	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates - Continued								
2.4.6-Tribromophenol	118-79-6	0.1	%	**63.6**	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**51.7**	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	**68.5**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	**65.8**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27.4	113
4-Terphenyl-d14	1718-51-0	32	112

QUALITY CONTROL REPORT

Work Order	: **ES1415361**	Page	: 1 of 5
Client	: **ENVIRON**	Laboratory	: Environmental Division Sydney
Contact	: MS KIRSTY GREENFIELD	Contact	: Client Services
Address	: PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: kgreenfield@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130383	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 14-JUL-2014
Sampler	: KG	Issue Date	: 21-JUL-2014
Order number	: ----		
		No. of samples received	: 1
Quote number	: SY/433/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

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

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

WORLD RECOGNISED ACCREDITATION

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics

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.

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: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3543302)									
ES1415322-015	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.005	0.001	126	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.022	0.019	14.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	3.08	3.01	2.1	0% - 20%
ES1415459-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.009	0.009	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.009	0.009	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.006	0.006	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.010	0.008	18.7	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.62	0.60	2.4	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 3543300)									
ES1415309-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES1415309-011	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3541970)									
ES1415361-001	DUP B1	EK040P: Fluoride	16984-48-8	0.1	mg/L	15.4	15.4	0.0	0% - 20%
ES1415432-009	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	1.3	1.2	0.0	0% - 50%

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: **WATER**

				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
EG020F: Dissolved Metals by ICP-MS (QCLot: 3543302)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.0	78	118
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.8	80	118
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.6	82	112
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.4	81	113
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.9	79	113
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.3	81	113
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.8	81	115
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	94.9	80	116
EG035F: Dissolved Mercury by FIMS (QCLot: 3543300)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.010 mg/L	89.2	78	114
EK040P: Fluoride by PC Titrator (QCLot: 3541970)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5.0 mg/L	102	75	119
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3540960)								
EP075(SIM): Naphthalene	91-20-3	0.2	µg/L	<1.0	20 µg/L	85.6	58.6	119
EP075(SIM): Acenaphthylene	208-96-8	0.2	µg/L	<1.0	20 µg/L	85.2	63.6	114
EP075(SIM): Acenaphthene	83-32-9	0.2	µg/L	<1.0	20 µg/L	86.0	62.2	113
EP075(SIM): Fluorene	86-73-7	0.2	µg/L	<1.0	20 µg/L	83.8	63.9	115
EP075(SIM): Phenanthrene	85-01-8	0.2	µg/L	<1.0	20 µg/L	89.1	62.6	116
EP075(SIM): Anthracene	120-12-7	0.2	µg/L	<1.0	20 µg/L	70.4	64.3	116
EP075(SIM): Fluoranthene	206-44-0	0.2	µg/L	<1.0	20 µg/L	91.0	63.6	118
EP075(SIM): Pyrene	129-00-0	0.2	µg/L	<1.0	20 µg/L	90.4	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	0.2	µg/L	<1.0	20 µg/L	85.5	64.1	117
EP075(SIM): Chrysene	218-01-9	0.2	µg/L	<1.0	20 µg/L	90.2	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.2	µg/L	<1.0	20 µg/L	96.3	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.2	µg/L	<1.0	20 µg/L	95.6	61.7	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.5	20 µg/L	88.9	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.2	µg/L	<1.0	20 µg/L	86.8	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.2	µg/L	<1.0	20 µg/L	84.7	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.2	µg/L	<1.0	20 µg/L	86.0	59.1	118

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: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	Recovery Limits (%) High
EG020F: Dissolved Metals by ICP-MS (QCLot: 3543302)							
ES1415322-017	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	119	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	113	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	98.6	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	93.2	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	105	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	100	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	124	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3543300)							
ES1415309-002	Anonymous	EG035F: Mercury	7439-97-6	0.0100 mg/L	89.5	70	130
EK040P: Fluoride by PC Titrator (QCLot: 3541970)							
ES1415361-001	DUP B1	EK040P: Fluoride	16984-48-8	25 mg/L	114	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are 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: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%) MS	Spike Recovery (%) MSD	Recovery Limits (%) Low	Recovery Limits (%) High	RPDs (%) Value	RPDs (%) Control Limit
EK040P: Fluoride by PC Titrator (QCLot: 3541970)										
ES1415361-001	DUP B1	EK040P: Fluoride	16984-48-8	25 mg/L	114	----	70	130	----	----
EG035F: Dissolved Mercury by FIMS (QCLot: 3543300)										
ES1415309-002	Anonymous	EG035F: Mercury	7439-97-6	0.0100 mg/L	89.5	----	70	130	----	----
EG020F: Dissolved Metals by ICP-MS (QCLot: 3543302)										
ES1415322-017	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	119	----	70	130	----	----
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	113	----	70	130	----	----
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	98.6	----	70	130	----	----
		EG020A-F: Copper	7440-50-8	0.2 mg/L	93.2	----	70	130	----	----
		EG020A-F: Lead	7439-92-1	0.2 mg/L	105	----	70	130	----	----
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	100	----	70	130	----	----
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	124	----	70	130	----	----

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1415361**	Page	: 1 of 5
Client	: ENVIRON	Laboratory	: Environmental Division Sydney
Contact	: MS KIRSTY GREENFIELD	Contact	: Client Services
Address	: PO Box 435 THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: kgreenfield@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 4962 5444	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 4962 5888	Facsimile	: +61-2-8784 8500
Project	: AS130383	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 14-JUL-2014
Sampler	: KG	Issue Date	: 21-JUL-2014
Order number	: ----		
		No. of samples received	: 1
Quote number	: SY/433/13	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with recommended holding times (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: **WATER**

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

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
DUP B1	**09-JUL-2014**	---	05-JAN-2015	----	**17-JUL-2014**	05-JAN-2015	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
DUP B1	**09-JUL-2014**	---	06-AUG-2014	----	**17-JUL-2014**	06-AUG-2014	✓
EK040P: Fluoride by PC Titrator							
Clear Plastic Bottle - Natural (EK040P)							
DUP B1	**09-JUL-2014**	---	06-AUG-2014	----	**15-JUL-2014**	06-AUG-2014	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
DUP B1	**09-JUL-2014**	**15-JUL-2014**	16-JUL-2014	✓	**16-JUL-2014**	25-AUG-2014	✓

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(where) 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: **WATER**

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)							
Dissolved Mercury by FIMS	EG035F	2	15	**13.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	16	**12.5**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	2	10	**20.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	15	**6.7**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	**6.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fluoride by PC Titrator	EK040P	1	10	**10.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

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*
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	AS 3550, APHA 21st ed. 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The 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)
Fluoride by PC Titrator	EK040P	WATER	APHA 21st ed., 4500 F--C CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

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

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

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

Appendix I

Groundwater Field Sheets

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 10/7/14
Project: Phase 2 ESA	**Sample Number:** MW06
Location: Hydro Kurri Kurri	**Location:** Background.

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 2.54 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°c)	D.O.	REDOX	EC mS	LITRES REMOVED	Comments (colour, odour, etc)
6.19	15.9	8.27	163	15.92	0.5	Clear
6.20	15.9	2.92	161	24.65	1	
6.19	16.0	1.84	157	24.89	1.5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:
Field Filtered ? Y / N Ease of filtering?
Weather Condition:
Duplicate Taken? Y / N Duplicate Number:
Triplicate Taken? Y / N Triplicate Number:
QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 9/7/14
Project: Phase 2 ESA	**Sample Number:** MW09
Location: Hydro Kurri Kurri	**Location:**

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 2.20 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°C)	D.O.	REDOX	EC mS	LITRES REMOVED	Comments (colour, odour, etc)
7.38	19.0	7.25	63	3.06	0.5	Clear
7.37	19.0	5.14	64	4.66	1	
7.36	18.9	5.04	66	4.59	1.5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 9/7/14
Project: Phase 2 ESA	**Sample Number:** MW07
Location: Hydro Kurri Kurri	**Location:** Refuelling Area

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 2.20 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:

Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°c)	D.O.	REDOX	EC µS	LITRES REMOVED	Comments (colour, odour, etc)
5.93	15.1	11.03	160	1315	0.5	Clear
6.16	15.3	2.70	151	2058	1	
6.22	15.4	2.03	126	1900	1.5	

Sampling

Sampling Method:

Type: Well / River / Surface water / Blank

Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 9/7/14
Project: Phase 2 ESA	**Sample Number:** MW08
Location: Hydro Kurri Kurri	**Location:** Refuelling Area

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 1.32 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°c)	D.O.	REDOX	EC µS	LITRES REMOVED	Comments (colour, odour, etc)
6.28	17.6	10.03	119	239.7	0.5	clear
6.27	17.8	4.35	115	356	1	
6.26	17.9	4.12	113	322	1.5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 9/7/14
Project: Phase 2 ESA	**Sample Number:** MW10
Location: Hydro Kurri Kurri	**Location:**

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 3.15 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°C)	D.O.	REDOX	EC mS	LITRES REMOVED	Comments (colour, odour, etc)
6.13	19.1	~~1079~~ 9.73	107	6.30	0.5	clear
6.13	18.9	1.92	107	10.27	1	
6.12	18.9	1.40	107	10.26	1.5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 9/7/14
Project: Phase 2 ESA	**Sample Number:** MW11
Location: Hydro Kurri Kurri	**Location:**

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 1·96 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°c)	D.O.	REDOX	EC µs	LITRES REMOVED	Comments (colour, odour, etc)
6·78	16·7	7·72	57	1396	0·5	clear
6·75	16·6	4·38	58	2209	1	
6·71	16·5	3·81	56	2146	1·5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 9/7/14
Project: Phase 2 ESA	**Sample Number:** MW12
Location: Hydro Kurri Kurri	**Location:** Anode Waste Pile

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 6.53 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°C)	D.O.	REDOX	EC mS	LITRES REMOVED	Comments (colour, odour, etc)
6.35	20.9	4.43	141	10.32	0.5	clear
6.26	20.6	3.01	139	17.30	1	
6.24	20.4	2.46	139	16.02	1.5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Metals + Al + F + PAH
ultratrace

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 9/7/14
Project: Phase 2 ESA	**Sample Number:** MW13
Location: Hydro Kurri Kurri	**Location:** Anode Waste Pile

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 1·76 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°c)	D.O.	REDOX	EC mS	LITRES REMOVED	Comments (colour, odour, etc)
7·40	18·3	9·35	52	3·10	0·5	brown purge
7·35	18·0	3·98	51	4·91	1	
7·32	17·9	3·35	50	~~3·22~~ 5·04	1·5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 9/7/14
Project: Phase 2 ESA	**Sample Number:** MW14
Location: Hydro Kurri Kurri	**Location:** Carbon Plant

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 3.25 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°C)	D.O.	REDOX	EC mS	LITRES REMOVED	Comments (colour, odour, etc)
7.18	19.7	9.07	42	3.16	0.5	clear
7.15	19.8	4.99	44	5.04	1	
7.14	19.8	4.83	45	5.04	1.5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:
Field Filtered ? Y / N Ease of filtering?
Weather Condition:
Duplicate Taken? Y / N Duplicate Number:
Triplicate Taken? Y / N Triplicate Number:
QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 11/7/14
Project: Phase 2 ESA	**Sample Number:** MW15
Location: Hydro Kurri Kurri	**Location:** Carbon Plant

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 3.05 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:

Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°C)	D.O.	REDOX	EC µS	LITRES REMOVED	Comments (colour, odour, etc)
6.59	16.4	2.86	90	1936	0.5	clear
6.60	19.6	2.54	81	1949	1	
6.60	19.7	2.39	81	1954	1.5	

Sampling

Sampling Method:

Type: Well / River / Surface water / Blank

Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 10/7/14
Project: Phase 2 ESA	**Sample Number:** MW16
Location: Hydro Kurri Kurri	**Location:** Carbon Plant

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 0.61 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°c)	D.O.	REDOX	EC µS	LITRES REMOVED	Comments (colour, odour, etc)
7.03	17.3	9.98	117	298	0.5	Clear
6.99	17.0	5.96	115	440	1	
6.97	17.0	2.88	114	458	1.5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

TPH odour in vicinity
Sampled for TPH

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 10/7/14
Project: Phase 2 ESA	**Sample Number:** MW17
Location: Hydro Kurri Kurri	**Location:** Carbon Plant

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 1.45 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°C)	D.O.	REDOX	EC µS	LITRES REMOVED	Comments (colour, odour, etc)
7.63	17.4	11.43	137	48.8	0.5	clear
7.02	17.9	4.79	131	896	1	
6.94	18.0	4.43	125	888	1.5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comment

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 10/7/14
Project: Phase 2 ESA	**Sample Number:** MW18
Location: Hydro Kurri Kurri	**Location:** Carbon Plant

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 1.73 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°c)	D.O.	REDOX	EC µS	LITRES REMOVED	Comments (colour, odour, etc)
5.35	16.2	12.71	178	232.8	0.5	Clear
5.42	16.4	3.61	175	233	1	
5.52	16.6	3.86	172	234	1.5	
5.60	16.6				1.7	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 10/7/14
Project: Phase 2 ESA	**Sample Number:** ~~[illegible]~~ S3B
Location: Hydro Kurri Kurri	**Location:** Carbon Plant

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 4.45 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°C)	D.O.	REDOX	EC µS	LITRES REMOVED	Comments (colour, odour, etc)
7.38	~~18~~ 18.3	10.86	93	711	0.5	clear
7.29	18.8	7.54	92	1167	1	
7.18	19.0	7.28	92	1188	1.5	
7.13	19.4	7.14	91	1213	2	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 10/7/14
Project: Phase 2 ESA	**Sample Number:** ~~[illegible]~~ S3A
Location: Hydro Kurri Kurri	**Location:** Carbon Plant

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 1.91 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°c)	D.O.	REDOX	EC µS	LITRES REMOVED	Comments (colour, odour, etc)
8.07	15.1	12.14	77	1862	0.5	clear
~~9.58~~ 8.11	15.3	9.56	79	185	1	
8.13	15.3	9.14	81	270	1.5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 10/7/14
Project: Phase 2 ESA	**Sample Number:** MW19
Location: Hydro Kurri Kurri	**Location:** Diesel Spray Area

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 2.38 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:

Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°C)	D.O.	REDOX	EC us	LITRES REMOVED	Comments (colour, odour, etc)
6.42	19.5	5.40	74	764	0.5	clear
6.39	19.6	3.41	75	1113	1	
6.38	19.7	2.54	77	1111	1.5	

Sampling

Sampling Method:

Type: Well / River / Surface water / Blank

Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 10/7/14
Project: Phase 2 ESA	**Sample Number:** MW20
Location: Hydro Kurri Kurri	**Location:** Diesel Spray Area

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 2.63 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°C)	D.O.	REDOX	EC µS	LITRES REMOVED	Comments (colour, odour, etc)
7.19	16.9	11.82	77	1909	0.5	clear
7.02	17.2	6.77	78	2.85mS	1	
6.94	17.3	6.69	78	2.57	1.5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 9/7/14
Project: Phase 2 ESA	**Sample Number:** MW101
Location: Hydro Kurri Kurri	**Location:** Refuelling Area

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 1.76 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°c)	D.O.	REDOX	EC µS	LITRES REMOVED	Comments (colour, odour, etc)
6.61	20.1	9.45	102	345	0.5	clear
6.59	20.4	4.16	96	543	1	
6.55	20.2	4.25	94	548	1.5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 9/7/14
Project: Phase 2 ESA	**Sample Number:** MW102
Location: Hydro Kurri Kurri	**Location:** Refuelling Area

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 1.53 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:

Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°c)	D.O.	REDOX	EC μs	LITRES REMOVED	Comments (colour, odour, etc)
7.12	19.5	5.50	110	482	0.5	clear
7.10	19.5	4.72	107	483	1	
7.06	19.5	4.29	106	482	1.5	

Sampling

Sampling Method:

Type: Well / River / Surface water / Blank

Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number: DUP A

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 9/7/14
Project: Phase 2 ESA	**Sample Number:** MW103
Location: Hydro Kurri Kurri	**Location:** Anode Waste Pile

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 1.79 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:

Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°C)	D.O.	REDOX	EC uS	LITRES REMOVED	Comments (colour, odour, etc)
6.12	18.2	10.69	80	1657	0.5	clear
6.02	17.6	2.81	89	2.48 mS	1	
5.98	17.5	2.02	93	2.21	1.5	

Sampling

Sampling Method:

Type: Well / River / Surface water / Blank

Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 9/7/14
Project: Phase 2 ESA	**Sample Number:** MW104
Location: Hydro Kurri Kurri	**Location:** Anode Waste Pile
Field Measurements	
Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 1.78 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:

Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°C)	D.O.	REDOX	EC mS	LITRES REMOVED	Comments (colour, odour, etc)
6.86	18.7	1.55	26	2.59	0.5	~~Clear~~
6.85	18.7	0.91	20	2.77	1	brown tinge
6.84	18.5	0.83	16	2.66	1.5	

Sampling

Sampling Method:

Type: Well / River / Surface water / Blank

Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number: DUP B

Triplicate Taken? Y / N Triplicate Number: DUP B1

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 10/7/14
Project: Phase 2 ESA	**Sample Number:** MW105
Location: Hydro Kurri Kurri	**Location:** Carbon Plant

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 1.02 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°c)	D.O.	REDOX	EC us	LITRES REMOVED	Comments (colour, odour, etc)
8.14	15.3	6.79	124	539	0.5	Clear
9.68	15.5	2.44	104	973	1	
9.73	15.5	1.78	101	958	2	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Note: Overflow in HTM oil area in days before sampling. Sorbent material used to clean up the day before. Some wash down water in top of casing - went down well before sampling

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 10/7/14
Project: Phase 2 ESA	**Sample Number:** MW106
Location: Hydro Kurri Kurri	**Location:** Carbon Plant

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 4.81 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:

Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°c)	D.O.	REDOX	EC uS	LITRES REMOVED	Comments (colour, odour, etc)
7.39	17.2	11.66	97	968	0.5	cloudy
7.40	18.2	11.19	99	1034	1	
7.34	19.6	2.86	97	1693	1.5	clear
7.30	19.9	1.92	95	1706	2	

Sampling

Sampling Method:

Type: Well / River / Surface water / Blank

Start Sampling:	Finish Sampling:

Sample Appearance, eg colour, sediment:

Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number:

Groundwater Sampling Field Parameter Form

Ref. Number: AS130383	**Date:** 11/7/14
Project: Phase 2 ESA	**Sample Number:** MW107
Location: Hydro Kurri Kurri	**Location:** Carbon Plant

Field Measurements

Organic vapours in well: ppm	Measurement device:
Depth to water: (from top of casing) 1·43 m	Measurement Device:
Stickup:	
Well Depth (from TOC):	

Well Purging

Purge Method:	
Volume in Casing: L	Purge Volume: L
Start Purge:	End Purge:

pH	TEMP (°C)	D.O.	REDOX	EC us	LITRES REMOVED	Comments (colour, odour, etc)
5·42	15·7	6·13	147	386	0·5	clear
5·52	15·9	2·46	153	608	1	
5·52	16·0	2·06	153	604	1·5	

Sampling

Sampling Method:			
Type: Well / River / Surface water / Blank			
Start Sampling:		Finish Sampling:	
Sample Appearance, eg colour, sediment:			
Pre-Sampling:	pH:	Spec.Cond:	Temp:
Pre-Sampling:	pH:	Spec.Cond:	Temp:

Miscellaneous Field Comments

Well Head Integrity:

Field Filtered ? Y / N Ease of filtering?

Weather Condition:

Duplicate Taken? Y / N Duplicate Number:

Triplicate Taken? Y / N Triplicate Number:

QA/QC Taken? Y / N QA/QC Number: