

Phase 2 Environmental Site Assessment, Parcel 13

Prepared for: Hydro Aluminium Kurri Kurri Pty Ltd

On behalf of:

Prepared by: ENVIRON Australia Pty Ltd

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Specific assumptions and limitations identified by ENVIRON as being relevant are set out in the report. The methodology adopted 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.

This report should be read in full.

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VERSION CONTROL RECORD

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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)
СТ	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 GPS	Groundwater Management Unit 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 NATA	Micrograms per Litre
NATA	National Association of Testing Authorities 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
	Upper Confidence Limit
US EPA	United States Environment Protection Authority
μg/L VENM	Micrograms per Litre virgin excavated natural material
	On tables is "not calculated", "no criteria" or "not applicable"
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Executive Summary

This report presents the findings of a Phase 2 Environmental Site Assessment undertaken on part of the Hydro Aluminium Kurri Kurri (Hydro) owned land known as Parcel 13. Parcel 13 is approximately 20ha and is accessed from Bowditch Avenue, Loxford and located within the buffer zone and to the east of the Hydro aluminium smelter. Parcel 13 comprises six residential properties, with cleared open grassland with scattered mature trees at the rear of each property. The northern-most property also contains two chicken sheds.

The objectives of the assessment were to assess the potential for contamination at Parcel 13 based on historical and current landuse and to assess the suitability of Parcel 13 for low rural residential (R2) land use.

A Phase 1 Environmental Site Assessment has previously been completed for the Hydro owned lands including Parcel 13 (ENVIRON (22 October 2013) Phase 1 ESA, Hydro Kurri Kurri Aluminium Smelter). The Phase 1 identified that contamination of Parcel 13 may have occurred from dust deposition due to the proximity of the Hydro smelter and from construction/ demolition of buildings constructed with asbestos containing materials.

To assess the potential contaminants of concern on Parcel 13, a site walkover was completed and surface soil samples were collected for across the parcel.

The site walkover identified six lots that are or were previously used for residential purposes. Two of the lots were formerly used for poultry farming and one lot is currently used for this activity. Farm-type wastes were identified in surface fill, on the surface of hummocky ground and stockpiled at various locations across all six lots on Parcel 13 including ACM fragments. Buried wastes, including ACM fragments, were identified at the following locations:

- At the location of the former poultry sheds on Lots 460 and 463;
- In a gully on Lot 458;
- Within a filled-in septic tank on Lot 461;
- In hummocky ground in the centre of Lot 462;
- At three separate areas at the rear of Lot 463.

The dwellings and associated sheds on Parcel 13 were assessed in a Hazardous Materials Audit, which identified asbestos containing building materials in the dwellings and garages on Lots 458, 460, 461, 462 and 463.

The site will be suitable for the proposed low rural residential (R2) land use subject to completion of the following remedial actions:

• Areas impacted by ACM fragments should be evaluated for feasible remediation options including excavation and combined encapsulation at another location within Hydro-owned land.

- For aesthetic reasons, other wastes should also be removed from the parcel and recycled as appropriate.
- The recommendations of the Hazardous Materials Audit should be followed.

ENVIRON consider that Parcel 13 can be made suitable for the proposed low rural residential land use following remediation. A Remedial Action Plan will be completed to assess the remedial options and outline the requirements for remediation and validation.

Hydro has separately engaged a NSW EPA-accredited Site Auditor to review the investigations completed and the Remedial Action Plan and to complete an interim opinion letter, indicating that the site can be made suitable for the proposed landuse.

1 Introduction

1.1 Background

This report presents the findings of a Phase 2 Environmental Site Assessment undertaken on part of the Hydro Aluminium Kurri Kurri Pty Limited (Hydro) owned land known as Parcel 13. Parcel 13 is located off Bowditch Avenue, Loxford, New South Wales (2326). The location of Parcel 13 is shown in **Figure 1**.

The work has been performed at the request of Hydro Aluminium Kurri Kurri Pty Limited (the "Client").

Hydro is currently evaluating options for the divestment of land parcels for a range of proposed uses following the closure of the smelter in May 2014. A Rezoning Masterplan has been developed that identifies Parcel 13 to comprise land suitable for low rural residential (R2) land use.

A Phase 1 Environmental Site Assessment has previously been prepared for all Hydro owned lands and evaluated the potential for contamination. On Parcel 13, these investigations identified the presence of dwellings likely to contain asbestos and current and former poultry sheds.

It is noted that at the time of the fieldwork, this land parcel was named Employment Land Subarea 13 and as such the soil samples reference this name. The name of the land parcel as referenced in this report changed to Parcel 13 during the rezoning process.

The location of Parcel 13 in the context of the Rezoning Masterplan is shown in Figure 2.

1.2 Objectives and Scope of Work

The objectives of the assessment were to assess the potential for contamination at Parcel 13 based on historical and current land use and to assess the suitability of Parcel 13 for the purposes of low rural residential (R2) land use.

The scope of work performed to meet the objectives comprised:

- A review of available information relating to land use to assess the potential for soil, groundwater or surface water contamination arising from historic and current activities;
- A review of published geological, hydrogeological and hydrological data to establish the environmental setting and sensitivity;
- Field work comprising:
 - Collection of surface soil samples to provide a coarse grid assessment to assess the potential for dust deposition from the smelter operations;
 - A site walkover to evaluate other potential locations of buried waste or illegal dumping.
 - Intrusive investigations using a back hoe to investigate areas of fill.
- Data interpretation including comparison against relevant guidelines and a discussion of the findings in terms of human health and environment risk under the current and future land use scenarios.

• Review of options available for remediation or management to render Parcel 13 suitable for the proposed land use.

2 Site Description

2.1 Site Location

Parcel 13 is owned by Hydro Aluminium Kurri Kurri Pty Limited and is located approximately 35km north west of the city of Newcastle and 150km north of Sydney, in the suburb of Loxford, Kurri Kurri, New South Wales, Australia. Parcel 13 is accessed from Bowditch Avenue. The location of Parcel 13 is shown in **Figure 1**.

Parcel 13 is located within the Buffer Zone of the Hydro Aluminium Kurri Kurri Smelter, east of the smelter. The Buffer Zone is an area of land surrounding the smelter that provides a buffer between the smelter and surrounding communities.

The site comprises six residential properties, each with a dwelling and associated sheds. The rear of each property is cleared open grassland with mature trees. Dams are located on the north western boundary of the three central properties. The northern-most property also comprises two poultry sheds, two smaller farm sheds and a dam. Parcel 13 drains to Swamp Creek, located approximately 60m north east of the site. A train line for coal transport is located on the north western site boundary.

Parcel 13 is located within the Cessnock Local Government Area and is zoned RU2 – Rural Landscape under the Cessnock Local Environment Plan.

Parcel 13 is approximately 20 hectares (ha) and comprises the lot numbers and deposited plans (DP) listed in **Table 1**:

Table 1: Lot and Deposited Plans for Parcel 13.						
Subarea Lot/ DP Area (ha) Total Area (ha)						
Parcel 13	Lot 458 DP755231	3.8	19.6			
	Lot 459 DP755231	3.8				
	Lot 460 DP755231	2.8				
	Lot 461 DP755231	3.1				
	Lot 462 DP755231	3.0				
	Lot 463 DP755231	3.1				

Land uses surrounding Parcel 13 are as follows:

- North: Rural residential landuse, including a poultry farm, then farmland.
- South east: The Kurri Kurri Campus of Hunter TAFE (education facility) then bushland.
- West: A dedicated coal train line, then bushland.

2.2 Site Setting

2.2.1 Topography

Parcel 13 is located in a low lying area of the Buffer Zone at approximately 12 mAHD. The main entrance off Bowditch Avenue to Parcel 13 extends along its south western boundary and is the highest point on the site. The natural topography slopes to the north west towards Swamp Creek, located approximately 60m west of the site boundary.

2.2.2 Regional Geology

According to the review of the regional geology described on the Sydney Basin Geological Sheet, Parcel 13 is underlain by siltstone, marl and minor sandstone from the Permian aged Rutherford Formation (Dalwood Group) in the Sydney Basin.

Undifferentiated Quaternary alluvium occurs on the surface of Parcel 13 associated with surface water bodies. Quaternary sediments which are associated with Swamp Creek (located approximately 60m west of the site) and the Hunter River consist of gravel, sand, silt and clay.

2.2.3 Site Hydrology

Surface water from Parcel 13 discharges primarily via infiltration and overland flow to Swamp Creek, located approximately 60m west of the site. Swamp Creek discharges into Wentworth Swamp, which in turn discharges to the Hunter River approximately 11km northeast of Parcel 13 near Maitland.

The Wentworth Swamp system is within the Fishery Creek Catchment, where declining stream water quality and a reduction in diversity of native plants and animals has occurred due to population growth and development pressures in the last ten years (Hunter-Central Rivers Catchment Management Authority).

2.2.4 Regional Hydrogeology

Regional groundwater is expected to follow topography and flow northeast towards the surface water bodies that discharge to the Hunter River. Locally, groundwater beneath Parcel 13 is expected to flow west to Swamp Creek located approximately 60m west of the site.

According to the NSW Office of Environment and Heritage (Natural Resource Atlas), there are 21 licensed groundwater abstractions (bores) located within 2km of Parcel 13. The majority of the groundwater bores are located within the aluminium smelter and buffer zone.

Information for 11 bores located in a 1km radius from Parcel 13 has been included in Appendix A. The bores are used for monitoring purposes. No further information, such as depth to water or logging information was provided.

The Hunter River Alluvium Groundwater Management Unit (GMU) is an important groundwater resource to the region. Groundwater extraction for irrigation, urban supply, drought supply, stock, domestic and commercial/ industrial use occurs, with volumes in excess of 10,000ML per annum extracted from the Hunter River Alluvium GMU. Aquifer storage and recovery is also an important use of this GMU. It is noted that the Hunter River GMU is not the primary drinking water supply in the region, although the protection of

drinking water is a water quality objective for the Hunter River (NSW Water Quality and River Flow Objectives)(www.environment.nsw.gov.au/ieo/Hunter/index.htm).

2.3 Site Sensitivity

The sensitivity of Parcel 13 with respect to surface water and groundwater is considered to be moderate based on the following:

- Surface water and groundwater discharge into Swamp Creek, located approximately 60m west of the site, which discharges to the Hunter River via Wentworth Swamp within the Fishery Creek Catchment, approximately 11km northeast of Parcel 13 near Maitland.
- Declining stream water quality and a reduction in diversity of native plants and animals has occurred within the Fishery Creek Catchment and water quality down gradient of Parcel 13 has been impacted by historical coal mining;
- The Hunter River GMU is used for irrigation, urban supply, drought supply, stock, domestic and commercial/ industrial use but it is not the main drinking water supply in the region.

3 Site History

Site history investigations included in the Phase 1 ESA for the Hydro Aluminium Kurri Kurri Smelter, dated 26 August 2013 provided the following historical information about Parcel 13:

- Earliest records (aerial photograph in 1951) shows that Parcel 13 comprised semicleared land, with the six lots evident. There do not appear to be developments on any of the lots at this time.
- Residential dwellings were constructed on the six lots between the 1960s and the 1990s. These dwellings and associated sheds remain on site at present.
- Lots 458, 460 and 463 in DP755231 were developed with poultry sheds in the early 1970s. The sheds have since been removed from Lots 460 and 463. Two poultry sheds remain on Lot 458, however they are at present in a different location to where they were originally constructed in the 1970s;
- Parcel 13 is located approximately 650m east of the smelter boundary and may be impacted from smelter dust deposition.

The locations of the current and former poultry sheds and current dwellings are included in **Figures 3 to 8**. Photos are presented in **Appendix C**.

4 Sampling and Analytical Quality Plan

4.1 Potential Areas and Contaminants of Concern

Based on Parcel 13 historical information as discussed in **Section 3**, the following areas of concern were identified:

- Construction and removal of poultry sheds;
- Residential developments on the six lots.
- Smelter dust deposition.

Contaminants of concern associated with the range of previous site activities are:

- Asbestos;
- Fluoride.

4.2 Data Quality Objectives and Data Quality Indicators

Data quality objectives (DQOs) and Data Quality Indicators (DQIs) were developed by ENVIRON using the US EPA seven-step DQO process. Completing the seven-step process helps to define the purpose of the assessment and the type, quality and quantity of data needed to inform decisions relating to the assessment of site contamination.

The seven-step DQO process and DQIs are included in Appendix F.

4.3 Sampling Design

The sampling design was optimised following the development of DQOs and DQIs. The sampling design is outlined below. ENVIRON notes that the historical site activities indicate potential contamination to surface soils only. Where fill was identified during the site walkover, a second round of field investigations was completed to assess subsurface soils. No potential contamination sources to surface water or groundwater have been identified.

4.3.1 Fluoride

To assess the potential for fluoride in soil from dust deposition from the Hydro Aluminium Kurri Kurri Smelter, surface soil samples were collected at a rate of one sample per 5ha.

The sample density is lower than that suggested in Table A of NSW EPA (1995) Contaminated Sites: Sampling Design Guidelines. The density is considered adequate for the purposes of this investigation for the following reasons:

- aerial dust deposition is likely to be relatively consistent over the surface of the parcel and therefore sampling on a low density will allow for identification of whether or not dust deposition is an issue; and
- in the event that elevated or variable fluoride concentrations are identified, additional sampling will be completed.

Samples were collected by trowel from surface soils on an approximate grid across open areas of Parcel 13. Sample locations were logged by GPS.

Soil samples were placed into laboratory-supplied paper bags and stored in an ice-filled cooler for transportation to the laboratory. Soil samples were transported to the laboratory under chain of custody conditions. Intra-laboratory duplicate soil samples were collected at a rate of 10%.

Soil samples were analysed for soluble fluoride, as this is the portion of total fluoride that is available for uptake in receptors including biota, flora, fauna and humans. The laboratory was NATA accredited for the analysis.

4.3.2 Asbestos

To assess the potential for asbestos and other illegally dumped wastes to be present at Parcel 13, a site walkover of accessible areas was completed.

The location and type of dumped wastes were detailed on Field Information Sheets and logged by GPS. Where asbestos was confidently identified by the field personnel, no sampling was completed. If not, a sample of potential asbestos containing material (ACM) was collected for laboratory analysis. ACM fragments were collected into a zip-lock bag using dedicated disposable gloves.

ACM fragments were analysed for asbestos identification by a laboratory NATA accredited for the analysis.

4.3.3 Potential Fill

The site walkover identified the potential for fill material at Parcel 13. As such, a second round of fieldwork was completed to assess the potential fill and its potential for contamination.

A back hoe was used to excavate test pits into areas of potential fill identified at Parcel 13. The number of test pits completed at the six lots is as follows:

- Lot 458: 12 test pits;
- Lot 459: 4 test pits;
- Lot 460: 24 test pits;
- Lot 461: 17 test pits;
- Lot 462: 20 test pits;
- Lot 463: 11 test pits.

The test pits were logged by an ENVIRON environmental scientist and soil samples were collected for analysis.

Soil samples were collected into laboratory-supplied acid-rinsed glass jars using dedicated disposable gloves. The soil samples were stored in an ice-filled cooler for transportation to the laboratory. Soil samples were transported to the laboratory under chain of custody conditions. Intra-laboratory duplicate soil samples were collected at a rate of 10%.

Soil samples were analysed for a range of potential contaminants, including heavy metals, total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphorous pesticides (OPPs) and asbestos. The laboratory was NATA accredited for the analysis.

5 Basis for Assessment Criteria

5.1 Soil

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

• NEPC (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, as follows:

- HIL A residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry), also includes children day care centres, preschools and primary schools
- HIL B residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats
- HIL C public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves) which should be subject to a site-specific assessment where appropriate
- HIL D commercial/industrial such as shops, offices, factories and industrial sites.

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 objective of the Phase 2 ESA is to assess soil contamination at Parcel 13 in relation to risks posed to human health and the environment under the proposed future land use of rural residential. As such, soil investigation results will be compared against the HIL/HSL Residential A (low density residential), management limits and EILs/ESLs for urban residential/public open space.

- 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 residential use.
- HSLs for soil vapour intrusion from petroleum hydrocarbons 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.

- EILs for urban residential/ public open space, 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 urban residential/ public open space, 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 2:

Table 2: Soil Assessment Criteria (mg/kg) – Health and Ecological Investigation Levels						
HIL A EIL ¹						
Arsenic	100	100				
Cadmium	20	-				
Chromium (VI)	100	410 (Cr III, 1% Clay)				
Copper	6000	220				
Lead	300	1100				
Nickel	400	220				
Zinc	7,400	630				
Mercury (inorganic)	40	-				
Fluoride	Ref Table 5	-				
Carcinogenic PAHs (as BaP TEQ)	3	-				
Total PAHs	300	-				
DDT+DDE+DDD	240	180				
Aldrin and dieldrin	6	-				
Chlordane	50	-				
Endosulfan	270	-				
Endrin	10	-				
Heptachlor	6	-				
НСВ	10	-				
Methoxychlor	300	-				
Mirex	10	-				
Toxaphane	20	-				
Atrazine	320	-				
Chlorpyrifos	160	-				
Bifenthrin	600	-				

1 EILs for urban residential and public open spaces calculated using the NEPM (2013) EIL Calculation Spreadsheet and a pH of 5 and Cation Exchange Capacity (CEC) of 15cmolc/kg for Parcel 13 from ALS report ES408784001.

The applicable assessment criteria for petroleum hydrocarbons in soil are presented in Table 3 and Table 4:

Table 3: Soil Assessment Criteria for Vapour Intrusion - HSL A & HSL B (mg/kg) - Sand					
	0 to <1m	1m to <2m	2m to <4m	4m+	
Toluene	160	220	310	540	
Ethylbenzene	55	NL	NL	NL	
Xylenes	40	60	95	170	
Naphthalene	3	NL	NL	NL	
Benzene	0.5	0.5	0.5	0.5	
F1(4)	45	70	110	200	
F2(5)	110	240	440	NL	

1 Land use settings are equivalent to those described in Section 5.1 (above). HSLs for vapour intrusion for high density residential assume residential occupation of the ground floor. If communal car parks or commercial properties occupy the ground floor, HSL D should be used.

2 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'.

3 (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.

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

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

TPH fraction Soil texture		ESLs (mg/kg dry soil)	Management Limits ¹ (mg/kg dry soil)	
		Urban residential and public open space	Residential, parkland and public open space	
F1 C6-C10	Fine	180*	800	
F2 >C10-C16	Fine	120*	1000	
F3 >C16-C34	Fine	1300	3500	
F4 >C34-C40	Fine	5600	10000	
Benzene	Fine	65	-	
Toluene	Fine	105	-	
Ethylbenzene	Fine	125	-	
Xylenes	Fine	45	-	
Benzo(a)pyrene	Fine	0.7	-	

Table 4: ESLs and Management Limits for Petroleum Hydrocarbons in Soil

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.

Z:\Projects\Hydro Australia\AS130348 Buffer Zone Investigations\Fieldwork Info Packages\EMP 13 now Parcel 13\Reporting\Final for Rezoning\AS130348 Phase 2 ESA - Parcel 13_Final for Rezoning.doc 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 5**. The HSLs are generic to all soil types.

Table 5. Health screening levels for asbestos contamination in soil Health Screening Level (w/w)						
Form of asbestos Residential Residential Recreational Commercia A1 B2 C3 Industrial D						
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 Smelter . The screening levels are protective of the range of human receptors and are provided in **Table 6**:

Table 6: Site Specific Soil Assessment Criteria (mg/kg) for Fluoride				
Preliminary screening levels				
Land Use	Preliminary screening level			
Residential landuse	F 440mg/kg			
Recreational landuse	F 1200mg/kg			
Commercial/ industrial landuse	F 17000mg/kg			

Soil investigation results for the samples taken from a grid formation across Parcel 13 have been compared against the residential land use screening level. The fluoride 'residential land use' screening level is considered to be suitably protective of both 'residential' and 'rural residential' land use because the exposure pathways (including vegetable ingestion) and behavioural assumptions (e.g. soil ingestion rate) for the child are considered to be identical under residential and rural residential land use scenarios.

There is a possibility that the rural plots may contain a low density of domestic livestock such as poultry and goats, however there is limited evidence of fluoride accumulation in milk and edible tissues of animals fed high levels of fluorides (ATSDR, 2003; NAS, 1971). Rather, fluoride accumulates primarily (up to approximately 99%) in the skeletal tissues of terrestrial animals that consume fluoride-containing foliage (WHO, 1997; ATSDR, 2003). This assumption is supported by site-specific data collected during the 29th annual cattle survey conducted in March 2012 on cattle located within the site's buffer zone, and surrounding areas (AECOM, 2013). The results of this survey concluded that cattle has had little or no exposure to excess environmental fluoride; skeletal fluoride levels decreased compared to 2011 levels, with all fluoride measurements below the toxic threshold; and all cattle examined were in good health and body condition. Consequently, the residential screening level is considered to be suitably protective of rural residential land use that may contain a low density of domestic livestock.

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 (UCL) of mean against the relevant guideline also ensuring that:
 - $\circ\,$ the standard deviation of the results is less than 50% of the relevant investigation or screening level, and
 - $_{\odot}$ no single value exceed 250% of the relevant investigation or screening level.

6 Results

6.1 Site Walkover

A site walkover was completed to identify areas of environmental concern, such as illegally dumped wastes and fill at Parcel 13. The entrance to Parcel 13 is from Bowditch Avenue, which borders the eastern site boundary. The site comprises six rural residential lots, Lots 458 to 463, with dwellings and associated sheds on four of the six lots. Each lot generally comprises buildings in the eastern portion of the lot, close to Bowditch Avenue, with the remainder of the lot comprising cleared open grassland with some mature trees and farm dams near the western site boundary. The exception is Lot 458, which comprises two active poultry sheds and several farm buildings including a shipping container and a fuel tank at the rear of the dwelling.

The dwellings and associated sheds were assessed separately in a Hazardous Materials Audit, a copy of which is included in **Appendix G**.

The site walkover identified hummocky ground, small fill mounds, former poultry shed footprints with associated debris such as metal pipes and concrete rubble, former building footprints and small stockpiles of wastes such as bricks, tyres, scrap metal and ACM fragments. A description of the areas of concern identified at each lot on Parcel 13 is outlined in **Table 7**.

The locations of areas of concern identified during the field investigations are shown in **Figures 3 to 8**. Photographs are included in **Appendix B**. Field Information Sheets are included in **Appendix C**.

Lot	Poultry Shed/ Building Footprints	Hummocky Ground	Fill Mounds	Waste Stockpiles
Lot 458	Two current poultry sheds and one former poultry shed footprint identified.	Two areas of hummocky ground identified at the rear of the poultry sheds.	Six areas of fill identified close to poultry sheds, including buried and surface ACM fragments.	Waste stockpile on southern boundary fence, included metal framework, tyres, timber, chemical drums and plastic industrial chemical containers.
Lot 459	One shed footprint was identified near the house, with ACM scattered over the footprint.	Two areas of hummocky ground identified, one with scrap metal and concrete pieces visible.	Two identified, one at the rear of the house and one 100m west of the house.	A stack of old roof tiles was identified.
Lot 460	Two poultry shed footprints and one building footprint, with minor surface debris including the concrete slabs. The former building footprint behind the house included asbestos sheeting and large ACM fragments.	Two areas of hummocky ground, one at the rear of the former poultry sheds and one at the front of the former poultry sheds, both with bricks and concrete visible on the surface.	One identified near the dam in the western portion of the lot, which appeared to be soil only.	Waste only associated with former building footprints.
Lot 461	Three former building footprints were identified, with ACM fragments scattered across the concrete slabs. The building footprints do not represent former poultry sheds, due to shape and size. One large concrete slab extends parallel to Bowditch Avenue, whereas former poultry sheds extend perpendicular to the road. Other concrete slabs, one with	Two areas of hummocky ground identified, one immediately at the rear of the current house with bricks and concrete visible, and one in the eastern portion of the lot.	Two fill mounds identified, one with a metal pipe visible and one with partially buried fence posts under a tree.	The building footprints and fill mounds included wastes such as metal sheeting, an old drum, ceramic water pipes, bricks, concrete and ACM fragments.

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Lot	Poultry Shed/ Building Footprints	Hummocky Ground	Fill Mounds	Waste Stockpiles
	a hole in it and remnants of ceramic pipe, indicates former unknown use.			
Lot 462	Former building footprints were identified within a fenced area near Bowditch Avenue with ACM fragments scattered on the ground surface.	One area identified behind an old shed, with sheet metal and concrete footings evident.	Potential fill mounds were identified between Bowditch Avenue and the dwelling on site, with gravelly exposed soil.	Two stockpiles, one of old fence posts and wire, and one of old tyres and scrap metal were identified.
Lot 463	Two footprints of former sheds, has thick grass cover. ACM fragments, scrap metal and concrete rubble identified, metal pipes still in place.	None identified	Fill mounds identified at two locations, metal machine parts visible in one grass covered mound. Concrete pieces with reinforcing bar and bricks were visible on the surface of the other mound.	Wastes including sheet metal, concrete and bricks identified or ground surface between the two poultry shed footprints.

6.2 Soil Investigations

6.2.1 Fluoride and Asbestos

Six surface soil samples were collected from across Parcel 13 as per the sampling design to assess the potential for fluoride in soil from dust deposition from the Hydro Aluminium Kurri Kurri Smelter as shown in **Figures 3 to 8**. A generalised lithology of the surface soils encountered at Employment Land Subarea 13 is as follows:

• Topsoil: Silt, dark brown, slightly moist.

Seven ACM fragments were collected from representative areas of each lot for laboratory analysis. In addition, a 10m by 10m grid was set up at two locations of former poultry sheds, one on Lot 460 and one on Lot 463, and a walkover screening survey conducted over those areas comprising two passes with a 90° directional change between them, as per NEPM (2013). ACM fragments were not identified within the 10m by 10m grid at either area during the intensive walkover.

6.2.1 Potential Fill

Sixty two test pits were excavated in areas of potential fill across five of the six lots, as shown in **Figures 3 to 8**. The findings from the test pits on each lot are outlined in **Table 8**.

Lot	No. of Test Pits	Fill	Depth of Fill	Natural Ground	Depth of Natural Ground
Lot 458	12	Three separate areas of deep fill were identified at the rear of the lot (TP16, TP19 and TP23). At each location, fill included wastes such as glass, metal sheeting, fence posts, car parts, electrical wire, plastic containers, ceramic pipe, house bricks, concrete pieces and ACM fragments. These areas appear to be distinct excavations for burial of wastes. Surrounding test pits did not identify extensive waste burial.	TP16: 0.5m to 2.0m TP19: 0m to 1.8m TP23: 0m to 2.7m	Sandy CLAY, orange/ grey, with some gravel, no odour.	TP16: From 2.0m TP19: From 1.8m TP23: From 2.7m
Lot 459	4	Clay fill material was identified on Lot 459. No wastes were observed within the fill.	0.7m to 1.3m	CLAY, orange/ red	Generally from 0.7m
Lot 460	24	Generally, scattered surficial fill was identified to a maximum depth of 0.5m bgs. This surficial fill included wastes such as house bricks, metal sheeting, car tyres, electrical wire, fence wire, plastic sheeting, glass, concrete pieces	Surficial fill: 0m to 0.5m	CLAY, orange/ grey, no odour	Generally from 0.4m in areas of fill

		and ACM fragments. One test pit (TP29) identified deeper fill to 1.9m comprising small pieces of metal scrap.	TP29: 0m to 1.9m		
Lot 461	17	Surficial fill was identified to a maximum depth of 1m bgs at the rear of a former tennis court. This surficial fill included wastes such as house bricks, timber, scrap metal, roof tiles, fence wire, concrete pieces, glass, broken crockery and ACM pieces.	Surficial fill: generally 0m to 0.5m, up to 1.0m at TP4.	Sandy CLAY, orange/ grey, moist	Generally from 0.4m in areas of fill
		One test pit (TP8) was excavated into a septic tank that has been filled in. Wastes within the filled in tank included house bricks, ceramic pipe and concrete pieces.	TP8: 0m to 2.0m		
Lot 462	20	Fill was identified in the footprint of the former house and in hummocky ground surrounding the house footprint, including wastes such as timber, house bricks, plastic, PVC pipe, electrical cable, tile pieces and ACM fragments.	Former house footprint: 0.3m to 0.5m.	CLAY, orange/ brown, no odour	Former house footprint: From 0.5m
		A mound filled with wastes (SP3) was identified in the centre of the lot. From the surface, 0.5m of ACM fragments	Filled gully: 0.0m to 2.1m	CLAY, orange/ grey, wet	Filled gully: from 2.1m

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		were uncovered. Below the ACM fragments, other wastes including chemical drums, rubber tubing, steel beams, metal pipes, carpet, house bricks, concrete pieces, concrete bricks, tile pieces, chicken wire, timber, burnt timber, metal gutters, plastic containers and ACM fragments were buried to a depth of 2.1m bgs.			
Lot 463	11	Generally, fill was found buried below the ground surface at the location of the former poultry sheds and included wastes such as ash/ slag, metal, timber and ACM fragments. Buried ACM fragments were identified in a gully at the rear of the lot (TP9) between the ground surface and 0.3m bgs.	Generally 0.2m to 1.0m Gully: 0.0m to 0.3m	Sandy CLAY, orange/ grey, no odour	From 0.2m to1.0m From 0.3m

6.3 Soil Results

Soil analytical results are presented in **Table A** in Appendix E. Laboratory reports are included in **Appendix F**. A summary of the soil results is presented in **Table 5**.

Table 5: Summary of Soil Results					
Analyte	No. of Samples	Maximum Concentration (mg/kg)	No. exceeding Site Criteria	Criteria Exceeded (mg/kg)	
Fluoride	6	10	0	-	
Arsenic	17	18	0	-	
Cadmium	17	1	0	-	
Chromium	17	66	0	-	
Copper	17	52	0	-	
Lead	17	57	0	-	
Nickel	17	31	0	-	
Zinc	17	572	0	-	
Mercury	17	0.1	0	-	
BaP TEQ	15	1.2	0	-	
Total PAHs	15	8.5	0	-	
Benzene	15	<0.2	0	-	
Toluene	15	<0.5	0	-	
Ethyl benzene	15	<0.5	0	-	
Xylene	15	<0.5	0	-	
TRH C6-C10	15	<10	0	-	
TRH >C10-C16	15	170	1	110 (HSL)	
TRH >C16-C34	15	1080	0	-	
TRH >C34-C40	15	240	0	-	
OCPs excluding DDE + DDD + DDT	11	<lor< td=""><td>0</td><td>-</td></lor<>	0	-	
Sum of DDE + DDD+ DDT	11	1.13	0	-	
OPPs	11	<lor< td=""><td>0</td><td>-</td></lor<>	0	-	
Asbestos	59	16 – Chrysoite, crocidolite and amosite	16	Presence	

The results of surface soil sampling for fluoride demonstrate that the conditions at Parcel 13 were not impacted by stack particulate fallout from the Hydro Aluminium Kurri Kurri Smelter.

The results of fill sampling indicate that surface soils from 0m to 0.3m at one location (TP7 on Lot 463) are impacted by petroleum hydrocarbons at concentrations exceeding the HSL for vapour intrusion in sandy soils. The log for this test pit indicates the fill soils are impacted with ash or slag and no odour was evident.

The results of fill sampling indicate that some fill soils are impacted with zinc at concentrations exceeding the EIL. The logs indicate that the elevated zinc concentrations are associated with scrap metal within the fill, which is the likely source of zinc.

Chrysotile, crocidolite and amosite asbestos were identified in the ACM fragments collected. Asbestos was identified in 9 of the 52 soil samples collected for asbestos analysis, comprising both bonded asbestos cement sheeting fragments and degraded/ friable asbestos cement sheeting fragments.

6.4 Quality Assurance/ Quality Control

A quality assurance assessment for this report is presented in **Appendix F**. 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. Overall it is considered that the completed investigation works and the data are of suitable quality to meet the project objectives.

7 Site Characterisation

7.1 Conceptual Site Model

Parcel 13 consists of six residential properties with dwellings and associated sheds located close to the eastern site boundary with cleared land at the rear of each property. One of the properties comprises a poultry farm. Parcel 13 is bounded by Bowditch Avenue to the east, a dedicated coal railway line to the west and other rural properties to the north and south. The site is located in the east of the Buffer Zone of the Hydro Aluminium Kurri Kurri Smelter.

Parcel 13 was developed for rural residential landuse, including poultry farming, between the 1960s and the 1990s. Poultry sheds were identified on three lots, Lots 458, 460 and 463, in aerial photographs from the early 1970s. Poultry farming is currently undertaken on only one of the six lots, Lot 458. Poultry sheds on the other lots are understood to have been demolished.

The location of these former poultry sheds on Lots 460 and 463 were confirmed during the site walkover. The walkover identified surficial debris associated with the former poultry sheds, which was generally located within and surrounding the shed footprints and included concrete rubble, metal scrap and scattered ACM fragments. Buried debris was identified during the intrusive investigations scattered over the area of the former poultry sheds up to depths of 1m bgs and comprising wastes such as house bricks, timber, scrap metal, roof tiles, fence wire, concrete pieces, glass, broken crockery, ash/slag and ACM pieces.

The location of other former buildings such as dwellings and sheds were also confirmed during the site walkover. Surficial and buried debris associated with the former dwellings was also identified, generally in the vicinity of the former buildings. On Lot 460, buried debris was identified in hummocky ground at the rear of the tennis court and included house bricks, timber, scrap metal, roof tiles, fence wire, concrete pieces, glass, broken crockery and ACM pieces to a depth of 1.0m bgs.

Other farm-type wastes were identified in surface fill, on the surface of hummocky ground and stockpiled at various locations across all six lots on Parcel 13 including fence posts, metal framework, metal scrap and metal sheeting, an old drum, chemical drums, timber, tyres, bricks, metal machine parts and ACM fragments. ACM fragments were identified buried just below ground surface in a gully at the rear of Lot 463. It is noted that no wastes were observed within the fill material on Lot 459.

The intrusive investigations identified deeper areas of buried wastes at the following locations:

- Within a gully on Lot 458, including house bricks, ceramic pipe, metal pipe, machinery parts, concrete pieces, plastic containers, wire, fence posts, metal sheeting and ACM fragments. The buried wastes were identified to a depth of 2.7m bgs.
- Within a septic tank on Lot 461 that has been filled in. Wastes within the filled in tank included house bricks, ceramic pipe and concrete pieces to a depth of 2.0m bgs.

- In hummocky ground in the centre of Lot 462, including chemical drums, rubber tubing, steel beams, metal pipes, carpet, house bricks, concrete pieces, concrete bricks, tile pieces, chicken wire, timber, burnt timber, metal gutters, red containers and ACM fragments. The buried wastes were identified to a depth of 2.1m bgs.
- Buried wastes were identified in three separate areas at the rear of Lot 463. At each location, fill included wastes such as glass, metal sheeting, fence posts, car parts, electrical wire, plastic containers, ceramic pipe, house bricks, concrete pieces and ACM fragments. These areas appear to be distinct excavations for burial of wastes. Surrounding test pits did not identify extensive waste burial. The maximum depth of the buried waste was to 2.7m bgs.

Laboratory analysis on soil samples from fill associated with the buried and surficial wastes indicated there is limited impact to the land from the waste materials, with no impact from heavy metals, PAHs, OCPs or OPPs.

Surface soils from 0m to 0.3m at one location (TP7 on Lot 463) are impacted by petroleum hydrocarbons at concentrations exceeding the HSL for vapour intrusion in sandy soils. The log for this test pit indicates the fill soils are impacted with ash or slag and no odour was evident. This result is not considered representative of fill material with ash or slag, as other similar samples did not have elevated petroleum hydrocarbon results. This result is not considered to represent a risk to human health, as there is no residence in this area.

Asbestos in the form of both bonded asbestos cement sheeting fragments and degraded/ friable asbestos cement sheeting fragments were identified throughout the surficial and buried fill across the six lots in Parcel 13. Asbestos represents a health risk to current and future site users and must be remediated for Parcel 13 to be considered suitable for the current and future landuse.

The remainder of the surfcial and filled wastes are aesthetically unsuitable for the future rural residential landuse scenario and should also be remediated.

The dwellings and associated sheds on Parcel 13 were assessed in a Hazardous Materials Audit, which identified asbestos containing building materials in the dwellings and garages on Lots 458, 460, 461, 462 and 463.

Parcel 13 has not been affected by dust deposition of fluoride from the Hydro Aluminium Kurri Kurri Smelter, with fluoride concentrations in surface soil are below the preliminary screening level for residential landuse. It is noted that there is currently no source of aerial fluoride emissions, as the smelter is in a care and maintenance mode.

7.2 Waste Characterisation

Wastes identified at the six lots generally comprise municipal wastes (non-putrescible). Wastes are dry, and no free liquid was identified during excavations.

The majority of the asbestos identified across the six lots on Parcel 13 comprised bonded ACM fragments, which classify as Asbestos Waste. Bonded asbestos can be remediated by a contractor with a Non-friable Class B Asbestos Removal Licence.

In addition, asbestos fines (ACM <7mm) were identified in one soil sample from Lot 458 and degraded and friable ACM fragments were identified in soil samples from Lots 462 and 463. These types of asbestos also classify as Asbestos Waste, however asbestos fines and friable asbestos must be remediated by a contractor with a Friable Class A Asbestos Removal Licence.

8 Conclusions and Recommendations

This report presents the findings of a Phase 2 Environmental Site Assessment undertaken on part of the Hydro Aluminium Kurri Kurri (Hydro) owned land known as Parcel 13. Parcel 13 is approximately 20ha and is accessed from Bowditch Avenue, Loxford and located within the buffer zone and to the east of the Hydro aluminium smelter. Parcel 13 comprises six residential properties, with cleared open grassland with scattered mature trees at the rear of each property. The northern-most property also contains two chicken sheds.

The objectives of the assessment were to assess the potential for contamination at Parcel 13 based on historical and current landuse and to assess the suitability of Parcel 13 for low rural residential (R2) land use.

A Phase 1 Environmental Site Assessment has previously been completed for the Hydro owned lands including Parcel 13 (ENVIRON (22 October 2013) Phase 1 ESA, Hydro Kurri Kurri Aluminium Smelter). The Phase 1 identified that contamination of Parcel 13 may have occurred from dust deposition due to the proximity of the Hydro smelter and from construction/ demolition of buildings constructed with asbestos containing materials.

To assess the potential contaminants of concern on Parcel 13, a site walkover was completed and surface soil samples were collected for across the parcel.

The site walkover identified six lots that are or were previously used for residential purposes. Two of the lots were formerly used for poultry farming and one lot is currently used for this activity. Farm-type wastes were identified in surface fill, on the surface of hummocky ground and stockpiled at various locations across all six lots on Parcel 13 including ACM fragments. Buried wastes, including ACM fragments, were identified at the following locations:

- At the location of the former poultry sheds on Lots 460 and 463;
- In a gully on Lot 458;
- Within a filled-in septic tank on Lot 461;
- In hummocky ground in the centre of Lot 462;
- At three separate areas at the rear of Lot 463.

The dwellings and associated sheds on Parcel 13 were assessed in a Hazardous Materials Audit, which identified asbestos containing building materials in the dwellings and garages on Lots 458, 460, 461, 462 and 463.

The site will be suitable for the proposed low rural residential (R2) land use subject to completion of the following remedial actions:

• Areas impacted by ACM fragments should be evaluated for feasible remediation options including excavation and combined encapsulation at another location within Hydro-owned land.

- For aesthetic reasons, other wastes should also be removed from the parcel and recycled as appropriate.
- The recommendations of the Hazardous Materials Audit should be followed.

ENVIRON consider that Parcel 13 can be made suitable for the proposed low rural residential land use following remediation. A Remedial Action Plan will be completed to assess the remedial options and outline the requirements for remediation and validation.

Hydro has separately engaged a NSW EPA-accredited Site Auditor to review the investigations completed and the Remedial Action Plan and to complete an interim opinion letter, indicating that the site can be made suitable for the proposed landuse.

9 References

AECOM. 2013. Hydro Aluminum – 2012 Annual Environmental Management Review. 2 June 2013;

ANZECC & NHMRC (1992) Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites;

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

ENVIRON (2013) Phase 1 ESA, Hydro Kurri Kurri Aluminium Smelter;

Hunter Catchment Management Trust (2000) Wallis and Fishery Creeks Total Catchment Management Strategy;

National Academy of Sciences. 1971a. Biologic effects of atmospheric pollutants: Fluorides. Washington, DC: National Academy of Sciences, National Research Council, Committee on Biologic Effects of Atmospheric Pollutants, 239;

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure (NEPM);

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 DECC (2008) Waste Classification Guidelines;

World Health Organisation (1997) Environmental Health Criteria for Fluorides and Fluorosis. 2nd ed. Internal Technical Report, International Program on Safety, WHO, Geneva.

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 18 September 2013 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 Parcel 13. 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 Parcel 13 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 Hydro Aluminium Kurri Kurri Pty Ltd and may not be relied upon by any other person or entity without ENVIRON's express written permission.
Hydro Aluminium April 2015

Figures



- Approximate Location of land owned by Hydro
- Approximate Location of Buffer Zone
- Land not owned by Hydro

Parcel 13



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FIGURE 1

Parcel 13 - Site Location











FIGURE 3







ENVIRON

JOB NO: AS130348

DATE: March 2014

FIGURE 3







Appendix A

Surrounding Groundwater Bores

Groundwater Wells near Employment Land Subarea 11

Map created with NSW Natural Resource Atlas - http://www.nratlas.nsw.gov.au Wednesday, January 08, 2014



•	Cities and large towns renderImage: Cannot build image from features
Cowrai O	Populated places renderImage: Cannot build image from features
•	Towns
•	Groundwater Bores
	Catchment Management Authority boundaries
\wedge	Major rivers



Copyright © 2014 New South Wales Government. Map has been compiled from various sources and may contain errors or omissions. No representation is made as to its accuracy or suitability.

Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Monday, January 6, 2014

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079088

Works Details (top)

GROUNDWATER NUMBER GW079088 LIC-NUM **AUTHORISED-PURPOSES** INTENDED-PURPOSES MONITORING BORE WORK-TYPE Bore WORK-STATUS (Unknown) CONSTRUCTION-METHOD (Unknown) **OWNER-TYPE** (Unknown) **COMMENCE-DATE COMPLETION-DATE FINAL-DEPTH (metres) DRILLED-DEPTH (metres) CONTRACTOR-NAME DRILLER-NAME** PROPERTY **GWMA GW-ZONE** STANDING-WATER-LEVEL SALINITY YIELD

Site Details (top)

REGION 20 - HUNTER **RIVER-BASIN AREA-DISTRICT CMA-MAP GRID-ZONE** SCALE **ELEVATION ELEVATION-SOURCE** NORTHING 6371306.00 EASTING 358054.00 LATITUDE 32 47' 13" 151 29' 3" LONGITUDE **GS-MAP**

AMG-ZONE COORD-SOURCE REMARK

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Monday, January 6, 2014

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079090

Works Details (top)

GROUNDWATER NUMBER GW079090 LIC-NUM **AUTHORISED-PURPOSES** INTENDED-PURPOSES MONITORING BORE WORK-TYPE Bore WORK-STATUS (Unknown) CONSTRUCTION-METHOD (Unknown) **OWNER-TYPE** (Unknown) **COMMENCE-DATE COMPLETION-DATE FINAL-DEPTH (metres) DRILLED-DEPTH (metres) CONTRACTOR-NAME DRILLER-NAME** PROPERTY **GWMA GW-ZONE** STANDING-WATER-LEVEL SALINITY YIELD

Site Details (top)

REGION 20 - HUNTER **RIVER-BASIN AREA-DISTRICT CMA-MAP GRID-ZONE** SCALE **ELEVATION ELEVATION-SOURCE** NORTHING 6371368.00 EASTING 358105.00 32 47' 11" LATITUDE LONGITUDE 151 29' 5" **GS-MAP**

AMG-ZONE COORD-SOURCE REMARK

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Monday, January 6, 2014

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079092

Works Details (top)

GROUNDWATER NUMBER GW079092 LIC-NUM **AUTHORISED-PURPOSES** INTENDED-PURPOSES MONITORING BORE WORK-TYPE Bore WORK-STATUS (Unknown) CONSTRUCTION-METHOD (Unknown) **OWNER-TYPE** (Unknown) **COMMENCE-DATE COMPLETION-DATE FINAL-DEPTH (metres) DRILLED-DEPTH (metres) CONTRACTOR-NAME DRILLER-NAME** PROPERTY **GWMA GW-ZONE** STANDING-WATER-LEVEL SALINITY YIELD

Site Details (top)

REGION 20 - HUNTER **RIVER-BASIN AREA-DISTRICT CMA-MAP GRID-ZONE** SCALE **ELEVATION ELEVATION-SOURCE** NORTHING 6371429.00 EASTING 358078.00 LATITUDE 32 47' 9" 151 29' 4" LONGITUDE **GS-MAP**

AMG-ZONE COORD-SOURCE REMARK

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Monday, January 6, 2014

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079093

Works Details (top)

GROUNDWATER NUMBER GW079093 LIC-NUM **AUTHORISED-PURPOSES** INTENDED-PURPOSES MONITORING BORE WORK-TYPE Bore WORK-STATUS (Unknown) CONSTRUCTION-METHOD (Unknown) **OWNER-TYPE** (Unknown) **COMMENCE-DATE COMPLETION-DATE FINAL-DEPTH (metres) DRILLED-DEPTH (metres) CONTRACTOR-NAME DRILLER-NAME** PROPERTY **GWMA GW-ZONE** STANDING-WATER-LEVEL SALINITY YIELD

Site Details (top)

REGION 20 - HUNTER **RIVER-BASIN AREA-DISTRICT CMA-MAP GRID-ZONE** SCALE **ELEVATION ELEVATION-SOURCE** NORTHING 6371460.00 EASTING 358078.00 LATITUDE 32 47' 8" 151 29' 4" LONGITUDE **GS-MAP**

AMG-ZONE COORD-SOURCE REMARK

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Monday, January 6, 2014

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079094

Works Details (top)

GROUNDWATER NUMBER GW079094 LIC-NUM **AUTHORISED-PURPOSES** INTENDED-PURPOSES MONITORING BORE WORK-TYPE Bore WORK-STATUS (Unknown) CONSTRUCTION-METHOD (Unknown) **OWNER-TYPE** (Unknown) **COMMENCE-DATE COMPLETION-DATE FINAL-DEPTH (metres) DRILLED-DEPTH (metres) CONTRACTOR-NAME DRILLER-NAME** PROPERTY **GWMA GW-ZONE** STANDING-WATER-LEVEL SALINITY YIELD

Site Details (top)

REGION 20 - HUNTER **RIVER-BASIN AREA-DISTRICT CMA-MAP GRID-ZONE** SCALE **ELEVATION ELEVATION-SOURCE** NORTHING 6371462.00 EASTING 358234.00 LATITUDE 32 47' 8" 151 29' 10" LONGITUDE **GS-MAP**

AMG-ZONE COORD-SOURCE REMARK

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Monday, January 6, 2014

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079096

Works Details (top)

GROUNDWATER NUMBER GW079096 LIC-NUM **AUTHORISED-PURPOSES** INTENDED-PURPOSES MONITORING BORE WORK-TYPE Bore WORK-STATUS (Unknown) CONSTRUCTION-METHOD (Unknown) **OWNER-TYPE** (Unknown) **COMMENCE-DATE COMPLETION-DATE FINAL-DEPTH (metres) DRILLED-DEPTH (metres) CONTRACTOR-NAME DRILLER-NAME** PROPERTY **GWMA GW-ZONE** STANDING-WATER-LEVEL SALINITY YIELD

Site Details (top)

REGION 20 - HUNTER **RIVER-BASIN AREA-DISTRICT CMA-MAP GRID-ZONE** SCALE **ELEVATION ELEVATION-SOURCE** NORTHING 6371707.00 EASTING 358152.00 LATITUDE 32 47' 0" 151 29' 7" LONGITUDE **GS-MAP**

AMG-ZONE COORD-SOURCE REMARK

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Monday, January 6, 2014

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079097

Works Details (top)

GROUNDWATER NUMBER GW079097 LIC-NUM **AUTHORISED-PURPOSES** INTENDED-PURPOSES MONITORING BORE WORK-TYPE Bore WORK-STATUS (Unknown) CONSTRUCTION-METHOD (Unknown) **OWNER-TYPE** (Unknown) **COMMENCE-DATE COMPLETION-DATE FINAL-DEPTH (metres) DRILLED-DEPTH (metres) CONTRACTOR-NAME DRILLER-NAME** PROPERTY **GWMA GW-ZONE** STANDING-WATER-LEVEL SALINITY YIELD

Site Details (top)

REGION 20 - HUNTER **RIVER-BASIN AREA-DISTRICT CMA-MAP GRID-ZONE** SCALE **ELEVATION ELEVATION-SOURCE** NORTHING 6371679.00 EASTING 358335.00 LATITUDE 32 47' 1" 151 29' 14" LONGITUDE **GS-MAP**

AMG-ZONE COORD-SOURCE REMARK

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Monday, January 6, 2014

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079099

Works Details (top)

GROUNDWATER NUMBER GW079099 LIC-NUM **AUTHORISED-PURPOSES INTENDED-PURPOSES** WORK-TYPE Bore WORK-STATUS (Unknown) CONSTRUCTION-METHOD (Unknown) **OWNER-TYPE** (Unknown) **COMMENCE-DATE COMPLETION-DATE FINAL-DEPTH (metres) DRILLED-DEPTH (metres) CONTRACTOR-NAME DRILLER-NAME** PROPERTY **GWMA GW-ZONE** STANDING-WATER-LEVEL SALINITY YIELD

Site Details (top)

20 - HUNTER REGION **RIVER-BASIN AREA-DISTRICT CMA-MAP GRID-ZONE** SCALE **ELEVATION ELEVATION-SOURCE** NORTHING 6371003.00 358448.00 EASTING LATITUDE 32 47' 23" 151 29' 18" LONGITUDE **GS-MAP**

AMG-ZONE COORD-SOURCE REMARK

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Monday, January 6, 2014

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079101

Works Details (top)

GROUNDWATER NUMBER GW079101 LIC-NUM **AUTHORISED-PURPOSES INTENDED-PURPOSES** WORK-TYPE Bore WORK-STATUS (Unknown) CONSTRUCTION-METHOD (Unknown) **OWNER-TYPE** (Unknown) **COMMENCE-DATE COMPLETION-DATE FINAL-DEPTH (metres) DRILLED-DEPTH (metres) CONTRACTOR-NAME DRILLER-NAME** PROPERTY **GWMA GW-ZONE** STANDING-WATER-LEVEL SALINITY YIELD

Site Details (top)

REGION 20 - HUNTER **RIVER-BASIN AREA-DISTRICT CMA-MAP GRID-ZONE** SCALE **ELEVATION ELEVATION-SOURCE** NORTHING 6371680.00 EASTING 358387.00 LATITUDE 32 47' 1" 151 29' 16" LONGITUDE **GS-MAP**

AMG-ZONE COORD-SOURCE REMARK

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Monday, January 6, 2014

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079102

Works Details (top)

GROUNDWATER NUMBER GW079102 LIC-NUM **AUTHORISED-PURPOSES INTENDED-PURPOSES** WORK-TYPE Bore WORK-STATUS (Unknown) CONSTRUCTION-METHOD (Unknown) **OWNER-TYPE** (Unknown) **COMMENCE-DATE COMPLETION-DATE FINAL-DEPTH (metres) DRILLED-DEPTH (metres) CONTRACTOR-NAME DRILLER-NAME** PROPERTY **GWMA GW-ZONE** STANDING-WATER-LEVEL SALINITY YIELD

Site Details (top)

REGION 20 - HUNTER **RIVER-BASIN AREA-DISTRICT CMA-MAP GRID-ZONE** SCALE **ELEVATION ELEVATION-SOURCE** NORTHING 6371685.00 EASTING 358725.00 LATITUDE 32 47' 1" 151 29' 29" LONGITUDE **GS-MAP**

AMG-ZONE COORD-SOURCE REMARK

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Groundwater Works Summary

For information on the meaning of fields please see <u>Glossary</u> Document Generated on Monday, January 6, 2014

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW079103

Works Details (top)

GROUNDWATER NUMBER GW079103 LIC-NUM **AUTHORISED-PURPOSES INTENDED-PURPOSES** WORK-TYPE Bore WORK-STATUS (Unknown) CONSTRUCTION-METHOD (Unknown) **OWNER-TYPE** (Unknown) **COMMENCE-DATE COMPLETION-DATE FINAL-DEPTH (metres) DRILLED-DEPTH (metres) CONTRACTOR-NAME DRILLER-NAME** PROPERTY **GWMA GW-ZONE** STANDING-WATER-LEVEL SALINITY YIELD

Site Details (top)

REGION 20 - HUNTER **RIVER-BASIN AREA-DISTRICT CMA-MAP GRID-ZONE** SCALE **ELEVATION ELEVATION-SOURCE** NORTHING 6371530.00 EASTING 358675.00 LATITUDE 32 47' 6" LONGITUDE 151 29' 27" **GS-MAP**

AMG-ZONE COORD-SOURCE REMARK

Form-A (top)

no details

Licensed (top)

no details

Water Bearing Zones (top)

no details

Drillers Log (top)

no details

Appendix B Site Photographs



Photo 1: Photograph showing small fill stockpile and metal framing, with waste stockpile in the background, on Lot 458.



Photo 2: Photograph of the waste stockpile, including farming machinery, an Intermediate Bulk Container, 44 gallon drums and scrap metal on Lot 458.

Title:	Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Parcel 13	KW	AS130348	24/1/2014
Client:	Hydro Aluminium Kurri Kurri	S ENVIRON		


Photo 3: Photograph showing small stockpile of fill material with ACM fragments on Lot 458.



Photo 4: Photograph of the residential property on Lot 460, facing east.

Title:	Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Parcel 13	KW	AS130348	24/1/2014
Client:	Hydro Aluminium Kurri Kurri		13 🖓	VIRON



Photo 5: Photograph of a stockpile of building debris, including concrete and ACM fragments in foreground, on Lot 460.



Photo 6: Photograph of building debris on Lot 460.

Title:	Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Parcel 13	KW	AS130348	24/1/2014
Client:	Hydro Aluminium Kurri Kurri		13 🖓	VIRON



Photo 7: Photograph of concrete slab for former building on Lot 461.



Photo 8: Photograph of concrete slabs for former building on Lot 461.

Title:	Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Parcel 13	KW	AS130348	24/1/2014
Client:	Hydro Aluminium Kurri Kurri		13 🖓	NVIRON



Photo 9: Photograph of debris on Lot 461, including rusted 44 gallon drum.



Photo 10: Photograph of the general site at Lot 462, facing east.

Title:	Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Parcel 13	KW	AS130348	24/1/2014
Client:	Hydro Aluminium Kurri Kurri		13 🖓	NVIRON



Photo 11: Photograph of concrete building rubble on Lot 462, with an old shed in the background.



Photo 12: Photograph of old tyres on Lot 462.

Title:	Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Parcel 13	KW	AS130348	24/1/2014
Client:	Hydro Aluminium Kurri Kurri		13 🖓	VIRON



Photo 13: Photograph of a drainage line on Lot 463.



Photo 14: Photograph of concrete building debris on Lot 463.

Title:	Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Parcel 13	KW	AS130348	24/1/2014
Client:	Hydro Aluminium Kurri Kurri		13 🖓	VIRON



Photo 15: Photograph of a dam on the western boundary of Lot 463, facing west. Note the coal train line in the background (western site boundary).

Title:	Phase 2 ESA	Approved:	Project-Nr.:	Date:
Site:	Parcel 13	KW	AS130348	24/1/2014
Client:	Hydro Aluminium Kurri Kurri		13 🖓	NVIRON

Appendix C

Field Information Sheets

Site Walkover Checklist

4-1 - 3-Ai

1

Project No.: AST	30 348	Date and Time: 25/10/13	
Land Parcel: FL	P 13	Weather: fine, narm	
Lot and DP: / f	463	Environ Personnel: KW	
Site Description			
Topography	Mat, near the vo	ad & gentle slope to vail	
Surface Geology	/		styres
Fill evident?	yes ? former po	sultry shed bot print is filled	E Concrete E metal aiso s
Hummocky ground?	yes - back of proper	ty behind a am - sman fill mound ge	Dent
Structures on site?	house - occupie	of	
Location of structures	as per map -	- dam, footprint, drainage line	
Building materials used in structures	asbestos used .	in former powling sheds	
Asbestos debris on site?	possibly, fragme	ents from 10×10 submitter analy	sis
Location of asbestos debris?	~		
Volume of asbestos debris?	-		
GPS Locations of Inte Point of Interest Small fill mound drainage line - former poultry Small rubble mu Description of Photos former poultry drainage line drainage line fill mounds fill mounds fill mounds fill mounds fill mounds	nels D - scrap metal visible shed 10×10m (ist for ounds (2) raphs taken - metal mach (2) - reo concre Ven clo	Thick grass cover, some small areas Thick grass cover, some small areas ine parts visible, grass covered preces on surface, bricks	Smaccurau 1 1ect?
E 151.49125°E 5m accuraci -> Silt, davk bu	10m on former uande Sample 32:79722.5 Journ Smotst, fopsoil d. files/Projects/Hydro Australia/Site Walka	netal pipes still in pla small amount building debris visible on surface - scrap metal Concrete pie .) strip of land between 2 footp (former drivenay?) is also fi with sheet metal, concrete bri Uisible on surface	ces nhts 11

Hummocky ground? Structures on site? Job Shed near The road Location of structures Building materials used in structures Asbestos debris on site? Asbestos debris on debris? Volume of asbestos debris? See be low Volume of asbestos debris? Scattered around the site 7 publing Col permit point of interest Point of interes	Land Parcel: ELP 13 Lot and DP: Lot 462 Slie Description Topography flat and near Rd & gentle slope to railing Surface Geology Fill evident? Yes, infront of 2nd dam along at proper Hummocky ground? Structures on site? I old shed near the road Location of structures	
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\\Auhunfp1.environcorp.int\shared_files\Projec/s\Hydro Australia\Site Walkover Checklst.doc	inf bed Acon 3	
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Project No.: AS (30348	Date and Time: 25/10/13	
Land Parcel: ELF	0 13 '	Weather:	
Lot and DP: Lot	- 461	Environ Personnel: KW	
Steposcupilon			
Topography	as perother lot	s along this Rd.	
Surface Geology			
Fill evident?	yes across the	he front portion of the	
Hummocky ground?	yes front 10	portion	
Structures on site?		mer building footprints x3 (BFP)	
L ocation of structur es	F sample S SF3 F	-32.796010 topsoil -151.49353 brown, silt, dry	
Building materials used in structures			
Asbestos debris on site? Location of asbestos	yes former b		
debris?	ACM Scatter long Sl	ab, Stat amount of Aret across the	
Volume of asbestos debris?	Smill sample for 10 p.	2 Collected Grand N	lab
		grass Surrow Sta	inding
CIPSTLOCATIONS OF INC	iest	Easting Northing	e alot
Fill (1) - met	al pape visibles	5m/1mours/51.4928/E 32.7954505	
Buildary FP ()	£ 411 '-		
7-11(2) - unde	v-free-old fence per	Arie of 151-49338 32.79575	
	CONTRACTOR SOLUTION	/ Charley II > ACMD - Stange of Speed (Ch	lected
DIF(1) & fil	- motal shees No ACM S	f, old dimm, ceramic water pipe port	1
BFP(2) & nearly	by fill (at bethe and	1367 BEP3 & Smll mound to the rear of	17
			nds
BFP(3) & near!	by grassed fill mo	-> other hummocky ground to the	BFPZ
	all visible BFP s	lab VSible also concrete slap may be on	ther
Miscellaneous Field of	and for Another and an a 1 Robust.	par	
auface debri	s a wire isi.		ythick
Hummocky grou	ind immediately rea		ass?
	¥ 151	. 49367E 32.79614°S	6
	8 * 151	49334 32.79647 st	lab is
Humbrocky grou	nd (Ship of) at		athroom
BFPB) ->	S151.49349°E		anly?
	(32·79686° 5		ground upe hng
ACMO -> San	uple of spread collecte	0.41	inted
	Lfiles\Projects\Hydro Australia\Site Walko	ENVIRON	

Project No.: AS	30	Date and Time:	30/10/13	
Land Parcel: ELF	0/30348	Weather: Cloud	1, Sunny Co.	ol breeze
Lot and DP: lot l		Environ Personne	1	
NIE DEVELOION				
Topography	front of property-slip - slight slope to	htslope towards	Rd, back of	property
Surface Geology	- slight slope to	fail line a	r pear or p	perty.
Fill evident?	yes poultry she	ds & footpril are built up	nts & builde	ng footprint
Hummocky ground?		ont of pion	(
Structures on site?	neighborn ment		, , , , ,	it front photi
Location of structures	~			Soft
Building materials used in structures	-			ground
Asbestos debris on site?	fill exposed on	building footp	not on hor	
Location of asbestos debris?	~	- 2011	tains asbes de anound a unface asbe	
Volume of asbestos debris?	- /			stos ;
eksembark et a. Suddarmenski fra delski makan val 1. sru se	32.79548	151.49381.1	5	
Point of Interest	(E)	Easting	Northing	
	d near dams at r		49354 32-7	
(soil only -> appe			101 0-	<u>, , , , , , , , , , , , , , , , , , , </u>
Hummodey grou	ind (1) at rear of p	authyshedr 151	.49366 32.	79481
<u>Mummocky</u> m	ound(2) at front of lot	151,	<u>49484 32 · </u>	7.9578
Lummoden avoi	101	former pour	thy sheds	
bricks & concre	te preces virible a	in the surfa	ce	
former buildin		edinfely beh	and house c	1. 1
is built up a	those ground leve	Ashered	ets here - me	1 debris visible
at rear corne	is of tootprint -	, Immed. The from	Fof 2nd mult	try shad Antonn t
Sunface borks 9	concrete preces) de	buir VBIALE-	some concrete &	Tab exposed but
ווייין פאוניבייויין איייייין אייייייייייייייייייייייי	Constant of the state of the second state of t	an an Anna an Anna an Anna Anna Anna An	N. 45	in second of Hy
min surface	tebris on the for	mer poultre	shed foot pr	ints grassa
Televated abo	ve ground level) -), well on	assed over	very
all building	fortponts, spa	rse patches		Lueij
10x10 grid	mid pt on poul	hy shed foo	tprint - noth	ing found
		32.79541	151.4944	4
F sample.	talcer (SF4)-32.7	947505		
tracel alt	lancing IFT II			
JMOIST, Some		-0(-0.02m)	er Checkist doc	
3: \rrojects \Hyaro Australia \AS 303	135 Groundwater Plume Delineation\Field	איטיג (רו ט יט ארפיז: <i>ל</i> אנה אמוגסא		IRON
ł	1			

Land Parcel: ELP 13 Weather: 45 per Lot 460 Lot and DP: lot 459 Topography As per lot 460 Surface Geology Rill evident? 42.5 Hummocky ground? 42.8 Stattars of sile? Location of structures Advertures of sile? Advertures adverture in the use on site, near road Building materials Advertures on the sile of the use on site, near road Building materials Advertures adverture in the use on site, near road Building materials Advertures adverture in the use on site, near road Building materials Advertures adverture in the use on site, near road Building materials Advertures advertures in the use on site, near road Building materials Advertures advertures in the use of the site of of th		Project No.: ASI	30348	Date and Time: 30/10	13
Sta Description Image: State of the second seco				Weather: As per L	of 460
Ste Securities Topography as per lot 460 Surface Geology Hill evident? ye.s Hummocky ground? ge 8 Stocotors on site? Location of structures Asbertos debris on site? Location of asbestos Location of Asbestos Lo		Lot and DP: lot	459		
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Hummocky ground? Ges Studenties on site? Location of structures Asbestos debris on site? Location of obsestos Location of obsestos debris? Volume of asbestos ges on house lot old Shed footprint debris? Volume of asbestos indiverses Stattered all over footprint debris? Volume of asbestos ges locations of indiverses Point of interest Asbestos during of the second all over footprint debris? Volume of asbestos indiverses For locations of indiverses Point of interest Asbestos during of the second all over footprint debris? Volume of asbestos indiverses Point of interest Asbestos of indiverses Point of interest Asbestos of indiverses Asbestos of indiverses Point of interest Asbestos of indiverses Asbestos of indiverses Asbesto		Fill evident?	LIR-S	· · · · · · · · · · · · · · · · · · ·	
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debris itt bown Diathered all over 400tpmnt prodist $\leq F - Sample taken SF2-151.49591*E 32.79487*S$ GPS Locations of Interest Point of Interest Aiff ground over 3 hummacky areq 151.49396 32.79449 Shill Hill wound SO grass coursed 151.49429 32.79448 Shill Hill wound SO grass coursed 151.49429 32.79448 Shill Hill wound SO grass coursed 151.49412 32.794476 Jold roof files - stacked rear of house -151.49482 °C Small fill mounds 2 - manad. rear of house -151.49482 °C Small fill mounds 2 - mond. rear of house -151.49482 °C Small fill mounds 2 - mond. rear of house -151.49482 °C Small fill mounds 2 - mond. rear of house -151.49482 °C Small fill mounds 2 - mond. rear of house -151.49482 °C Small fill mounds 2 - mond. rear of house -151.49482 °C Small fill mounds 2 - 150 m rear of house -151.49482 °C Miscollaneous fills of monochy area - 151.49511 °E - Some surface concrete pipes - 32.79514 °S diff grass Over (3) & hummochy area - 151.49511 °E - Some surface concrete pipes - 32.79484.5 diff grass feace & front of lot 459 (near road) - 151.49616 °E - 151.49617 °E - 200 metal 32.794455 °S rear fill mound -> 151.49616 °E - 200 metal - 32.794455 °S rear fill mound -> 151.49616 °E - 32.794455 °S rear fill mound -> 151.49616 °E - 32.795270 °S - 151.49616 °E - 200 metal - 32.794450 °S - 200 metal - 32.7944770 °S - 200 metal - 32.795270 °S - 320 metal - 32.795270 °S - 320 metal - 320 metal - 320 metal - 320 me		Location of asbestos	11		
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diff ground cover 3 hummocky areq 151.499396 32.79419 Shill fill mound SO grass covered 151.49429 32.79438 long area - diff grass over it hummocky - 151.49429 32.79476 old roof files - stacked have house 32.79476 dishuct fill mounds - manad. rear of house - 151.49482 e Small fill mounds (2) - 100 m rear of house - 151.49482 e Small fill mounds (2) - 100 m rear of house - 32.79514°S 151.49469°E 32.79457°S diff. grass over (3) at hummocky area - 151.49511°E - Some surface concrete pipes - 32.79484°S at wetat scrap visible here (reornsheed) Miscellaneous Held Comments V old water pipe Still in graund near lot 458 fence at front of lot 459 (near voad) - 151.49612°E - 32.79455°S Near fill nound -> 151.49612°E - 32.79455°S Near fill nound -> 151.49612°E - 32.79455°S Near fill nound -> 151.49612°E - 32.79527°S - 32.79527°S - 154.49612°E - 154.49612°E		and an		Easting	Northing
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CISINGLATION AND MARCH MARCH AND			?alans faizen		
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old water pipe still in graund near let 458 fence & front of lot 459 (near voad) -> 151,49612°E 1 23,32,79465°S vear fill mound -> 151,49616°E old vege path? 32,79527°S 32,79527°S 151,49616°E 01,492 path? 32,79527°S 151,49616°E 02,000 path?		-) some	metal scrap visi	ble here (commented	<u>}</u>
lot 459 (near voad) -) 151,49612°E 10,32,79465°S vear fill mound -> 151,49616°E 010 vege path? 32,79477°S 32,79527°S 32,79527°S 151,49612°E 151,49616°E 1			omments	C Harden sonde	7
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151.32.79465°S Near fill mound -> 151.49616°E old nege path? 32.79477°S 32.79477°S 32.79527°S					e a' front of
od vege path? 32.79477°S 32.79527°S 32.79527°S 15149~77°S 15149~77°S 15149~77°S				\$3.32.79465°5	THE.
House lot - former Shed foot print 7 ACM fragments Scattered ACM 1 & Old timber & whet former		rear fill mo	und -> 151,1	49616°E	Sample aren
House lot - former Shed foot print 7 ACM fragments Scattered ACM 1 & Old timber & to metal fence		ord hege po	0 R 2 . 79	52705 322	The Argorit
Shed foot print 7 ACM fragments scattered Shed foot print 7 ACM fragments scattered fence ACM 1 & Old timber & to metal fence	L	Harida	151.49	563°E Topser	Clarkford Moist of
Shed poot print & old timber & to metal tence		rouse lot	-tiormer	2 ACM fragment	's scattered in
			Shed poot pring ACM 1	& old time	er & to hetal tence
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Project No.: AS	130348	Date and Time: 30/10/13	
Land Parcel: EL	0 [3	Weather: fine, cloudy	
Lot and DP: Lot	458	Environ Personnel: k_{fA}	
Sile Description			
Topography	gentle slope to	at rear front & gentle slope	
Surface Geology			
Fill evident?	yes		
Hummocky ground?			
Structures on site?	yes 2 Curren aspestos sheet	+ poultry sheds, house visible or paultry sheds	
Location of structures	I old, forme	visible or party sheds r pouttry shed gone & newer it der sheds as per aar	h
Building materials used in structures	asbestas in ola	dur sheds as perfaor	1aB
Asbestos debris on site?	yes		
Location of asbestos debris?	see below	0.pi-0.	sel.
Volume of asbestos debris?	Unknown as	possibly buried sandy?	si lt voist
	mple taken (s	F3 - 32. 79400°5 151. 49641°E	
CPS Locations of Intel Point of Interest	(2).	Easting Northing S	
fill D? Smill	Hound	151.49560 2 32.79409 5	1
fin (2) "	4	151.49457°E 32.79390 .5	
hammocky () (+	11) - 8 Surface And a		
2 2 F	(28 6)(3) mel-mou	und	
	ee debris - nea	r near fence of property near	
10 6 511211	II Sta	mounds & old aletal	
HZ & Fill3 4		nber chemical drims (fuel?)	
fill 4 - buried &s	surface ACM pla	estic Industrial chemical container	<i>a</i> r
fill 5 - grassed	inounds 315	1. 49417°E 32. 79304°S fill 6 - farm	uted
	the design of the second	fill 6 - Soil/groven >30	2. 7928
old she		why shedy dam house 151	4956
(thing)	FORMS U	[eider] Grank in monea	· /
	funk	Sheet Control Shall new with the	<i>roat</i>
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Appendix D

Results Tables

TABLE A: Soil Analytical Results - Grid Sampling

Sample Depth: 0.0m - 0.01m Sampling Date: 30/10/13 Laboratory PQL: 0.5 mg/kg Site Specific HIL - Fluoride: 440mg/kg

	Soluble
Sample	Fluoride
Identification	mg/kg (1:5
	soil:water)
Lot 458 SF3	7
Lot 459 SF2	10
Lot 460 SF1	1
Lot 461 SF3	6
Lot 462 SF2	8
Lot 463 SF1	7

TABLE B. Soil Analytical Results - Intrusive Investigation

TABLE B: Soil Analytical R	lesults - I	ntrusive l																						
Sample Identification			G	uideline						Lot 463 TP7			Lot 462 SP3	Lot 460 TP4	Lot 460 TP8	Lot 459 TP11	Lot 459 TP12	Lot 458 TP16	Lot 458 TP19	Lot 458 TP23				Lot 463 TP5
Sample Depth (m)					ESL		0.2-0.3	0.6-0.7	0.0-0.3	1.0-1.1	0.5-0.6	0.3-0.5									0.2-0.3	0.8-0.9	0.6-0.7	1.1-1.3
	PQL		HSL 'A'	EII	Residential	Mat Limits																		
Date	1 GEL	HIL 'A' A		Residential ^B	(Coarse	Residential	20/03/2014	20/03/2014	21/03/2014	21/03/2014	21/03/2014	21/03/2014	21/03/2014	31/03/2014	31/03/2014	31/03/2014	31/03/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014
Date			to 1m	Realdential	Soil)	Residential	20/03/2014	20/03/2014	21/03/2014	21/03/2014	21/03/2014	21/03/2014	21/03/2014	51/03/2014	51/03/2014	31/03/2014	51/03/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014
					0011)																			
Sample Profile							FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL	FILL
Sample collected by							KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW	KW
Metals					1	1																		
Arsenic	5	100		100			9	9	12	15	10	9	10	8	14	14	18	<5	<5	15	9		9	
Cadmium	1	20					<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1		<1	
Chromium	2	100		410			66	16	,	32	17	9	15	27	31	12	23	9	5	10	66		16	
Copper	5	6000		220			20	9	52	<5	<5	15	24	<5	8	14	22	<5	<5	34	20		9	
Nickel Lead	5	400		220 1100			36 3	16 7	22	11	11	38	57 4	14	16 4	13	56 13	12 5	9	17	36		16	
	2	300 7400		1100 630			3 52	515	31 24	<2	3	5	445	4 362	4	283	13 535	5	5	6 362	3 52		515	
Zinc	5 0.1	10		630			52 <0.1		24	6 <0.1	30 <0.1	<0.1	445 <0.1	362 <0.1	<0.1				<0.1	362 <0.1	52 <0.1		515 <0.1	
Marcury Polycyclic Aromatic Hydroca					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	
Naphthalene	0.1	,	1	170	1	1	<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	
Acenaphthylene	0.1			170	-		<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	
Acenaphthylene	0.1						<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	
Fluorene	0.1		-				<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	
Phenanthrene	0.1						0.7	<0.5	1.7	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	0.7		<0.5	
Anthracene	0.1						<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	
Fluoranthene	0.1						1.1	<0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	1.1		<0.5	
Pyrene	0.1						1.1	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	1.1		<0.5	
Benz(a)anthracene	0.1						0.7	< 0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	< 0.5	<0.5	<0.5	<0.5	0.7		<0.5	
Chrysene	0.1						0.8	< 0.5	0.6	< 0.5	<0.5	< 0.5	< 0.5	<0.5		<0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.8		<0.5	
Benzo(b)&(k)fluoranthene	0.2						1.2	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.2		<0.5	
Benzo(a) pyrene	0.05				0.7		0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6		< 0.5	
Indeno(1,2,3-c,d)pyrene	0.1						0.9	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	< 0.5		< 0.5	< 0.5	< 0.5	<0.5	<0.5	0.9		< 0.5	
Dibenz(a,h)anthracene	0.1						0.6	< 0.5	< 0.5	< 0.5	<0.5	< 0.5	< 0.5	<0.5		<0.5	< 0.5	<0.5	< 0.5	< 0.5	0.6		<0.5	
Benzo(g,h,i)perylene	0.1						<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	
Benzo(a)pyrene TEQ	0.5	3					1.2	< 0.5	< 0.5	<0.5	<0.5	<0.5	<0.5	< 0.5		<0.5	<0.5	<0.5	<0.5	<0.5	0.8		<0.5	
Total +ve		300					8.5	< 0.5	4.1	<0.5	<0.5	<0.5	<0.5	< 0.5		<0.5	<0.5	<0.5	<0.5	<0.5	8.5		<0.5	
Total Recoverable Hydrocarb	ons (TRH) - NEPM (2013)																					
TRH C6 - C10	25		45	1	180	700	<25	<25	<10	<25	<25	<25	<25	<25		<25	<25	<25	<25	<25	<10		<10	
vTPH C6 - C10 less BTEX	25		45		-	-	<25	<25	<10	<25	<25	<25	<25	<25	1	<25	<25	<25	<25	<25	<50		<50	
TRH >C10-C16	50		110		120	1000	<50	<50	170	<50	<50	<50	<50	<50		<50	<50	<50	<50	<50	<100		<100	
TRH >C16-C34	100		NL		300	2500	<100	<100	1080	<100	<100	<100	<100	<100		<100	<100	<100	<100	<100	<100		<100	
TRH >C34-C40	100	1	NL		2800	10,000	<100	<100	240	<100	<100	<100	<100	<100		<100	<100	<100	<100	<100	<50		<50	
BTEX										1												İ		
Benzene	0.2		0.5		50		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Toluene	0.5	1	160	1	85		<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	<0.5	
Ethylbenzene	1		35		70		<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	
m+p-xylene	2		40	1	105		<2	<2	<2	<2	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	
o-Xvlene	1		40		105		<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	l
OC/ OP Pestcides			40	L	1		<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	
			1	1	1	1																		
Sum of Aldrin + Dieldrin	0.05	6			1		< 0.05	< 0.05	< 0.05	< 0.05			<0.05	< 0.05		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05			< 0.05
Sum of DDD + DDT + DDE	0.05	240	-				1.13	< 0.05	< 0.05	< 0.05			0.45	< 0.05		< 0.05	< 0.05	<0.05	< 0.05	< 0.05	< 0.05			< 0.05
Remainder of OCPs	0.05				1		< 0.05	<0.05	< 0.05	< 0.05			< 0.05	< 0.05		< 0.05	< 0.05	< 0.05	<0.05	<0.05	< 0.05			<0.05
OPPs	0.05				1		<0.05	<0.05	< 0.05	< 0.05			<0.05	< 0.05		< 0.05	<0.05	<0.05	< 0.05	<0.05	< 0.05			< 0.05

 OPTS
 0.05
 0.05
 <0.05</td>
 <0

TABLE B. Soil Analytical Results - Intrusive Investigation

TABLE B: Soil Analytical I	Results - I	ntrusive l	nvestigati	ons										
Sample Identification			G	uideline		Lot 463 TP7	Lot 463 TP7	Lot 463 SP2	Lot 463 TP9	Lot 462 TPA	Lot 462 TPC	Lot 462 TP10	Lot 4632 SP3	ot 462 TP Gul
Sample Depth (m)					501	0-0.3	1-1.1		0.5-0.6	0.3-0.5	0.3-0.5	0-0.3		
	PQL		HSL 'A'	EIL	ESL Residential									
Date	1 GEL	HIL 'A' A	Sand 0m	Residential ^B	(Coarse	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014
Date			to 1m	Residential	Soil)	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014	1/04/2014
					,									
Sample Profile						FILL	FILL	FILL						
Sample collected by						KW	KW	KW						
Metals														
Arsenic	5	100	1	100		12	15	15		10		9		10
Cadmium	1	20		100		<1	<1	<1		<1		<1		<1
Chromium	2	100		410		7	32	32		17		9		15
Copper	5	6000		220		52	<5	<5		<5		15		24
Nickel	5	400		220		22	11	11		11		38		57
Lead	2	300		1100		31	<2	<2		3		5		4
Zinc	5	7400		630		24	6	6		30		122		445
Marcury	0.1	10				<0.1	<0.1	<0.1		<0.1		<0.1	l	<0.1
Polycyclic Aromatic Hydroc					1									
Naphthalene	0.1			170			<0.5	< 0.5	<0.5		<0.5		<0.5	
Acenaphthylene	0.1						< 0.5	< 0.5	< 0.5		< 0.5		< 0.5	
Acenaphthene	0.1						< 0.5	< 0.5	< 0.5		< 0.5		< 0.5	
Fluorene	0.1						<0.5	< 0.5	< 0.5		<0.5		<0.5	
Phenanthrene	0.1						1.7	<0.5	<0.5		<0.5		<0.5	
Anthracene	0.1						<0.5	<0.5	<0.5		<0.5		<0.5	
Fluoranthene	0.1						1	< 0.5	<0.5		< 0.5		<0.5	
Pyrene	0.1						0.8	<0.5	<0.5		<0.5		<0.5	
Benz(a)anthracene	0.1						<0.5	<0.5	<0.5		<0.5		<0.5	
Chrysene	0.1						0.6	<0.5	<0.5		<0.5		<0.5	
Benzo(b)&(k)fluoranthene	0.2						<0.5	<0.5	<0.5		<0.5		<0.5	
Benzo(a) pyrene	0.05				0.7		<0.5	<0.5	<0.5		<0.5		<0.5	
Indeno(1,2,3-c,d)pyrene	0.1						<0.5	<0.5	<0.5		<0.5		<0.5	
Dibenz(a,h)anthracene	0.1						<0.5	<0.5	<0.5		<0.5		<0.5	
Benzo(g,h,i)perylene	0.1	3					<0.5	<0.5	<0.5		<0.5		<0.5	
Benzo(a)pyrene TEQ Total +ve	0.5	300					<0.5	<0.5	<0.5		<0.5		<0.5	
Total Recoverable Hydrocar			012)	I			4.1	<0.5	<0.5		<0.5		<0.5	
TRH C6 - C10	25) - INEFINI (2	45	1	180	<10	<25		<25		<25		<25	
VTPH C6 - C10 less BTEX	25		45		-	100	<25		<25		<25		<25	-
TRH >C10-C16	25 50		45		- 120	840	<25		<25		<25		<25	ł
TRH >C10-C16 TRH >C16-C34	100		NL NL		300	840 440	<50		<50		<50		<50	ł
									-					l
TRH >C34-C40	100		NL	I	2800	1380	<100		110		<100		<100	
BTEX			1	1										
Benzene	0.2		0.5		50		<0.2		<0.2		<0.2		<0.2	
Toluene	0.5		160		85		<0.5		<0.5		<0.5		<0.5	
Ethylbenzene	1		35		70		<1		<1		<1		<1	
m+p-xylene	2		40		105		<2		<2		<2		<2	
o-Xylene	1		40				<1		<1		<1		<1	
OC/ OP Pestcides														
Sum of Aldrin + Dieldrin	0.05	6					< 0.05		< 0.05				<0.05	
Sum of DDD + DDT + DDE	0.05	240					< 0.05		< 0.05				< 0.05	
Remainder of OCPs	0.05						< 0.05		< 0.05				< 0.05	
OPPs	0.05			l			< 0.05	İ	< 0.05	İ		İ	< 0.05	

All results are in mg/kg
All A - Residential landuse

TriL - A reasoning anoual of Ells preprietar the most conservative value possible as the lowest value for added contaminant limit (ACL) was use Results shaded grey are in excess of the investigation criteria. Benzo(a)pyrene TEQ is indicative of carcinogenic PAHs: the HIL is based on the 8 carcinogenic PAHs and their TEFs

TABLE C: Soil Quality Assu	urance/ Qua	lity Conti	ol Results			
Sample Identification		QA1			QA1	
Sample Depth (m)	Fill soi	l matrix		Fill soi	l matrix	
Duplicate Type	Intralab	oratory	RPD %	Intralat	ooratory	RPD %
Sample Profile		LL			LL ,	
Sample collected by	К	W		К	Ŵ	
Metals						
Arsenic	<5	5	NC	<5	5	NC
Cadmium	<1	<1	NC	<1	<1	NC
Chromium	7	13	60	7	13	60
Copper	16	23	36	16	23	36
Lead	<5	6	NC	<5	6	NC
Nickel	4	8	67	4	8	67
Zinc	31	32	3	31	32	3
Mercury	0.2	0.3	40	0.2	0.3	40
Polycyclic Aromatic Hydrocar	bons (PAH)					
Naphthalene	<0.5	<0.5	NC	<0.5	<0.5	NC
Acenaphthylene	<0.5	<0.5	NC	<0.5	<0.5	NC
Acenaphthene	<0.5	<0.5	NC	<0.5	<0.5	NC
Fluorene	<0.5	<0.5	NC	<0.5	<0.5	NC
Phenanthrene	<0.5	<0.5	NC	<0.5	<0.5	NC
Anthracene	<0.5	<0.5	NC	<0.5	<0.5	NC
Fluoranthene	<0.5	<0.5	NC	<0.5	<0.5	NC
Pyrene	<0.5	<0.5	NC	<0.5	<0.5	NC
Benz(a)anthracene	<0.5	<0.5	NC	<0.5	<0.5	NC
Chrysene	<0.5	<0.5	NC	<0.5	<0.5	NC
Benzo(b)&(k)fluoranthene	<0.5	<0.5	NC	<0.5	<0.5	NC
Benzo(a) pyrene	<0.5	<0.5	NC	<0.5	<0.5	NC
Indeno(1,2,3-c,d)pyrene	<0.5	<0.5	NC	<0.5	<0.5	NC
Dibenz(a,h)anthracene	<0.5	<0.5	NC	<0.5	<0.5	NC
Benzo(g,h,i)perylene	<0.5	<0.5	NC	<0.5	<0.5	NC
Benzo(a)pyrene TEQ	<0.5	<0.5	NC	<0.5	<0.5	NC
Total +ve	<0.5	<0.5	NC	<0.5	<0.5	NC
Total Recoverable Hydrocarb	ons (TRH) - N	NEPM (201	3)			
TRH C6 - C10	<25	<25	NC	<25	<25	NC
vTPH C6 - C10 less BTEX	<25	<25	NC	<25	<25	NC
TRH >C10-C16	<50	<50	NC	<50	<50	NC
TRH >C16-C34	<100	<100	NC	<100	<100	NC
TRH >C34-C40	<100	<100	NC	<100	<100	NC
BTEX						
Benzene	<0.2	<0.2	NC	<0.2	<0.2	NC
Toluene	<0.5	<0.5	NC	<0.5	<0.5	NC
Ethylbenzene	<1	<1	NC	<1	<1	NC
m+p-xylene	<2	<2	NC	<2	<2	NC
o-Xylene	<1	<1	NC	<1	<1	NC

Note all units in mg/kg

BOLD identifies where RPD results

DOLD Identifies where it Diresuits				
intralaboratory	interlaboratory		interlaboratory	
>50	>60	where both sample results	>60	where both sample results exceed ten x P
>75	>85	where both sample results a	>85	where both sample results are within 5 to
>100	>100	where both sample results a	>100	where both sample results are within 2 to
AD>2.5 * PQL		where one or both sample r	esults are <2	where one or both sample results are <2 >

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 C: Soil Analy	Asbestos Detecti		Asbestos Qua	antificatio	n			
Sample Identification	Asbestos Type	Description	Weight for ca			be: ACM >7mm	AF/FA <7m	m Trace Asbestos
	////		kg	g	g	%	%	Fibres
Lot 460 TP1	No				Ĩ			
Lot 460 TP2	No							
Lot 460 TP3	No							
Lot 460 TP4	No							
Lot 460 TP8	No							
Lot 459 TP11	No							
Lot 459 QA1	No							
Lot 459 TP12	No							
Lot 458 TP16	Yes	Ch + Cr						
ot 458 TP17	No							
Lot 458 QA2	No							
Lot 458 TP19	No							
Lot 458 TP23	Yes	Ch						
Lot 459 TP27	No							
Lot 459 TP28	No							
Lot 459 TP29	No							
Lot 459 TP30	No							
ot 459 TP31	No							
ot 459 TP32	No							
ot 459 TP33	No							
Lot 459 TP34	No							
ot 459 TP35	No							
ot 459 TP36	Yes	Ch						
Lot 459 TP37	No							
Lot 459 TP38	No							
Lot 463 TP1	Yes	Ch + Cr						
ot 463 TP3	No							
Lot 463 TP5	No		0.25	<0.1	<0.02	< 0.01	<0.001	No
Lot 463 TP7 0-0.3m	Yes	Am + Cr						
Lot 463 TP7 1-1.1m	No		0.04	<0.1	< 0.002	<0.04	<0.005	No
Lot 463 QA1	No							
Lot 463 SP2	No							
ot 463 TP9	No							
Lot 462 TPA	No		0.0716	<0.1	<0.002	<0.02	<0.003	No
Lot 462 TPB	No		0.309	<0.1	<0.002	<0.01	<0.001	Mo
Lot 462 TPC	No							
Lot 462 TP10	No		0.0524	<0.1	<0.002	<0.03	<0.004	No
ot 462 TPE	No		0.296	<0.1	<0.002	<0.01	< 0.001	No
Lot 462 SP3	Yes	Ch	0.35	<0.1	<0.002	<0.01	< 0.001	No
Lot 462 TP Gully	Yes	Ch + Am + Cr						
Lot 462TP4	Yes	Ch + Am + Cr						
Lot 462TP3	Yes	Am + Cr						
Lot 463 TP2	No		0.0732	<0.1	<0.002	<0.02	<0.003	No
Lot 463 TP3	No		0.305	< 0.1	< 0.002	< 0.01	< 0.001	No

Appendix E

Laboratory Reports

No. - NA Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc. EAZBOZ Additional Information ò V = VOA Val HCI Preserved. VB = VOA Val Sodium Bisulphate Preserved. Val Suffuric Preserved Val Solfuric Preserved Amber Glass. H = HCI preserved Pastic; HS = HCI preserved Speciation bottlet, SP = Suffaric Preserved Pastic; F = Formaldenyde Preserved Glass. Z = Zinc detate Preserved Bottlet, E = EDTA Preserved Bottlet, SST = Sterile Bottlet, SSS = Plastic Bast of Act Suffarite Preserved Bast, Unpreserved 09 aS RECEIVED BY: DATE/TIME: FOR LABORATORY USE ONLY (Circle). F1 Launcoston: 27 Webbryten St. Launasslen TAS 7250 Ph.03 6331 2458 E. humcesten@galsconce.com Ph. 08.0209.7655.E. samples perth@dfs.mwo.com Random Sample. Lemperalure on Red Environmental Division Telephone : +61-2-8764 8555 11 Perth 10 Hod Way, Malaga WA 6050 ES1323625 SOLL ANALYSIS REQUIRED Including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bolls required) or Dissofved (field filtered bolls required). Free loay frozen loe, br Work Order Othercomments RELINQUISHED BY: Sydney ¢ <u>19</u>74 S = Sadium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Ainfreight Unpreserved Plastic ь. ~ ە œ (Circle) Melhautus 2:4 Westal RJ Surrgwio VIC 3171
 PICS 32015600 E smiptos meluoroxidoatacino com Cl. Adolando: 2:1 Burnin RU Poscola SA 5065
 PL 705 3535 05301 E-adola-degistramin com ŝ COC SEQUENCE NUMBER 0 0 4 ŝ 9:55am 4/11/3 4/11/3 RECEIVED BY COC: (1) DATE/TIME Ţ al rotodat Sidulos Sidulos Ë Non Standard or urgent TAT (List due date): Ŋ Standard T'A'T {List due date): Х C) Townswiller 14-15 Dosma CL Boldo QI D 4818 Pl.07 4796 0600 E: transfile environment/Applemente con-(7) (1) Britsbare 32 Shard SI, Statford OLD 4053 Ph 07 3243 7222 E samples hirsbano@hisomate com TOTAL BOTTLES 3 SELLINGUISHED BY: \sim Fridoso Scadman genviron Com DATETIME TOTAL CONTAINER INFORMATION Unpreserved Ziplach unpreserved payer Ashestos Unpresenred 9/955 9 TYPE & PRESERVATIVE (refer to codes below) シナレ (Standard TAT may be longer for some tests e.g.. Ultra Trace Organica) TURNAROUND REQUIREMENTS : Codes: P = Unpreserved Plastic: N = Nitric Preserved Plastic: ORC = Nitric Preserved ORC; SH = Sodilin Hydroxide/Cd Pres CONTACT PH: 02 4962 COUNTRY OF ORIGIN: LI Newcastlo: 5 Roscgun RU Wruzucok NSW 2304 Ph.12 4968 9433 E semples newcastleigalsemmo.com EJ Sydney, 277 Woodpark RU. Smithteld NSW 2176 Ph. 02 8784 8555 Ersemplex avaneyitgalsonviro.com ALS QUOTE NO .: EDD FORMAT (or default): MATRIX SAMPLER MOBILE; $\langle \rangle$ S り \sim 5 V) $\tilde{\omega}$ \sim $\widetilde{\mathbf{\omega}}$ $\widetilde{\mathbb{O}}$ \mathfrak{V} (ro/13 $\overline{\mathbb{W}}$ \mathcal{O} m \mathbb{S} ELP13 Lot 460 AGM | 30/10/12 DATE / TIME 0 25/10/ 5 ELP13 Lot 462 ACM\$ 25/10/ 30/101 Y ELP13 Lot 462 AGM2 25/10/ ELP 13 10+459 ACM 30 1'(01 PROJECT NO .: PURCHASE ORDER NO.: 0 25/10/ 0 30/10.1 SAMPLE DETAILS MATRIX: Solid(S) Water(W) ELPISLOT 461 AGM2 25 , EPPISLOT 462 SF2 251 3 ELP13644585F3 301 Email Reports to (will default to PM if no other addresses are listed): Gmail Invoice to (will default to PM if no other addresses are listed): ad man COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: 6 ELP1310+463 ACM1 CHAIN OF CUSTODY ELP13 Lot461 SF3 ELP13 Lot 459SFZ ELPIS Lot 458 Acm ELP13 Lot 463 SF1 ALS Laboratory: please fick SAMPLE ID he Junction at Wood PROJECT: AS 130348 PROJECT MANAGER: Steve COC Emailed to ALS? (YES KNO) TNVI RON 3 7 ALS USE ONLY 2 ÷ **DRDER NUMBER:** 60 Ċ, LAB ID ALS A SAMPLER: Ř OFFICE: CLIENT:

אווס נאוו אהו 145 7250 ני כמוו	NLY (Grade) - Lives (No.	ALC: NON	o Receipt.		RECEIVED BY:	!	DATE/TIME:			Additional Information	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.	, ,		-										= Formaídehyde Preserved Glass;
PAL 08 2209 7655 E. samples pulliĝials. Inno tan 1.1 Lantnasten: 27 Welngjon St. Lumasann YAS 7260 Ph. 03 6331 2168 E. inumastenĝialsmente com	FORLABORATORYUSE ONLY (Circle) Custody Seel InterC		7 Random Sample Temperature on Receipt.	7 Other Common Common Common Common Common Common Common Common Common Common Common Common Common Common Commo	RELINQUISHED BY:		DATE/TIME:		-	des must be listed to attract sulte price). Discolved (held filered bolle required).				-				-						preserved Plastic nttler SP = Suffuric Preserved Plastic: F
Ph.03 8543 9600 E, samples malkamm@bhlseman.com 13 Adoktaba: 2-1 Burnis Rd Proceba SA 9095 Ph.08 8359 10290 E.chdeladeigalsammo.com	teta).	COC SEQUENCE NUMBER (Circle)	coc: i 🔁 3 4 5 6	0F: 1 2 3 4 5 6	RECEIVED BY:	ଧ୍ୟ	DATE/TIME:	4/11/3 0955		ANAL YSIS REQUIRED including SUITES (NB. Sulls Cades must be listed to attract suite price) Wisee Meals are required, specify Total (urilinered bolls required) or Discolved (Med Ninered bolls required).														Arrive states and a second providence of the second of the second of the second of the second of the second providence of
	Standard TAT (List due date): Non structed or uncost TAT if ist due data)				f	~	9:55am			ANALYSIS REC Whate Metals		14. رو راغل	оп <u>-</u> /по //пр/	4 33	X /	•								roxide Preserved Plastic; AG =
RARCOUR FULVE 2013 12.2.2.2.2.2.00.302 MISSANGERMENTATION CON- NSW 2320 F. T. TOWNEVILLE, 14.5.Davina OL Behlia OLD ARIB SONNO LONI P1.07 4796 0600 E. Paanovity, frantamentationenvio.com	TURNAROUND REQUIREMENTS : Constandard T (Standard TAT may be longer for some tests	1	OF ORIGIN:	49625444	A RELINDING AND A RELINDING A RELINDING AND A RELINDING AND A RELINDING AND A RELINDING AND A RELINDING AND A RELINDING AND A RELINDING AND A RELINDING AND A RELINDING AND A RELINDING AND A RELINDING AND A RELINDING AND A RELINDING ARD A RELINDING ARCHING A RELINDING A	n Knyard	Scadman en utencorp.com DATE TIME	4/11/13		CONTAINER INFORMATION		TYPE & PRESERVATIVE			urpreserved glass								Torta	Sodium Hydroxide/Cd Proserved; S = Sodium Hyd
Rd Watelucok s newcastlongal	TURNARO	ALS QUOTE NO.:	COUNTRY OF ORIGIN:			EDD FORMAT (or default):	(a)en	,					MATRIX		S									ed ORC; SH =
en uz osot oson e sonta svaregigatsenducum Li Newcastlor 5 Rowgum Rd Watabrook NSW 2304 Ph/12 4968 9433 E samples newcastlengalonum o com		PROJECT NO .:	PURCHASE ORDER NO.:	2 CONTACT PH: 02		EDD FORMA	- 3		•	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			DATE / TIME		30/10/13	-								ad Plastic; ORC = Nitric Preserv
ALS Leboratory: please fick 🤿	NVIRON			Steve Caelman	inland S	res (NO)	mail Reports to (will default to PM if no other addresses are listed):	mail Invoice to (will default to PM if no other addresses are listed):	OMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:	SAMPLE MATRIX: Sol			SAMPLE ID		ELP13/of 460SF1									3 = Unpreserved Plastic; N = Nitric Preserve
(SIS)	HENT: ENL	ROJECT: AS /	RDER NUMBER:	ROJECT MANAGER:	AMPLER: Kafe	OC Emailed to ALS? (YES	nail Reports to (will de	nail Invoice to (will de	DMMENTS/SPECIAL F	ALS USE ONLY			LABIU		1	-			-					ater Confainer Codes: 1



	CERTIFICATE OF ANALYSIS											
Work Order	ES1323625	Page	: 1 of 5									
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney									
Contact	: MR STEVE CADMAN	Contact	: Client Services									
Address	: PO BOX 560	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164									
	NORTH SYDNEY NSW, AUSTRALIA 2060											
E-mail	scadman@environcorp.com	E-mail	: sydney@alsglobal.com									
Telephone	: +61 02 99548114	Telephone	: +61-2-8784 8555									
Facsimile	:	Facsimile	: +61-2-8784 8500									
Project	: AS130348	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement									
Order number	:											
C-O-C number	:	Date Samples Received	: 04-NOV-2013									
Sampler	: KW	Issue Date	: 11-NOV-2013									
Site	:											
		No. of samples received	: 13									
Quote number	: SY/446/12	No. of samples analysed	: 13									

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

• Descriptive Results

	NATA Accredited Laboratory 825	<i>Signatories</i> This document has been electronically	signed by the authorized signatories	indicated below. Electronic signing has been
NATA	Accredited for compliance with	carried out in compliance with procedures sp	pecified in 21 CFR Part 11.	
	ISO/IEC 17025.	Signatories	Position	Accreditation Category
WORLD RECOGNISED		Ashesh Patel Celine Conceicao	Inorganic Chemist Senior Spectroscopist	Sydney Inorganics Sydney Inorganics
ACCREDITATION		Peter Rennie	Asbestos Identifier	Newcastle - Asbestos

Address 277-289 Woodpark Road Smithfield NSW Australia 2164 PHONE +61-2-8784 8555 Facsimile +61-2-8784 8500 Environmental Division Sydney ABN 84 009 936 029 Part of the ALS Group An ALS Limited Company



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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.

- EA200 Legend
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Ch' Chrysotile (white asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' Asbestos fibres detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	ELP13 LOT 460 ACM1	ELP13 LOT 459 ACM1	ELP13 LOT 461 ACM2	ELP13 LOT 462 ACM2	ELP13 LOT 462 ACM4
	C	lient sampli	ng date / time	30-OCT-2013 15:00	30-OCT-2013 15:00	25-OCT-2013 15:00	25-OCT-2013 15:00	25-OCT-2013 15:00
Compound	CAS Number	LOR	Unit	ES1323625-001	ES1323625-002	ES1323625-003	ES1323625-004	ES1323625-005
EA200: AS 4964 - 2004 Identification	of Asbestos in bulk	samples						
Asbestos Detected	1332-21-4	0.1	g/kg	Yes	Yes	Yes	Yes	Yes
Asbestos Type	1332-21-4	0.1		Ch + Am	Ch	Ch + Cr	Ch + Cr	Ch + Am
Sample weight (dry)		0.01	g	65.2	62.8	34.4	26.4	36.0
APPROVED IDENTIFIER:		-		P.RENNIE	P.RENNIE	P.RENNIE	P.RENNIE	P.RENNIE



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Cli	ent sample ID	ELP13 LOT 463 ACM1	ELP13 LOT 458 ACM1	ELP13 LOT 461 SF3	ELP13 LOT 463 SF1	ELP13 LOT 462 SF2
	Cl	ient sampli	ing date / time	25-OCT-2013 15:00	30-OCT-2013 15:00	25-OCT-2013 15:00	25-OCT-2013 15:00	25-OCT-2013 15:00
Compound	CAS Number	LOR	Unit	ES1323625-006	ES1323625-007	ES1323625-008	ES1323625-009	ES1323625-010
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%			4.2	6.2	25.4
EA200: AS 4964 - 2004 Identification of	Asbestos in bulk	samples						
Asbestos Detected	1332-21-4	0.1	g/kg	Yes	Yes			
Asbestos Type	1332-21-4	0.1		Am + Cr	Ch + Am + Cr			
Sample weight (dry)		0.01	g	1.98	38.4			
APPROVED IDENTIFIER:		-		P.RENNIE	P.RENNIE			
EK040: Fluoride								
Fluoride	16984-48-8	1	mg/kg			6	7	8



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID		ELP13 LOT 458 SF3	ELP13 LOT 459 SF2	ELP13 LOT 460 SF1	 	
	Cl	ient sampli	ng date / time	30-OCT-2013 15:00	30-OCT-2013 15:00	30-OCT-2013 15:00	
Compound	CAS Number	LOR	Unit	ES1323625-011	ES1323625-012	ES1323625-013	
EA055: Moisture Content							
Moisture Content (dried @ 103°C)		1.0	%	10.7	14.4	10.3	
EK040: Fluoride							
Fluoride	16984-48-8	1	mg/kg	7	10	1	

Analytical Results

Descriptive Results

Sub-Matrix: SOIL		
Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification	n of Asbestos in bulk samples	
EA200: Description	ELP13 LOT 460 ACM1 - 30-OCT-2013 15:00	Four pieces of bonded asbestos cement sheeting approximately 130 x 50 x 5mm.
EA200: Description	ELP13 LOT 459 ACM1 - 30-OCT-2013 15:00	Three pieces of bonded asbestos cement sheeting approximately 105 x 60 x 5mm.
EA200: Description	ELP13 LOT 461 ACM2 - 25-OCT-2013 15:00	Several pieces of bonded asbestos cement sheeting approximately 45 x 25 x 5mm.
EA200: Description	ELP13 LOT 462 ACM2 - 25-OCT-2013 15:00	Several pieces of bonded asbestos cement sheeting approximately 45 x 35 x 5mm.
EA200: Description	ELP13 LOT 462 ACM4 - 25-OCT-2013 15:00	Several pieces of bonded asbestos cement sheeting approximately 45 x 35 x 7mm.
EA200: Description	ELP13 LOT 463 ACM1 - 25-OCT-2013 15:00	Several pieces of heavily degraded and friable asbestos cement sheeting approximately 10 x 5 x 5mm.
EA200: Description	ELP13 LOT 458 ACM1 - 30-OCT-2013 15:00	Three pieces of bonded asbestos cement sheeting approximately 55 x 45 x 5mm.
· · · · · · · · · · · · · · · · · · ·		



QUALITY CONTROL REPORT

Work Order	: ES1323625	Page	: 1 of 4
Client	ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 560 NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 99548114	Telephone	: +61-2-8784 8555
Facsimile	:	Facsimile	: +61-2-8784 8500
Project	: AS130348	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	:		
C-O-C number	:	Date Samples Received	: 04-NOV-2013
Sampler	: KW	Issue Date	: 11-NOV-2013
Order number	:		
		No. of samples received	: 13
Quote number	: SY/446/12	No. of samples analysed	: 13

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 Signatories

Laboratory 825 This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out ir compliance with procedures specified in 21 CFR Part 11.

Accredited for	Signatories	Position	Accreditation Category
compliance with ISO/IEC 17025.	Ashesh Patel	Inorganic Chemist	Sydney Inorganics
130/IEC 17025.	Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
	Peter Rennie	Asbestos Identifier	Newcastle - Asbestos

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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	Jub-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: 3147356)											
ES1323625-010	ELP13 LOT 462 SF2	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	25.4	23.8	6.6	0% - 20%		
ES1323785-008	Anonymous	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	5.3	6.0	12.3	No Limit		
EK040S: Fluoride So	oluble (QC Lot: 3144606)										
ES1323625-008	ELP13 LOT 461 SF3	EK040S: Fluoride	16984-48-8	1	mg/kg	6	6	0.0	No Limit		
ES1323784-005	Anonymous	EK040S: Fluoride	16984-48-8	1	mg/kg	4	4	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 Sample (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)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EK040S: Fluoride Soluble (QCLot: 3144606)									
EK040S: Fluoride	16984-48-8	1.0	mg/kg	<1	25.0 mg/kg	116	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	Sub-Matrix: SOIL						
				Spike	SpikeRecovery(%)	Recovery L	imits (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK040S: Fluoride S	Soluble (QCLot: 3144606)						
ES1323625-008	ELP13 LOT 461 SF3	EK040S: Fluoride	16984-48-8	50 mg/kg	108	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	Sub-Matrix: SOIL			Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report							
				Spike	Spike Rec	overy (%)	Recovery	Limits (%)	RPD	s (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit	
EK040S: Fluoride S	oluble (QCLot: 3144606)										
ES1323625-008	ELP13 LOT 461 SF3	EK040S: Fluoride	16984-48-8	50 mg/kg	108		70	130			



	INTERPRETIVE	QUALITY CONTROL	KEPUKI
Nork Order	: ES1323625	Page	: 1 of 5
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 560 NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
Felephone	: +61 02 99548114	Telephone	: +61-2-8784 8555
Facsimile	:	Facsimile	: +61-2-8784 8500
Project	: AS130348	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	:		
C-O-C number	:	Date Samples Received	: 04-NOV-2013
Sampler	: KW	Issue Date	: 11-NOV-2013
Order number	:		
		No. of samples received	: 13
Quote number	: SY/446/12	No. of samples analysed	: 13

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

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Analysis Holding Time Compliance

Matrix: SOII

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 <u>VOC in soils</u> 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.

Evaluation: * = Holding time breach ; \checkmark = Within holding time.

			_				breach, • = within	i noluling tim
Method		Sample Date	Ex	traction / Preparation		Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content								
Pulp Bag (EA055-103) ELP13 LOT 461 SF3,	ELP13 LOT 463 SF1,	25-OCT-2013				08-NOV-2013	08-NOV-2013	~
ELP13 LOT 462 SF2 Soil Glass Jar - Unpreserved (EA055-103)								
ELP13 LOT 458 SF3, ELP13 LOT 460 SF1	ELP13 LOT 459 SF2,	30-OCT-2013				08-NOV-2013	13-NOV-2013	1
EA200: AS 4964 - 2004 Identification of Asbesto	s in bulk samples						1	
Snap Lock Bag (EA200) ELP13 LOT 461 ACM2, ELP13 LOT 462 ACM4.	ELP13 LOT 462 ACM2, ELP13 LOT 463 ACM1	25-OCT-2013		23-APR-2014		08-NOV-2013	07-MAY-2014	~
Snap Lock Bag (EA200) ELP13 LOT 460 ACM1, ELP13 LOT 458 ACM1	ELP13 LOT 459 ACM1,	30-OCT-2013		28-APR-2014		08-NOV-2013	07-MAY-2014	~
EK040: Fluoride							1	<u> </u>
Pulp Bag (EK040S) ELP13 LOT 461 SF3, ELP13 LOT 462 SF2	ELP13 LOT 463 SF1,	25-OCT-2013	06-NOV-2013	01-NOV-2013	¥	08-NOV-2013	04-DEC-2013	~
Soil Glass Jar - Unpreserved (EK040S) ELP13 LOT 458 SF3, ELP13 LOT 460 SF1	ELP13 LOT 459 SF2,	30-OCT-2013	06-NOV-2013	06-NOV-2013	~	08-NOV-2013	04-DEC-2013	~



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 specificatio									
Quality Control Sample Type		Co	ount		Rate (%)		Quality Control Specification			
Analytical Methods	Method	00	Reaular	Actual	Expected	Evaluation				
Laboratory Duplicates (DUP)										
Fluoride - Soluble	EK040S	2	19	10.5	10.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement			
Moisture Content	EA055-103	2	19	10.5	10.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement			
Laboratory Control Samples (LCS)										
Fluoride - Soluble	EK040S	1	19	5.3	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement			
Method Blanks (MB)										
Fluoride - Soluble	EK040S	1	19	5.3	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement			
Matrix Spikes (MS)										
Fluoride - Soluble	EK040S	1	19	5.3	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).
Asbestos Identification in bulk solids	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples
Fluoride - Soluble	EK040S	SOIL	APHA 21st ed., 4500 FC 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	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
analytes			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		Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days	Date analysed	Due for analysis	Days
				overdue			overdue
EK040: Fluoride							
Pulp Bag							
ELP13 LOT 461 SF3,	ELP13 LOT 463 SF1,	06-NOV-2013	01-NOV-2013	5			
ELP13 LOT 462 SF2							

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.

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Approved Date, 27/06/2013

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Approved Data 27/08/2012



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Work Order	ES1406239	Page	: 1 of 20
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	MAITLAND NSW, AUSTRALIA 2320		
E-mail	scadman@environcorp.com	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 BUFFER ZONE INVESTIGATION AS130348	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: AS130348		•••
C-O-C number	:	Date Samples Received	: 21-MAR-2014
Sampler	: KW,SC	Issue Date	: 03-APR-2014
Site	:		
		No. of samples received	: 38
uote number	: SY/433/13	No. of samples analysed	: 20

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
- Descriptive Results
- Surrogate Control Limits

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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.

- ALS is not NATA accredited for the analysis of Bifenthrin in soils when performed under ALS Method EP068D
- EA200 Legend
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Ch' Chrysotile (white asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' Asbestos fibres detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- EA200Q: ALS laboratory procedures and methods used for the identification and quantitation of asbestos are consistent with AS4964-2004 and the requirements of the 2013 NEPM for Assessment of Site Contamination
- EA200Q: Asbestos weights and percentages are not covered under the Scope of NATA Accreditation. Weights of Asbestos are based on extracted bulk asbestos, fibre bundles, and/or ACM and do not include respirable fibres (if present). Percentages for Asbestos content in ACM are based on the 2013 NEPM default values. All numerical results under this method are approximate and should be used as a guide only.
- EP068: Pozitive results are on samples confirmed by re-extraction and re-analysis.

	NATA Accredited Laboratory 825	Signatories This document has been electronically	signed by the authorized signatories indicated and the signatories of the signatories	cated below. Electronic signing has been carried out in
NATA	Accredited for compliance with	compliance with procedures specified in 21	CFR Part 11.	
	ISO/IEC 17025.	Signatories	Position	Accreditation Category
				Sydney Inorganics
		Ashesh Patel	Inorganic Chemist	Sydney Inorganics
WORLD RECOGNISED		Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos
		Edwandy Fadjar	Organic Coordinator	Sydney Organics
		Pabi Subba	Senior Organic Chemist	Sydney Organics
		Shobhna Chandra	Metals Coordinator	Sydney Inorganics
		Wisam Marassa	Inorganics Coordinator	Sydney Inorganics



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL13 LOT463 TP1 0.2-0.3	PARCEL13 LOT463 TP3 0.8-0.9	PARCEL13 LOT463 TP4 0.6-0.7	PARCEL13 LOT463 TP5 1.1-1.3	PARCEL13 LOT463 TP7 0-0.3
	Cl	ient samplir	ng date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-001	ES1406239-003	ES1406239-004	ES1406239-005	ES1406239-006
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	7.1		11.1	7.1	6.8
EA200: AS 4964 - 2004 Identification of	of Asbestos in bulk	samples						
Asbestos Detected	1332-21-4	0.1	g/kg	Yes	No	No	Yes	No
Asbestos Type	1332-21-4	-		Ch + Cr	-	-	Am + Cr	-
Unknown Mineral Fibre		0.1	g/kg				Yes	
Sample weight (dry)		0.01	g	18.8	235	250	10.1	40.0
APPROVED IDENTIFIER:		-		G.MORGAN	C.OWLER	C.OWLER	G.MORGAN	C.OWLER
EA200Q: Asbestos Quantification (no	n-NATA)							
Weight Used for % Calculation		0.0001	kg			0.250		0.0400
Asbestos Containing Material	1332-21-4	0.1	g	18.8		<0.1	10.1	<0.1
Fibrous Asbestos		0.002	g			<0.002		<0.002
Asbestos Containing Material (as 15% Asbestos in ACM >7mm)	1332-21-4	0.01	%			<0.01		<0.04
Asbestos Fines and Fibrous Asbestos (<7mm)	1332-21-4	0.001	%			<0.001		<0.005
Trace Asbestos Detected		5	Fibres			No		No
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	9		9		12
Cadmium	7440-43-9	1	mg/kg	<1		<1		<1
Chromium	7440-47-3	2	mg/kg	66		16		7
Copper	7440-50-8	5	mg/kg	20		9		52
Lead	7439-92-1	5	mg/kg	36		16		22
Nickel	7440-02-0	2	mg/kg	3		7		31
Zinc	7440-66-6	5	mg/kg	52		515		24
EG035T: Total Recoverable Mercury	by FIMS							
Mercury	7439-97-6	0.1	mg/kg	<0.1		<0.1		0.1
EP068A: Organochlorine Pesticides (OC)							
alpha-BHC	319-84-6	0.05	mg/kg	<0.05			<0.05	
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05			<0.05	
beta-BHC	319-85-7	0.05	mg/kg	<0.05			<0.05	
gamma-BHC	58-89-9	0.05	mg/kg	<0.05			<0.05	
delta-BHC	319-86-8	0.05	mg/kg	<0.05			<0.05	
Heptachlor	76-44-8	0.05	mg/kg	<0.05			<0.05	



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL13 LOT463 TP1 0.2-0.3	PARCEL13 LOT463 TP3 0.8-0.9	PARCEL13 LOT463 TP4 0.6-0.7	PARCEL13 LOT463 TP5 1.1-1.3	PARCEL13 LOT463 TP7 0-0.3
	Cl	lient samplii	ng date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-001	ES1406239-003	ES1406239-004	ES1406239-005	ES1406239-006
EP068A: Organochlorine Pesticide	es (OC) - Continued							
Aldrin	309-00-2	0.05	mg/kg	<0.05			<0.05	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05			<0.05	
∑ Total Chlordane (sum)		0.05	mg/kg	<0.05			<0.05	
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05			<0.05	
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05			<0.05	
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05			<0.05	
Dieldrin	60-57-1	0.05	mg/kg	<0.05			<0.05	
4.4`-DDE	72-55-9	0.05	mg/kg	0.46			<0.05	
Endrin	72-20-8	0.05	mg/kg	<0.05			<0.05	
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05			<0.05	
↑ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05			<0.05	
4.4`-DDD	72-54-8	0.05	mg/kg	0.07			<0.05	
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05			<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05			<0.05	
4.4`-DDT	50-29-3	0.2	mg/kg	0.6			<0.2	
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05			<0.05	
Methoxychlor	72-43-5	0.2	mg/kg	<0.2			<0.2	
Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05			<0.05	
Sum of DDD + DDE + DDT		0.05	mg/kg	1.13			<0.05	
EP068B: Organophosphorus Pest	icides (OP)							
Dichlorvos	62-73-7	0.05	mg/kg	<0.05			<0.05	
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05			<0.05	
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2			<0.2	
Dimethoate	60-51-5	0.05	mg/kg	<0.05			<0.05	
Diazinon	333-41-5	0.05	mg/kg	<0.05			<0.05	
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05			<0.05	
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2			<0.2	
Malathion	121-75-5	0.05	mg/kg	<0.05			<0.05	
Fenthion	55-38-9	0.05	mg/kg	<0.05			<0.05	
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05			<0.05	
Parathion	56-38-2	0.2	mg/kg	<0.2			<0.2	
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05			<0.05	
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05			<0.05	



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	Cli	ent sampli	ng date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-001	ES1406239-003	ES1406239-004	ES1406239-005	ES1406239-006
EP068B: Organophosphorus Pestic	ides (OP) - Continued							
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05			<0.05	
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05			<0.05	
Prothiofos	34643-46-4	0.05	mg/kg	<0.05			<0.05	
Ethion	563-12-2	0.05	mg/kg	<0.05			<0.05	
Carbophenothion	786-19-6	0.05	mg/kg	<0.05			<0.05	
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05			<0.05	
EP075(SIM)B: Polynuclear Aromatic	Hydrocarbons							
Naphthalene	91-20-3	0.5	mg/kg	<0.5		<0.5		<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5		<0.5		<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5		<0.5		<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5		<0.5		<0.5
Phenanthrene	85-01-8	0.5	mg/kg	0.7		<0.5		1.7
Anthracene	120-12-7	0.5	mg/kg	<0.5		<0.5		<0.5
Fluoranthene	206-44-0	0.5	mg/kg	1.1		<0.5		1.0
Pyrene	129-00-0	0.5	mg/kg	1.1		<0.5		0.8
Benz(a)anthracene	56-55-3	0.5	mg/kg	0.7		<0.5		<0.5
Chrysene	218-01-9	0.5	mg/kg	0.8		<0.5		0.6
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	1.2		<0.5		<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	0.6		<0.5		<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.9		<0.5		<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	0.6		<0.5		<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5		<0.5		<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	0.8		<0.5		<0.5
Sum of polycyclic aromatic hydrocarbo	ns	0.5	mg/kg	8.5		<0.5		4.1
Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	1.2		<0.5		<0.5
Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	1.5		0.6		0.6
Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.7		1.2		1.2
EP080/071: Total Petroleum Hydroca	arbons							
C6 - C9 Fraction		10	mg/kg	<10		<10		<10
C10 - C14 Fraction		50	mg/kg	<50		<50		100
C15 - C28 Fraction		100	mg/kg	<100		<100		840
C29 - C36 Fraction		100	mg/kg	<100		<100		440
C10 - C36 Fraction (sum)		50	mg/kg	<50		<50		1380



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	Cli	ent sampl	ing date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-001	ES1406239-003	ES1406239-004	ES1406239-005	ES1406239-006
EP080/071: Total Recoverable Hydroc	arbons - NEPM 201	3						
C6 - C10 Fraction	C6_C10	10	mg/kg	<10		<10		<10
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10		<10		<10
>C10 - C16 Fraction	>C10_C16	50	mg/kg	<50		<50		170
>C16 - C34 Fraction		100	mg/kg	<100		<100		1080
>C34 - C40 Fraction		100	mg/kg	<100		<100		240
[^] →C10 - C40 Fraction (sum)		50	mg/kg	<50		<50		1490
>C10 - C16 Fraction minus Naphthalene		50	mg/kg	<50		<50		170
(F2)								
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2		<0.2		<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5		<0.5		<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5		<0.5		<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5		<0.5		<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5		<0.5		<0.5
Sum of BTEX		0.2	mg/kg	<0.2		<0.2		<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5		<0.5		<0.5
Naphthalene	91-20-3	1	mg/kg	<1		<1		<1
EP068S: Organochlorine Pesticide Su	urrogate							
Dibromo-DDE	21655-73-2	0.1	%	76.1			70.6	
EP068T: Organophosphorus Pesticid	e Surrogate							
DEF	78-48-8	0.1	%	78.0			75.7	
EP075(SIM)S: Phenolic Compound Su	urrogates							
Phenol-d6	13127-88-3	0.1	%	82.1		77.8		81.9
2-Chlorophenol-D4	93951-73-6	0.1	%	78.3		74.0		79.1
2.4.6-Tribromophenol	118-79-6	0.1	%	65.2		58.8		67.7
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	84.0		77.8		93.7
Anthracene-d10	1719-06-8	0.1	%	71.9		82.5		73.0
4-Terphenyl-d14	1718-51-0	0.1	%	85.9		77.8		80.8
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	112		97.0		106
Toluene-D8	2037-26-5	0.1	%	111		112		110



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL13 LOT463 TP1 0.2-0.3	PARCEL13 LOT463 TP3 0.8-0.9	PARCEL13 LOT463 TP4 0.6-0.7	PARCEL13 LOT463 TP5 1.1-1.3	PARCEL13 LOT463 TP7 0-0.3
	Cli	ent sampli	ng date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-001	ES1406239-003	ES1406239-004	ES1406239-005	ES1406239-006
EP080S: TPH(V)/BTEX Surrogates - Conti	nued							
4-Bromofluorobenzene	460-00-4	0.1	%	110		99.9		97.3



Sub-Matrix: SOIL (Matrix: SOIL)			ent sample ID	PARCEL13 LOT463 TP7 1-1.1	PARCEL13 LOT463 QA1	PARCEL13 LOT463 SP2	PARCEL13 LOT463 TP9 0.5-0.6 GU	PARCEL13 LOT462 TPA 0.3-0.5
	Cl	ient sampli	ing date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-007	ES1406239-008	ES1406239-009	ES1406239-010	ES1406239-011
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	16.7	16.5		12.3	
EA200: AS 4964 - 2004 Identification of	of Asbestos in bulk	samples						
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	No
Asbestos Type	1332-21-4	-		-	-	-	-	-
Sample weight (dry)		0.01	g	58.2	50.2	268	71.6	309
APPROVED IDENTIFIER:		-		C.OWLER	C.OWLER	C.OWLER	C.OWLER	C.OWLER
EA200Q: Asbestos Quantification (no	n-NATA)							
Weight Used for % Calculation		0.0001	kg				0.0716	0.309
Asbestos Containing Material	1332-21-4	0.1	g				<0.1	<0.1
Fibrous Asbestos		0.002	g				<0.002	<0.002
Asbestos Containing Material (as 15% Asbestos in ACM >7mm)	1332-21-4	0.01	%				<0.02	<0.01
Asbestos Fines and Fibrous Asbestos (<7mm)	1332-21-4	0.001	%				<0.003	<0.001
Trace Asbestos Detected		5	Fibres				No	No
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	15	13		10	
Cadmium	7440-43-9	1	mg/kg	<1	<1		<1	
Chromium	7440-47-3	2	mg/kg	32	32		17	
Copper	7440-50-8	5	mg/kg	<5	<5		<5	
Lead	7439-92-1	5	mg/kg	11	11		11	
Nickel	7440-02-0	2	mg/kg	<2	<2		3	
Zinc	7440-66-6	5	mg/kg	6	6		30	
EG035T: Total Recoverable Mercury I	by FIMS							
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1		<0.1	
EP068A: Organochlorine Pesticides (OC)							
alpha-BHC	319-84-6	0.05	mg/kg				<0.05	
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg				<0.05	
beta-BHC	319-85-7	0.05	mg/kg				<0.05	
gamma-BHC	58-89-9	0.05	mg/kg				<0.05	
delta-BHC	319-86-8	0.05	mg/kg				<0.05	
Heptachlor	76-44-8	0.05	mg/kg				<0.05	
Aldrin	309-00-2	0.05	mg/kg				<0.05	



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL13 LOT463 TP7 1-1.1	PARCEL13 LOT463 QA1	PARCEL13 LOT463 SP2	PARCEL13 LOT463 TP9 0.5-0.6 GU	PARCEL13 LOT462 TPA 0.3-0.5
	Cl	ient samplii	ng date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-007	ES1406239-008	ES1406239-009	ES1406239-010	ES1406239-011
EP068A: Organochlorine Pesticide	es (OC) - Continued							
Heptachlor epoxide	1024-57-3	0.05	mg/kg				<0.05	
[^] Total Chlordane (sum)		0.05	mg/kg				<0.05	
trans-Chlordane	5103-74-2	0.05	mg/kg				<0.05	
alpha-Endosulfan	959-98-8	0.05	mg/kg				<0.05	
cis-Chlordane	5103-71-9	0.05	mg/kg				<0.05	
Dieldrin	60-57-1	0.05	mg/kg				<0.05	
4.4`-DDE	72-55-9	0.05	mg/kg				<0.05	
Endrin	72-20-8	0.05	mg/kg				<0.05	
beta-Endosulfan	33213-65-9	0.05	mg/kg				<0.05	
∿ Endosulfan (sum)	115-29-7	0.05	mg/kg				<0.05	
4.4`-DDD	72-54-8	0.05	mg/kg				<0.05	
Endrin aldehyde	7421-93-4	0.05	mg/kg				<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg				<0.05	
4.4`-DDT	50-29-3	0.2	mg/kg				<0.2	
Endrin ketone	53494-70-5	0.05	mg/kg				<0.05	
Methoxychlor	72-43-5	0.2	mg/kg				<0.2	
[∿] Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg				<0.05	
Sum of DDD + DDE + DDT		0.05	mg/kg				<0.05	
EP068B: Organophosphorus Pesti	icides (OP)							
Dichlorvos	62-73-7	0.05	mg/kg				<0.05	
Demeton-S-methyl	919-86-8	0.05	mg/kg				<0.05	
Monocrotophos	6923-22-4	0.2	mg/kg				<0.2	
Dimethoate	60-51-5	0.05	mg/kg				<0.05	
Diazinon	333-41-5	0.05	mg/kg				<0.05	
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg				<0.05	
Parathion-methyl	298-00-0	0.2	mg/kg				<0.2	
Malathion	121-75-5	0.05	mg/kg				<0.05	
Fenthion	55-38-9	0.05	mg/kg				<0.05	
Chlorpyrifos	2921-88-2	0.05	mg/kg				<0.05	
Parathion	56-38-2	0.2	mg/kg				<0.2	
Pirimphos-ethyl	23505-41-1	0.05	mg/kg				<0.05	
Chlorfenvinphos	470-90-6	0.05	mg/kg				<0.05	
Bromophos-ethyl	4824-78-6	0.05	mg/kg				<0.05	



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL13 LOT463 TP7 1-1.1	PARCEL13 LOT463 QA1	PARCEL13 LOT463 SP2	PARCEL13 LOT463 TP9 0.5-0.6 GU	PARCEL13 LOT462 TPA 0.3-0.5
	Cli	ent sampli	ng date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-007	ES1406239-008	ES1406239-009	ES1406239-010	ES1406239-011
EP068B: Organophosphorus Pesticides	(OP) - Continued							
Fenamiphos	22224-92-6	0.05	mg/kg				<0.05	
Prothiofos	34643-46-4	0.05	mg/kg				<0.05	
Ethion	563-12-2	0.05	mg/kg				<0.05	
Carbophenothion	786-19-6	0.05	mg/kg				<0.05	
Azinphos Methyl	86-50-0	0.05	mg/kg				<0.05	
EP075(SIM)B: Polynuclear Aromatic Hyd	drocarbons							
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5		<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5		<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5		<0.5	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5		<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5		<0.5	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5		<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5		<0.5	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5		<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5		<0.5	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5		<0.5	
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5		<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5		<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5		<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5		<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5		<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5		<0.5	
Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	<0.5	<0.5		<0.5	
Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5		<0.5	
Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6		0.6	
Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2		1.2	
EP080/071: Total Petroleum Hydrocarbo	ons							
C6 - C9 Fraction		10	mg/kg	<10	<10		<10	
C10 - C14 Fraction		50	mg/kg	<50	<50		<50	
C15 - C28 Fraction		100	mg/kg	<100	<100		110	
C29 - C36 Fraction		100	mg/kg	<100	<100		<100	
C10 - C36 Fraction (sum)		50	mg/kg	<50	<50		110	
EP080/071: Total Recoverable Hydrocar	bons - NEPM 201	3						



Sub-Matrix: SOIL (Matrix: SOIL)		Cli	ent sample ID	PARCEL13 LOT463 TP7 1-1.1	PARCEL13 LOT463 QA1	PARCEL13 LOT463 SP2	PARCEL13 LOT463 TP9 0.5-0.6 GU	PARCEL13 LOT462 TPA 0.3-0.5
	Cli	ent sampli	ing date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-007	ES1406239-008	ES1406239-009	ES1406239-010	ES1406239-011
EP080/071: Total Recoverable Hydroc	arbons - NEPM 201	3 - Contin	ued					
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10		<10	
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10		<10	
>C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50		<50	
>C16 - C34 Fraction		100	mg/kg	<100	<100		100	
>C34 - C40 Fraction		100	mg/kg	<100	<100		<100	
>C10 - C40 Fraction (sum)		50	mg/kg	<50	<50		100	
^ >C10 - C16 Fraction minus Naphthalene		50	mg/kg	<50	<50		<50	
(F2)								
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2		<0.2	
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5		<0.5	
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5		<0.5	
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5		<0.5	
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5		<0.5	
[^] Sum of BTEX		0.2	mg/kg	<0.2	<0.2		<0.2	
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5		<0.5	
Naphthalene	91-20-3	1	mg/kg	<1	<1		<1	
EP068S: Organochlorine Pesticide Su	urrogate							
Dibromo-DDE	21655-73-2	0.1	%				78.0	
EP068T: Organophosphorus Pesticid	e Surrogate							
DEF	78-48-8	0.1	%				92.0	
EP075(SIM)S: Phenolic Compound Su	urrogates							
Phenol-d6	13127-88-3	0.1	%	87.0	86.0		94.7	
2-Chlorophenol-D4	93951-73-6	0.1	%	82.4	78.9		84.7	
2.4.6-Tribromophenol	118-79-6	0.1	%	64.8	63.9		72.4	
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	95.2	101		101	
Anthracene-d10	1719-06-8	0.1	%	92.2	98.7		99.6	
4-Terphenyl-d14	1718-51-0	0.1	%	87.0	93.9		96.6	
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	103	107		108	
Toluene-D8	2037-26-5	0.1	%	103	107		105	



Sub-Matrix: SOIL (Matrix: SOIL)		Cli	ent sample ID	PARCEL13 LOT463 TP7 1-1.1	PARCEL13 LOT463 QA1	PARCEL13 LOT463 SP2	PARCEL13 LOT463 TP9 0.5-0.6 GU	PARCEL13 LOT462 TPA 0.3-0.5
	Cl	ent sampli	ng date / time	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number LOR Unit			ES1406239-007	ES1406239-008	ES1406239-009	ES1406239-010	ES1406239-011
EP080S: TPH(V)/BTEX Surrogates - Cont	inued							
4-Bromofluorobenzene	460-00-4	0.1	%	102	102		101	



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL13 LOT462 TPB 0.3-0.5	PARCEL13 LOT462 TPC 0.3-0.5	PARCEL13 LOT462 TP10 0-0.3	PARCEL13 LOT462 TPE 0.3-0.5	PARCEL13 LOT462 SP3
	Cl	ient sampli	ng date / time	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-012	ES1406239-013	ES1406239-014	ES1406239-015	ES1406239-016
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%		5.9			10.2
EA200: AS 4964 - 2004 Identification of	of Asbestos in bulk	samples						
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	Yes
Asbestos Type	1332-21-4	-		-	-	-	-	Ch
Sample weight (dry)		0.01	g	9.60	52.4	296	350	33.9
APPROVED IDENTIFIER:		-		G.MORGAN	C.OWLER	C.OWLER	C.OWLER	G.MORGAN
EA200Q: Asbestos Quantification (no	n-NATA)							
Weight Used for % Calculation		0.0001	kg		0.0524	0.296	0.350	
Asbestos Containing Material	1332-21-4	0.1	g	<0.1	<0.1	<0.1	<0.1	33.9
Fibrous Asbestos		0.002	g		<0.002	<0.002	<0.002	
Asbestos Containing Material (as 15% Asbestos in ACM >7mm)	1332-21-4	0.01	%		<0.03	<0.01	<0.01	
Asbestos Fines and Fibrous Asbestos (<7mm)	1332-21-4	0.001	%		<0.004	<0.001	<0.001	
Trace Asbestos Detected		5	Fibres		No	No	No	
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg		9			10
Cadmium	7440-43-9	1	mg/kg		<1			<1
Chromium	7440-47-3	2	mg/kg		9			15
Copper	7440-50-8	5	mg/kg		15			24
Lead	7439-92-1	5	mg/kg		38			57
Nickel	7440-02-0	2	mg/kg		5			4
Zinc	7440-66-6	5	mg/kg		122			445
EG035T: Total Recoverable Mercury I	by FIMS							
Mercury	7439-97-6	0.1	mg/kg		<0.1			<0.1
EP068A: Organochlorine Pesticides (OC)							
alpha-BHC	319-84-6	0.05	mg/kg					<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg					<0.05
beta-BHC	319-85-7	0.05	mg/kg					<0.05
gamma-BHC	58-89-9	0.05	mg/kg					<0.05
delta-BHC	319-86-8	0.05	mg/kg					<0.05
Heptachlor	76-44-8	0.05	mg/kg					<0.05
Aldrin	309-00-2	0.05	mg/kg					<0.05



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL13 LOT462 TPB 0.3-0.5	PARCEL13 LOT462 TPC 0.3-0.5	PARCEL13 LOT462 TP10 0-0.3	PARCEL13 LOT462 TPE 0.3-0.5	PARCEL13 LOT462 SP3
	Cl	ient sampli	ng date / time	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-012	ES1406239-013	ES1406239-014	ES1406239-015	ES1406239-016
EP068A: Organochlorine Pesticide	es (OC) - Continued							
Heptachlor epoxide	1024-57-3	0.05	mg/kg					<0.05
└ Total Chlordane (sum)		0.05	mg/kg					0.12
trans-Chlordane	5103-74-2	0.05	mg/kg					0.12
alpha-Endosulfan	959-98-8	0.05	mg/kg					<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg					<0.05
Dieldrin	60-57-1	0.05	mg/kg					<0.05
4.4`-DDE	72-55-9	0.05	mg/kg					0.31
Endrin	72-20-8	0.05	mg/kg					<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg					<0.05
∿ Endosulfan (sum)	115-29-7	0.05	mg/kg					<0.05
4.4`-DDD	72-54-8	0.05	mg/kg					0.14
Endrin aldehyde	7421-93-4	0.05	mg/kg					<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg					<0.05
4.4`-DDT	50-29-3	0.2	mg/kg					<0.2
Endrin ketone	53494-70-5	0.05	mg/kg					<0.05
Methoxychlor	72-43-5	0.2	mg/kg					<0.2
Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg					<0.05
Sum of DDD + DDE + DDT		0.05	mg/kg					0.45
EP068B: Organophosphorus Pest	ticides (OP)							
Dichlorvos	62-73-7	0.05	mg/kg					<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg					<0.05
Monocrotophos	6923-22-4	0.2	mg/kg					<0.2
Dimethoate	60-51-5	0.05	mg/kg					<0.05
Diazinon	333-41-5	0.05	mg/kg					<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg					<0.05
Parathion-methyl	298-00-0	0.2	mg/kg					<0.2
Malathion	121-75-5	0.05	mg/kg					<0.05
Fenthion	55-38-9	0.05	mg/kg					<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg					<0.05
Parathion	56-38-2	0.2	mg/kg					<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg					<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg					<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg					<0.05



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL13 LOT462 TPB 0.3-0.5	PARCEL13 LOT462 TPC 0.3-0.5	PARCEL13 LOT462 TP10 0-0.3	PARCEL13 LOT462 TPE 0.3-0.5	PARCEL13 LOT462 SP3
	Cli	ent samplii	ng date / time	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-012	ES1406239-013	ES1406239-014	ES1406239-015	ES1406239-016
EP068B: Organophosphorus Pesticide	s (OP) - Continued							
Fenamiphos	22224-92-6	0.05	mg/kg					<0.05
Prothiofos	34643-46-4	0.05	mg/kg					<0.05
Ethion	563-12-2	0.05	mg/kg					<0.05
Carbophenothion	786-19-6	0.05	mg/kg					<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg					<0.05
EP075(SIM)B: Polynuclear Aromatic Hy	/drocarbons							
Naphthalene	91-20-3	0.5	mg/kg		<0.5			<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5			<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5			<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5			<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5			<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5			<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5			<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5			<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5			<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5			<0.5
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg		<0.5			<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5			<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5			<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5			<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5			<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5			<0.5
Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg		<0.5			<0.5
Benzo(a)pyrene TEQ (zero)		0.5	mg/kg		<0.5			<0.5
Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg		0.6			0.6
Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg		1.2			1.2
EP080/071: Total Petroleum Hydrocarb	ons							
C6 - C9 Fraction		10	mg/kg		<10			<10
C10 - C14 Fraction		50	mg/kg		<50			<50
C15 - C28 Fraction		100	mg/kg		<100			<100
C29 - C36 Fraction		100	mg/kg		<100			<100
C10 - C36 Fraction (sum)		50	mg/kg		<50			<50



Sub-Matrix: SOIL (Matrix: SOIL)		Cli	ent sample ID	PARCEL13 LOT462 TPB 0.3-0.5	PARCEL13 LOT462 TPC 0.3-0.5	PARCEL13 LOT462 TP10 0-0.3	PARCEL13 LOT462 TPE 0.3-0.5	PARCEL13 LOT462 SP3
	Cl	ient sampli	ing date / time	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-012	ES1406239-013	ES1406239-014	ES1406239-015	ES1406239-016
EP080/071: Total Recoverable Hydroc	arbons - NEPM 201	3 - Contin	ued					
C6 - C10 Fraction	C6_C10	10	mg/kg		<10			<10
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10			<10
>C10 - C16 Fraction	>C10_C16	50	mg/kg		<50			<50
>C16 - C34 Fraction		100	mg/kg		<100			<100
>C34 - C40 Fraction		100	mg/kg		<100			<100
[^] →C10 - C40 Fraction (sum)		50	mg/kg		<50			<50
>C10 - C16 Fraction minus Naphthalene		50	mg/kg		<50			<50
(F2)								
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg		<0.2			<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5			<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5			<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5			<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5			<0.5
Sum of BTEX		0.2	mg/kg		<0.2			<0.2
[∿] Total Xylenes	1330-20-7	0.5	mg/kg		<0.5			<0.5
Naphthalene	91-20-3	1	mg/kg		<1			<1
EP068S: Organochlorine Pesticide Su	irrogate							
Dibromo-DDE	21655-73-2	0.1	%					74.3
EP068T: Organophosphorus Pesticid	e Surrogate							
DEF	78-48-8	0.1	%					121
EP075(SIM)S: Phenolic Compound Su	urrogates							
Phenol-d6	13127-88-3	0.1	%		88.0			79.3
2-Chlorophenol-D4	93951-73-6	0.1	%		80.3			75.6
2.4.6-Tribromophenol	118-79-6	0.1	%		63.8			62.4
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%		100			94.4
Anthracene-d10	1719-06-8	0.1	%		95.0			91.3
4-Terphenyl-d14	1718-51-0	0.1	%		93.5			93.9
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%		118			110
Toluene-D8	2037-26-5	0.1	%		112			112



Sub-Matrix: SOIL (Matrix: SOIL)		Cli	ent sample ID	PARCEL13 LOT462 TPB 0.3-0.5	PARCEL13 LOT462 TPC 0.3-0.5	PARCEL13 LOT462 TP10 0-0.3	PARCEL13 LOT462 TPE 0.3-0.5	PARCEL13 LOT462 SP3
	C	ient sampli	ng date / time	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number LOR Unit		ES1406239-012	ES1406239-013	ES1406239-014	ES1406239-015	ES1406239-016	
EP080S: TPH(V)/BTEX Surrogates - Cor	ntinued							
4-Bromofluorobenzene	460-00-4	0.1	%		104			105



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL13 LOT462 TP GULLY	PARCEL13 LOT462 TP4 0.5-0.8	PARCEL13 LOT462 TP3 0.2-0.4	PARCEL13 LOT463 TP2 0.6-0.7	PARCEL 13 LOT 463 TP3 0.3-0.4
	С	lient sampli	ng date / time	21-MAR-2014 15:00	20-MAR-2014 15:00	20-MAR-2014 15:00	20-MAR-2014 15:00	21-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1406239-018	ES1406239-019	ES1406239-020	ES1406239-022	ES1406239-038
EA002 : pH (Soils)	externatioer							
pH Value		0.1	pH Unit					4.0
EA200: AS 4964 - 2004 Identification of	of Asbestos in bulk	samples						
Asbestos Detected	1332-21-4	0.1	g/kg	Yes	Yes	Yes	No	No
Asbestos Type	1332-21-4	-		Ch + Am + Cr	Ch + Am + Cr	Am + Cr	-	-
Unknown Mineral Fibre		0.1	g/kg			Yes		
Sample weight (dry)		0.01	g	34.4	46.6	48.4	73.2	305
APPROVED IDENTIFIER:		-		G.MORGAN	G.MORGAN	G.MORGAN	C.OWLER	C.OWLER
EA200Q: Asbestos Quantification (no	n-NATA)							
Weight Used for % Calculation		0.0001	kg				0.0732	0.305
Asbestos Containing Material	1332-21-4	0.1	g				<0.1	<0.1
Fibrous Asbestos		0.002	g				<0.002	<0.002
Asbestos Containing Material (as 15% Asbestos in ACM >7mm)	1332-21-4	0.01	%				<0.02	<0.01
Asbestos Fines and Fibrous Asbestos (<7mm)	1332-21-4	0.001	%				<0.003	<0.001
Trace Asbestos Detected		5	Fibres				No	No
ED007: Exchangeable Cations								
Exchangeable Calcium		0.1	meq/100g					2.0
Exchangeable Magnesium		0.1	meq/100g					0.2
Exchangeable Potassium		0.1	meq/100g					0.2
Exchangeable Sodium		0.1	meq/100g					<0.1
Cation Exchange Capacity		0.1	meq/100g					2.4
EP004: Organic Matter								
Organic Matter		0.5	%					4.7
Total Organic Carbon		0.5	%					2.7



Descriptive Results

Sub-Matrix: SOIL

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification	of Asbestos in bulk samples	
EA200: Description	PARCEL13 LOT463 TP1 0.2-0.3 - 20-MAR-2014 15:00	One piece of heavily degraded and friable asbestos cement sheeting approximately 80 x 50 x 4mm
EA200: Description	PARCEL13 LOT463 TP3 0.8-0.9 - 20-MAR-2014 15:00	Pale brown clay soil with some small red rocks plus a trace of vegetation
EA200: Description	PARCEL13 LOT463 TP4 0.6-0.7 - 20-MAR-2014 15:00	Mid brown soil with some quartz and charcoal grains plus a trace of vegetation
EA200: Description	PARCEL13 LOT463 TP5 1.1-1.3 - 21-MAR-2014 15:00	One piece of heavily degraded and friable asbestos cement sheeting approximately 60 x 45 x 4mm
EA200: Description	PARCEL13 LOT463 TP7 0-0.3 - 21-MAR-2014 15:00	Dark grey soil with some slag grains plus a trace of vegetation
EA200: Description	PARCEL13 LOT463 TP7 1-1.1 - 20-MAR-2014 15:00	Mid orange clay soil with a trace of vegetation
EA200: Description	PARCEL13 LOT463 QA1 - 20-MAR-2014 15:00	Mid orange clay soil with a trace of vegetation
EA200: Description	PARCEL13 LOT463 SP2 - 21-MAR-2014 15:00	Mid brown clay soil with some small red rocks plus some quartz grains and a trace of vegetation
EA200: Description	PARCEL13 LOT463 TP9 0.5-0.6 GU - 21-MAR-2014 15:00	Mid orange-brown clay soil with some red rocks plus a trace of vegetation
EA200: Description	PARCEL13 LOT462 TPA 0.3-0.5 - 21-MAR-2014 15:00	Mid grey-brown sandy soil with a trace of vegetation
EA200: Description	PARCEL13 LOT462 TPB 0.3-0.5 - 21-MAR-2014 15:00	Two pieces of cement sheeting approximately 40 x 20 x 5mm
EA200: Description	PARCEL13 LOT462 TPC 0.3-0.5 - 21-MAR-2014 15:00	Mid brown sandy soil with some shell debris plus a trace of vegetation
EA200: Description	PARCEL13 LOT462 TP10 0-0.3 - 21-MAR-2014 15:00	Mid grey-brown sandy soil with some grey and red rocks plus some quartz grains and a trace of vegetation
EA200: Description	PARCEL13 LOT462 TPE 0.3-0.5 - 21-MAR-2014 15:00	Mid grey-brown sandy soil with some grey and red rocks plus some quartz grains and a trace of vegetation
EA200: Description	PARCEL13 LOT462 SP3 - 21-MAR-2014 15:00	Two pieces of bonded asbestos cement sheeting approximately 55 x 40 x 5mm
EA200: Description	PARCEL13 LOT462 TP GULLY - 21-MAR-2014 15:00	Four pieces of bonded asbestos cement sheeting approximately 55 x 45 x 4mm
EA200: Description	PARCEL13 LOT462 TP4 0.5-0.8 - 20-MAR-2014 15:00	One piece of bonded asbestos cement sheeting approximately 70 x 65 x 5mm
EA200: Description	PARCEL13 LOT462 TP3 0.2-0.4 - 20-MAR-2014 15:00	Three pieces of heavily degraded and friable asbestos cement sheeting approximately 55 x 40 x 5mm
EA200: Description	PARCEL13 LOT463 TP2 0.6-0.7 - 20-MAR-2014 15:00	Pale yellow-orange clay soil with a trace of vegetation
EA200: Description	PARCEL 13 LOT 463 TP3 0.3-0.4 - 21-MAR-2014 15:00	Mid brown clay soil with some quartz grains plus a trace of vegetation



Surrogate Control Limits

Out Matter 201	Г		
Sub-Matrix: SOIL		Recover	y Limits (%)
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrog	jate		
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Su	rrogate		
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrog	gates		
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0



QUALITY CONTROL REPORT

Work Order	ES1406239	Page	: 1 of 13
Client		Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	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 BUFFER ZONE INVESTIGATION AS130348	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	:		
C-O-C number	:	Date Samples Received	: 21-MAR-2014
Sampler	: KW,SC	Issue Date	: 03-APR-2014
Order number	: AS130348		
		No. of samples received	: 38
Quote number	: SY/433/13	No. of samples analysed	: 20

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

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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



NATA Accredited Signatories

Laboratory 825	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.	
A corodited for		

compliance with	Signatories	Position	Accreditation Category	
ISO/IEC 17025.			Sydney Inorganics	
	Ashesh Patel	Inorganic Chemist	Sydney Inorganics	
	Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos	
	Edwandy Fadjar	Organic Coordinator	Sydney Organics	
	Pabi Subba	Senior Organic Chemist	Sydney Organics	
	Shobhna Chandra	Metals Coordinator	Sydney Inorganics	
	Wisam Marassa	Inorganics Coordinator	Sydney Inorganics	



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 I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%
A002 : pH (Soils)((QC Lot: 3365943)								
ES1406229-021	Anonymous	EA002: pH Value		0.1	pH Unit	6.2	6.2	0.0	0% - 20%
ES1406306-001	Anonymous	EA002: pH Value		0.1	pH Unit	5.1	5.1	0.0	0% - 20%
EA055: Moisture Co	ntent (QC Lot: 3363968)								
ES1406063-003	Anonymous	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	33.7	33.8	0.0	0% - 20%
ES1406239-005	PARCEL13 LOT463 TP5 1.1-1.3	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	7.1	7.8	8.8	No Limit
ED007: Exchangeab	ole Cations (QC Lot: 336316	9)							
ES1406239-038	PARCEL 13 LOT 463 TP3 0.3-0.4	ED007: Exchangeable Calcium		0.1	meq/100g	2.0	1.7	12.5	0% - 20%
		ED007: Exchangeable Magnesium		0.1	meq/100g	0.2	0.1	0.0	0% - 20%
		ED007: Exchangeable Potassium		0.1	meq/100g	0.2	0.2	0.0	0% - 20%
		ED007: Exchangeable Sodium		0.1	meq/100g	<0.1	<0.1	0.0	0% - 20%
		ED007: Cation Exchange Capacity		0.1	meq/100g	2.4	2.1	12.3	0% - 20%
G005T: Total Meta	Is by ICP-AES (QC Lot: 336	5885)							
ES1406140-008	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	5	5	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.0	No Limit
ES1406239-008	PARCEL13 LOT463 QA1	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	32	31	0.0	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	13	12	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	11	11	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	6	5	0.0	No Limit
G035T: Total Reco	overable Mercury by FIMS(QC Lot: 3365886)							
ES1406140-008	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1406239-008	PARCEL13 LOT463 QA1	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP004: Organic Mat	ter (QC Lot: 3368119)								
ES1406239-038	PARCEL 13 LOT 463 TP3 0.3-0.4	EP004: Organic Matter		0.5	%	4.7	4.7	0.0	No Limit
		EP004: Total Organic Carbon		0.5	%	2.7	2.7	0.0	No Limit

Page	: 4 of 13
Work Order	: ES1406239
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION AS130348



EP068.4: Organochlorine Posticides (OC) (QC Lot: 3381560) Second Se	Sub-Matrix: SOIL						Laboratory	Duplicate (DUP) Report	t	
EB1400335-001 Anonymous EP08: haph-BHC 319.4-41 0.05 mrg/kg -0.05 4.0.05 0.00 No. Limit EP08: bbashBHC 319.4-57 0.05 -0.05 -0.05 0.00 No. Limit EP08: bbashBHC 319.4-57 0.05 -0.05 -0.05 0.00 No. Limit EP08: bbashBHC 319.4-57 0.05 -0.05 -0.05 0.00 No. Limit EP08: bbashBHC 319.4-41 0.05 mrg/kg -0.05 -0.06 0.00 No. Limit EP08: bbashBHC 319.4-41 0.05 mrg/kg -0.05 -0.06 0.00 No. Limit EP08: bbashBHC 319.4-41 0.05 mrg/kg -0.05 -0.06 No. Limit EP08: bbashBHC 3109.4-57 0.05 mrg/kg -0.05 -0.06 No. Limit EP08: bbashBHC 72.55 0.05 mrg/kg -0.05 -0.06 No. Limit EP08: bbashBHC 72.54 0.05 mrg/kg -0.05 -0.05	Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
P1963: Headstochenzone (HCB) 116.74-1 0.05 m/90 -0.05 0.00 No.Limit P1963: State HHC 316.45-7 0.05 m/90 -0.05 0.00 No.Limit P1968: state HHC 316.45-00 0.05 m/90 -0.05 0.00 No.Limit P1968: state HHC 316.45-00 0.05 m/90 -0.05 -0.05 0.00 No.Limit P1908: State HHC 316.45-71 0.05 m/90 -0.05 -0.05 0.00 No.Limit E1908: State HHC 316.45-71 0.05 m/90 -0.05 -0.05 0.00 No.Limit E1908: State HHC 316.47-71 0.05 m/90 -0.05 -0.05 0.00 No.Limit E1908: State HHC 316.47-70 0.05 m/90 -0.05 -0.05 No.Limit E1908: State HHC 316.47-10 0.05 m/90 -0.05 0.00 No.Limit E1908: State HHC 316.47-10 0.05 m/90 -0.05 -0.05 0.00	EP068A: Organochlo	orine Pesticides (OC) (QC	C Lot: 3361560)							
ENODE Display 0.05 mgkq 0.06 0.06 0.00 No Limit ENODE Display 0.05 mgkq 0.05 0.06 0.06 0.00 No Limit ENODE Display 0.05 mgkq 0.05 0.06 0.06 0.00 No Limit ENODE Display 0.05 mgkq 0.05 0.06 0.06 0.00 No Limit ENODE Hightantin 0.040-02 0.05 mgkq 0.05 0.06 0.00 No Limit ENODE Hightantin 0.040-02 0.05 mgkq 0.05 0.06 0.00 No Limit ENODE Hightantin 0.05 mgkq 0.05 0.00	ES1406393-001	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP098: gamme BPIC 98.890 0.00 mgkg 40.05 40.05 40.05 No. Limit F0908: Helpschlor 76.440 0.05 mgkg 40.05 40.05 0.00 No. Limit F0908: Haptachlor cipoxida 1024 67.0 0.05 mgkg 40.05 40.05 0.00 No. Limit F0908: Haptachlor cipoxida 1024 67.0 0.05 mgkg 40.05 40.05 0.00 No. Limit F0908: Stable Endoullin E0908 40.01 0.05 mgkg 40.05 40.05 0.00 No. Limit F0908: Stable Endoullin E0908 4.4-DDC 72.49 0.05 mgkg 40.05 40.05 0.00 No. Limit F0908: Endon 72.49 0.05 mgkg 40.05 40.05 0.00 No. Limit F0908: Endon 72.44 0.05 mgkg 40.05 40.05 0.00 No. Limit F0908: Endon 72.44 0.05 mgkg 40.05 40.05 40.05 40.05 Mott Mott			EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
P008: depaie-bit/c 319-84.9 0.05 mg/tg -0.05 -0.05 0.00 No.Limit P008: hepischior spolde 379-020 0.05 mg/tg -0.05 -0.05 0.00 No.Limit E008: hepischior spolde 10024-57 0.05 mg/tg -0.05 -0.05 0.00 No.Limit E008: hepischior spolde 10024-57 0.05 mg/tg -0.05 -0.05 0.00 No.Limit E008: hepischior spolde 10034-71 0.05 mg/tg -0.05 -0.05 0.00 No.Limit E006: sight-Endosultan 98.948 0.05 mg/tg -0.05 -0.05 0.00 No.Limit E006: sight-Endosultan 32.31645 0.05 mg/tg -0.05 -0.05 0.00 No.Limit E006: Endosultan sultary 72.458 0.05 mg/tg -0.05 -0.05 0.00 No.Limit E006: Endosultan sultary 72.454 0.05 mg/tg -0.05 -0.05 0.00 No.Limit E008: Endo			EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP008: Heplachic 76-44 0.05 mg/kg -0.05 -0.05 0.00 No.Linit EP008: Addin 309-002 0.05 mg/kg -0.05 -0.05 0.00 No.Linit EP008: Motion cooled 0.034-57-3 0.05 mg/kg -0.05 -0.05 0.00 No.Linit EP008: Sight-finicos/Linit/ane 6103-74 0.05 mg/kg -0.05 -0.05 0.0 No.Linit EP008: Sight-finicos/Linit/ane 6103-74 0.05 mg/kg -0.05 -0.05 0.0 No.Linit EP008: Al-DDE 7243-8 0.05 mg/kg -0.05 -0.05 0.0 No.Linit EP008: Endin 32213-69 0.05 mg/kg -0.05 -0.05 0.0 No.Linit EP08: Endin 32213-69 0.05 mg/kg -0.05 -0.05 No.Linit EP08: Endin 32213-69 0.05 mg/kg -0.05 -0.05 No.Linit EP08: Endin 5324-70 0.05 mg/kg -0.05			EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP098.ind 309-02 0.05 mg/ng <0.05			EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
E3140539-008 Anonymous E008: Heptachlorepoxide 1024-57.3 0.06 morphig 40.06 40.05 0.00 No Limit EP066: trans-Chiordane 5103-74.2 0.06 mg/hg 40.06 40.05 0.00 No Limit EP066: cicles-Chiordane 6103-714 0.05 mg/hg 40.05 40.05 0.00 No Limit EP066: cicles-Chiordane 6103-714 0.05 mg/hg 40.05 40.05 0.00 No Limit EP066: ci-Chiordane 722-08 0.05 mg/hg 40.05 40.05 0.00 No Limit EP066: ci-Chiordane 722-08 0.05 mg/hg 40.05 40.05 0.00 No Limit EP066: ci-Chiordane 722-48 0.05 mg/hg 40.05			EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP08.trans_Chordian 6103-742 0.05 mg/kg 40.05 40.05 0.0 No Limit EP08.dighta_Endosulfan 95.98 0.05 mg/kg 40.05 40.05 0.0 No Limit EP08.dighta_Endosulfan 60.971 0.05 mg/kg 40.05 40.05 0.0 No Limit EP08.dighta_Endosulfan 60.971 0.05 mg/kg 40.05 40.05 0.0 No Limit EP08.tide_Endosulfan 72.258 0.05 mg/kg 40.05 40.05 0.0 No Limit EP08.tide_Endosulfan 72.248 0.05 mg/kg 40.05 40.05 0.0 No Limit EP08.tide_Endosulfan sultato 1013-078 0.05 mg/kg 40.05 40.05 0.0 No Limit EP08.tide_Endosulfan sultato 1013-078 0.05 mg/kg 40.05 40.05 0.0 No Limit EP08.tide_Endosulfan sultato 1014-07 60.23 mg/kg 40.05 40.05 0.0 No Limit EP08.tide_Endosu			EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP088: aighte Endesulfan 959.48 0.05 mg/kg 40.05 40.05 0.0 No Limit EP086: is is Chiochane 610.371 0.05 mg/kg 40.05 40.05 0.0 No Limit EP086: is is Chiochane 722.05 0.05 mg/kg 40.05 40.05 0.00 No Limit EP086: Endin 722.05 0.05 mg/kg 40.05 40.05 0.00 No Limit EP086: Endin 722.05 0.05 mg/kg 40.05 40.05 0.00 No Limit EP086: Endin aldehyde 724.15 0.05 mg/kg 40.05 40.05 0.00 No Limit EP086: Endin aldehyde 724.15 0.05 mg/kg 40.05 40.05 0.00 No Limit EP086: Endin aldehyde 724.15 0.05 mg/kg 40.05 40.05 0.00 No Limit EP086: Hebrachionexeme(HCB) 118.44 10.5 mg/kg 40.05 40.05 0.00 No Limit EP086: Hebrachionexeme(HCB) <			EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
F008: cis-Chlordane 6103-71-9 0.05 mg/kg <0.05			EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP088: Dieldm 60-67.4 0.05 mg/kg -0.05			EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP088: 4.4 - DDE 72.65.9 0.05 mg/kg -0.05			EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP088: Endmin 72:20-8 0.05 mg/kg <0.05			EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP060: beta-Endosulfan 32213-65-9 0.05 mg/kg <0.05			EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: 4.4-DDD 72-54-8 0.05 mg/kg <0.05			EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP086: Endoin aldehyde 7421-934 0.05 mg/kg <0.05			EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP68: Endosultary sulfate 1031-07.8 0.05 mg/kg <0.05 <0.05 0.00 No Limit EP088: Endink ketone 53494-705 0.05 mg/kg <0.05			EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: Endrin ketone 53494-70-5 0.05 mg/kg <0.05 <0.05 0.0 No Limit EP068: Ad-DDT 50.29-3 0.2 mg/kg <0.2			EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: 4.4 - DDT 50-29-3 0.2 mg/kg <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.0 No Limit E51406394-008 EP068: alpha-BHC 319-84-6 0.05 mg/kg <0.05			EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP088: Methoxychlor 72:43-5 0.2 mg/kg <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.0 No Limit E51406394-008 EP068: alpha-BHC 319-84-6 0.05 mg/kg <0.05			EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
ES1406394-008 Anonymous EP068: alpha-BHC 319-84-6 0.05 mg/kg <0.05 <0.05 0.00 No Limit EP068: beta-BHC 319-84-7 0.05 mg/kg <0.05			EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
Profile Profile <t< td=""><td></td><td></td><td>EP068: Methoxychlor</td><td>72-43-5</td><td>0.2</td><td>mg/kg</td><td><0.2</td><td><0.2</td><td>0.0</td><td>No Limit</td></t<>			EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068: beta-BHC 319-85-7 0.05 mg/kg <0.05 <0.05 0.0 No Limit EP068: gamma-BHC 58-89-9 0.05 mg/kg <0.05	ES1406394-008	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: gamma-BHC 58-89-9 0.05 mg/kg <0.05 <0.05 0.0 No Limit EP068: delta-BHC 319-86-8 0.05 mg/kg <0.05			EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: delta-BHC 319-86-8 0.05 mg/kg <0.05			EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: Heptachlor 76-44-8 0.05 mg/kg <0.05			EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: Aldrin 309-00-2 0.05 mg/kg <0.05			EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: Heptachlor epoxide 1024-57-3 0.05 mg/kg <0.05 <0.05 0.00 No Limit EP068: trans-Chlordane 5103-74-2 0.05 mg/kg <0.05			EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: trans-Chlordane5103-74-20.05mg/kg<0.05<0.050.0No LimitEP068: alpha-Endosulfan959-98-80.05mg/kg<0.05			EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: alpha-Endosulfan 959-98-8 0.05 mg/kg <0.05			EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: cis-Chlordane5103-71-90.05mg/kg<0.05<0.050.0No LimitEP068: Dieldrin60-57-10.05mg/kg<0.05			EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: Dieldrin 60-57-1 0.05 mg/kg <0.05			EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: 4.4 · DDE 72-55-9 0.05 mg/kg <0.05			EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: Endrin 72-20-8 0.05 mg/kg <0.05				60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: Endrin 72-20-8 0.05 mg/kg <0.05 <0.05 0.0 No Limit EP068: beta-Endosulfan 33213-65-9 0.05 mg/kg <0.05			EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: 4.4'-DDD 72-54-8 0.05 mg/kg <0.05 <0.05 0.0 No Limit EP068: Endrin aldehyde 7421-93-4 0.05 mg/kg <0.05			EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: Endrin aldehyde 7421-93-4 0.05 mg/kg <0.05 0.05 0.00 No Limit EP068: Endosulfan sulfate 1031-07-8 0.05 mg/kg <0.05			EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: Endosulfan sulfate 1031-07-8 0.05 mg/kg <0.05 0.0 No Limit			EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: Endosulfan sulfate 1031-07-8 0.05 mg/kg <0.05 0.05 0.0 No Limit			EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
EP068: Endrin ketone 53494-70-5 0.05 mg/kg <0.05 0.05 0.0 No Limit				1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
			EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

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Work Order	: ES1406239
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION AS130348



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 (%)
EP068A: Organochl	orine Pesticides (OC)	(QC Lot: 3361560) - continued							
ES1406394-008	Anonymous	EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068B: Organopho	osphorus Pesticides (C	DP) (QC Lot: 3361560)							
ES1406393-001	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES1406394-008	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit

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Work Order	ES1406239
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION AS130348



Sub-Matrix: SOIL						Laboratory L	Duplicate (DUP) Report	t	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068B: Organopho	osphorus Pesticides (OP) (QC Lot: 3361560) - continued							
ES1406394-008	Anonymous	EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP075(SIM)B: Polyr	uclear Aromatic Hydrocarb	ons (QC Lot: 3361413)							
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
	0.2-0.3	EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	0.7	0.7	0.0	No Limit
			120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	1.1	1.2	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	1.1	1.2	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	0.7	0.7	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	0.8	0.9	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	1.2	1.2	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	0.6	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.9	0.6	28.5	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	0.6	0.5	18.1	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	0.8	0.6	20.9	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	8.5	7.6	11.2	0% - 50%
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	1.2	0.8	35.6	No Limit
ES1406497-006	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	0.6	0.6	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	1.4	1.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	1.4	1.4	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	0.5	0.6	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	0.5	0.0	No Limit
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	0.7	0.8	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.9	1.0	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	0.6	0.7	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	6.1	7.6	21.9	0% - 50%
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	1.0	1.2	15.8	No Limit

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Work Order	: ES1406239
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION AS130348



Sub-Matrix: SOIL						Laboratory	Duplicate (DUP) Report	Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)					
EP080/071: Total Pe	etroleum Hydrocarbons (Q	C Lot: 3361276)												
EB1406826-002	Anonymous	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.0	No Limit					
ES1406494-001	Anonymous	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.0	No Limit					
EP080/071: Total Pe	troleum Hydrocarbons (Q0	C Lot: 3361412)												
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP071: C15 - C28 Fraction		100	mg/kg	<100	<100	0.0	No Limit					
		EP071: C29 - C36 Fraction		100	mg/kg	<100	<100	0.0	No Limit					
		EP071: C10 - C14 Fraction		50	mg/kg	<50	<50	0.0	No Limit					
ES1406497-006	Anonymous	EP071: C15 - C28 Fraction		100	mg/kg	<100	<100	0.0	No Limit					
		EP071: C29 - C36 Fraction		100	mg/kg	<100	<100	0.0	No Limit					
		EP071: C10 - C14 Fraction		50	mg/kg	<50	<50	0.0	No Limit					
EP080/071: Total Re	coverable Hydrocarbons -	NEPM 2013 (QC Lot: 3361276)												
EB1406826-002	Anonymous	EP080: C6 - C10 Fraction	C6 C10	10	mg/kg	<10	<10	0.0	No Limit					
ES1406494-001	Anonymous	EP080: C6 - C10 Fraction	 C6_C10	10	mg/kg	<10	<10	0.0	No Limit					
EP080/071: Total Re		NEPM 2013 (QC Lot: 3361412)	_		0.0									
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP071: >C16 - C34 Fraction		100	mg/kg	<100	<100	0.0	No Limit					
		EP071: >C34 - C40 Fraction		100	mg/kg	<100	<100	0.0	No Limit					
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.0	No Limit					
ES1406497-006	Anonymous	EP071: >C16 - C34 Fraction		100	mg/kg	<100	<100	0.0	No Limit					
ES1406497-006		EP071: >C34 - C40 Fraction		100	mg/kg	<100	<100	0.0	No Limit					
		EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	0.0	No Limit					
EP080: BTEXN (QC	Lot: 3361276)													
EB1406826-002	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit					
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit					
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit					
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit					
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit					
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit					
ES1406494-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit					
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit					
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit					
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit					
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit					
		EP080: Naphthalene	91-20-3	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 Sample (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)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
D007: Exchangeable Cations (QCLot: 336316	69)								
ED007: Exchangeable Calcium		0.1	meq/100g	<0.1					
ED007: Exchangeable Magnesium		0.1	meq/100g	<0.1					
ED007: Exchangeable Potassium		0.1	meq/100g	<0.1					
ED007: Exchangeable Sodium		0.1	meq/100g	<0.1					
D007: Cation Exchange Capacity		0.1	meq/100g	<0.1					
G005T: Total Metals by ICP-AES (QCLot: 336	55885)								
G005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	124	92	130	
G005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	101	87	121	
G005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	95.8	80	136	
EG005T: Copper	7440-50-8	5	mg/kg	<5	32.0 mg/kg	104	93	127	
EG005T: Lead	7439-92-1	5	mg/kg	<5	40.0 mg/kg	100	86	124	
G005T: Nickel	7440-02-0	2	mg/kg	<2	55.0 mg/kg	106	93	131	
G005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	105	81	133	
G035T: Total Recoverable Mercury by FIMS	(QCLot: 3365886)								
G035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	97.6	70	105	
EP004: Organic Matter (QCLot: 3368119)									
P004: Organic Matter		0.5	%	<0.5	4.58 %	97.8	85	105	
P004: Total Organic Carbon		0.5	%	<0.5	2.66 %	97.7	84	106	
P068A: Organochlorine Pesticides (OC) (QC	Lot: 3361560)								
P068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	98.8	71	113	
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	92.7	66	122	
P068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	102	69	119	
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.8	71	115	
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	104	65	113	
P068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	91.6	68	116	
P068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	102	68	118	
P068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	94.5	68	116	
P068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	92.2	68	120	
P068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	96.3	69	119	
P068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	94.5	67	121	
P068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	90.9	66	118	
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	94.8	69	117	
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.9	67	123	
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	95.8	76	120	

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Project	: HYDRO BUFFER ZONE INVESTIGATION AS130348



Sub-Matrix: SOIL				Method Blank (MB)		Laboratory Control Spike (LC	S) Report	
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 3	3361560) - continued							
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	97.3	76	120
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	111	57.3	115
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	102	60	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	96.7	67	127
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	110	65	123
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	97.5	65	129
EP068B: Organophosphorus Pesticides (OP) (QCL	ot: 3361560)							
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	76.3	56	126
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.7	64	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	81.0	54	122
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	101	64	124
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	79.0	73	117
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	105	55	119
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	103	69	123
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	102	70	120
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	95.1	71	115
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	96.6	68	114
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	87.5	68	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	89.1	69	115
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	89.7	70	118
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	97.8	68	116
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	92.2	64	120
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	93.9	68	116
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	96.6	70	118
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	95.4	67	123
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	94.0	42	126
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	(QCLot: 3361413)							
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	4 mg/kg	81.4	80	124
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	4 mg/kg	86.6	77	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	4 mg/kg	88.0	79	123
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	4 mg/kg	94.6	77	123
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	4 mg/kg	96.0	79	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	4 mg/kg	101	79	123
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	4 mg/kg	93.1	79	123
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	4 mg/kg	97.3	79	125
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	4 mg/kg	89.3	73	121
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	4 mg/kg	92.6	81	123
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	4 mg/kg	81.7	70	118
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	4 mg/kg	101	77	123

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Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EP075(SIM)B: Polynuclear Aromatic Hydrocarb	ons (QCLot: 3361413) - cor	ntinued							
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	4 mg/kg	119	76	122	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	4 mg/kg	106	71	113	
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	4 mg/kg	109	71.7	113	
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	4 mg/kg	103	72.4	114	
EP080/071: Total Petroleum Hydrocarbons(Q0	CLot: 3361276)								
EP080: C6 - C9 Fraction		10	mg/kg	<10	26 mg/kg	101	68.4	128	
EP080/071: Total Petroleum Hydrocarbons(Q0	CLot: 3361412)								
EP071: C10 - C14 Fraction		50	mg/kg	<50	200 mg/kg	92.4	71	131	
EP071: C15 - C28 Fraction		100	mg/kg	<100	300 mg/kg	97.2	74	138	
EP071: C29 - C36 Fraction		100	mg/kg	<100	200 mg/kg	103	64	128	
EP080/071: Total Recoverable Hydrocarbons -	NEPM 2013 (QCLot: 336127	6)							
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	99.4	68.4	128	
EP080/071: Total Recoverable Hydrocarbons -	NEPM 2013 (QCLot: 336141)	2)							
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	250 mg/kg	96.6	70	130	
EP071: >C16 - C34 Fraction		100	mg/kg	<100	350 mg/kg	97.7	74	138	
EP071: >C34 - C40 Fraction		100	mg/kg	<100					
		50	mg/kg		150 mg/kg	111	63	131	
EP080: BTEXN (QCLot: 3361276)									
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	107	62	116	
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	106	62	128	
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	100	58	118	
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	99.0	60	120	
	106-42-3								
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	100	60	120	
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	89.6	62	138	

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	ub-Matrix: SOIL			Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Recovery L	.imits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
EG005T: Total Met	als by ICP-AES (QCLot: 3365885)							
ES1406140-008	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	118	70	130	
		EG005T: Cadmium	7440-43-9	50 mg/kg	103	70	130	
		EG005T: Chromium	7440-47-3	50 mg/kg	103	70	130	
		EG005T: Copper	7440-50-8	125 mg/kg	106	70	130	

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ub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery L	_imits (%)
aboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
G005T: Total Met	als by ICP-AES (QCLot: 3365885) - continue	d					
S1406140-008	Anonymous	EG005T: Lead	7439-92-1	125 mg/kg	103	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	98.5	70	130
		EG005T: Zinc	7440-66-6	125 mg/kg	102	70	130
G035T: Total Red	coverable Mercury by FIMS (QCLot: 3365886)					
S1406140-008	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	92.7	70	130
P004: Organic Ma	atter (QCLot: 3368119)						
S1406239-038	PARCEL 13 LOT 463 TP3 0.3-0.4	EP004: Organic Matter		1.77 %	102		
		EP004: Total Organic Carbon		1.03 %	101		
P068A: Organoch	nlorine Pesticides (OC) (QCLot: 3361560)						
ES1406393-001	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	95.8	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	100	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	96.9	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	104	70	130
		EP068: Endrin	72-20-8	2 mg/kg	102	70	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	100	70	130
P068B: Organoph	nosphorus Pesticides (OP)(QCLot: 3361560)						1
ES1406393-001	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	106	70	130
S1406393-001 Ano		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	77.5	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	99.9	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	104	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	83.1	70	130
P075(SIM)B: Poly	nuclear Aromatic Hydrocarbons (QCLot: 33	61413)					
S1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	73.5	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	# 66.8	70	130
P080/071: Total P	etroleum Hydrocarbons (QCLot: 3361276)						
B1406826-002	Anonymous	EP080: C6 - C9 Fraction		32.5 mg/kg	99.7	70	130
P080/071: Total P	etroleum Hydrocarbons (QCLot: 3361412)						
S1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP071: C10 - C14 Fraction		640 mg/kg	80.2	73	137
		EP071: C15 - C28 Fraction		3140 mg/kg	90.1	53	131
		EP071: C29 - C36 Fraction		2860 mg/kg	78.4	52	132
P080/071: Total R	ecoverable Hydrocarbons - NEPM 2013 (QC	Lot: 3361276)					
B1406826-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	96.0	70	130
P080/071 <u>: Total R</u>	ecoverable Hydrocarbons - NEPM 2013 (QC	Lot: 3361412)					
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	109	73	137
		EP071: >C16 - C34 Fraction		4800 mg/kg	81.1	53	131
		EP071: >C34 - C40 Fraction		2400 mg/kg	66.2	52	132


Sub-Matrix: SOIL	Sub-Matrix: SOIL					Matrix Spike (MS) Report					
				Spike	SpikeRecovery(%)	Recovery L	imits (%)				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High				
EP080: BTEXN (Q	CLot: 3361276)										
EB1406826-002	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	95.5	70	130				
		EP080: Toluene	108-88-3	2.5 mg/kg	93.6	70	130				
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	92.6	70	130				
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	91.9	70	130				
			106-42-3								
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	88.5	70	130				
		EP080: Naphthalene	91-20-3	2.5 mg/kg	88.1	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 (N	IS) and Matrix Sp	Spike Duplicate (MSD) Report			
				Spike	Spike Red	overy (%)	Recovery	Limits (%)	RPI	Ds (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total I	Petroleum Hydrocarbons (QCLot: 336	51276)								
EB1406826-002	Anonymous	EP080: C6 - C9 Fraction		32.5 mg/kg	99.7		70	130		
EP080/071: Total I	Recoverable Hydrocarbons - NEPM 20	013 (QCLot: 3361276)								
EB1406826-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	96.0		70	130		
EP080: BTEXN (C	CLot: 3361276)									
EB1406826-002	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	95.5		70	130		
		EP080: Toluene	108-88-3	2.5 mg/kg	93.6		70	130		
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	92.6		70	130		
		EP080: meta- & para-Xylene 108-38		2.5 mg/kg	91.9		70	130		
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	88.5		70	130		
		EP080: Naphthalene	91-20-3	2.5 mg/kg	88.1		70	130		
EP080/071: Total I	Petroleum Hydrocarbons (QCLot: 336	51412)								
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP071: C10 - C14 Fraction		640 mg/kg	80.2		73	137		
		EP071: C15 - C28 Fraction		3140 mg/kg	90.1		53	131		
		EP071: C29 - C36 Fraction		2860 mg/kg	78.4		52	132		
EP080/071: Total I	Recoverable Hydrocarbons - NEPM 20	013 (QCLot: 3361412)								
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	109		73	137		
		EP071: >C16 - C34 Fraction		4800 mg/kg	81.1		53	131		
		EP071: >C34 - C40 Fraction		2400 mg/kg	66.2		52	132		
EP075(SIM)B: Pol	ynuclear Aromatic Hydrocarbons (Q0	CLot: 3361413)								
ES1406239-001	PARCEL13 LOT463 TP1 0.2-0.3	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	73.5		70	130		
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	# 66.8		70	130		

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Sub-Matrix: SOIL					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Red	covery (%)	Recovery	Limits (%)	RP	Ds (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limi	
EP068A: Organoch	nlorine Pesticides (OC) (QCLot: 3361	560)									
ES1406393-001 Anonymous		EP068: gamma-BHC	58-89-9	0.5 mg/kg	95.8		70	130			
		EP068: Heptachlor	76-44-8	0.5 mg/kg	100		70	130			
		EP068: Aldrin	309-00-2	0.5 mg/kg	96.9		70	130			
		EP068: Dieldrin	60-57-1	0.5 mg/kg	104		70	130			
		EP068: Endrin	72-20-8	2 mg/kg	102		70	130			
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	100		70	130			
EP068B: Organopl	nosphorus Pesticides (OP) (QCLot: 3	361560)									
ES1406393-001	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	106		70	130			
		EP068: Chlorpyrifos-methyl 5598-13-		0.5 mg/kg	77.5		70	130			
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	99.9		70	130			
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	104		70	130			
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	83.1		70	130			
EG005T: Total Met	als by ICP-AES (QCLot: 3365885)										
ES1406140-008	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	118		70	130			
		EG005T: Cadmium	7440-43-9	50 mg/kg	103		70	130			
		EG005T: Chromium	7440-47-3	50 mg/kg	103		70	130			
		EG005T: Copper	7440-50-8	125 mg/kg	106		70	130			
		EG005T: Lead	7439-92-1	125 mg/kg	103		70	130			
		EG005T: Nickel	7440-02-0	50 mg/kg	98.5		70	130			
		EG005T: Zinc	7440-66-6	125 mg/kg	102		70	130			
EG035T: Total Red	coverable Mercury by FIMS (QCLot: 3	3365886)									
ES1406140-008	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	92.7		70	130			
EP004: Organ <u>ic Ma</u>	atter (QCLot: 3368119)										
ES1406239-038	PARCEL 13 LOT 463 TP3 0.3-0.4	EP004: Organic Matter		1.77 %	102						
		EP004: Total Organic Carbon		1.03 %	101						



Work Order	: ES1406239	Page	: 1 of 8
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com
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Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500
Project Site	: HYDRO BUFFER ZONE INVESTIGATION AS130348	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C-O-C number	:	Date Samples Received	: 21-MAR-2014
Sampler	: KW,SC	Issue Date	: 03-APR-2014
Order number	: AS130348		
		No. of samples received	: 38
Quote number	: SY/433/13	No. of samples analysed	: 20

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

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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 ; ✓ = Withir	holding time
Method		Sample Date	Extraction / Preparation					
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved (EA002) PARCEL 13 LOT 463 TP3 0.3-0.4		21-MAR-2014	31-MAR-2014	28-MAR-2014	<u>s</u>	28-MAR-2014	31-MAR-2014	
EA055: Moisture Content		21-WAR-2014	31-WAR-2014	20 10/07 2014		20-104(-2014	01 10/07 2014	-
Soil Glass Jar - Unpreserved (EA055-103)								
PARCEL13 LOT463 TP1 0.2-0.3,	PARCEL13 LOT463 TP4 0.6-0.7,	20-MAR-2014				28-MAR-2014	03-APR-2014	1
PARCEL13 LOT463 TP7 1-1.1.	PARCEL13 LOT463 QA1							•
Soil Glass Jar - Unpreserved (EA055-103)								
PARCEL13 LOT463 TP5 1.1-1.3,	PARCEL13 LOT463 TP7 0-0.3,	21-MAR-2014				28-MAR-2014	04-APR-2014	1
PARCEL13 LOT463 TP9 0.5-0.6 GU,	PARCEL13 LOT462 TPC 0.3-0.5,							
PARCEL13 LOT462 SP3								
EA200: AS 4964 - 2004 Identification of Asbestos	in bulk samples							
Snap Lock Bag (EA200)								
PARCEL13 LOT463 TP1 0.2-0.3,	PARCEL13 LOT462 TP4 0.5-0.8,	20-MAR-2014		16-SEP-2014		03-APR-2014	30-SEP-2014	✓
PARCEL13 LOT462 TP3 0.2-0.4								
Snap Lock Bag (EA200)								
PARCEL13 LOT462 TPB 0.3-0.5,	PARCEL13 LOT462 TPC 0.3-0.5,	21-MAR-2014		17-SEP-2014		03-APR-2014	30-SEP-2014	✓
PARCEL13 LOT462 TP10 0-0.3,	PARCEL13 LOT462 SP3,							
PARCEL13 LOT462 TP GULLY								
Soil Glass Jar - Unpreserved (EA200)								
PARCEL13 LOT463 TP3 0.8-0.9,	PARCEL13 LOT463 TP4 0.6-0.7,	20-MAR-2014		16-SEP-2014		03-APR-2014	30-SEP-2014	 ✓
PARCEL13 LOT463 TP7 1-1.1,	PARCEL13 LOT463 QA1,							
PARCEL13 LOT463 TP2 0.6-0.7								
Soil Glass Jar - Unpreserved (EA200)								
PARCEL13 LOT463 TP5 1.1-1.3,	PARCEL13 LOT463 TP7 0-0.3,	21-MAR-2014		17-SEP-2014		03-APR-2014	30-SEP-2014	✓
PARCEL13 LOT463 SP2,	PARCEL13 LOT463 TP9 0.5-0.6 GU,							
PARCEL13 LOT462 TPA 0.3-0.5,	PARCEL13 LOT462 TPE 0.3-0.5,							
PARCEL 13 LOT 463 TP3 0.3-0.4								
ED007: Exchangeable Cations								
Soil Glass Jar - Unpreserved (ED007)								
PARCEL 13 LOT 463 TP3 0.3-0.4		21-MAR-2014	31-MAR-2014	18-APR-2014	✓	31-MAR-2014	18-APR-2014	✓

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Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION AS130348



Matrix: SOIL					Evaluation	× = Holding time	breach ; 🗸 = Withir	n holding time
Method		Sample Date	Ex	traction / Preparation				
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)								
PARCEL13 LOT463 TP1 0.2-0.3,	PARCEL13 LOT463 TP4 0.6-0.7,	20-MAR-2014	31-MAR-2014	16-SEP-2014	~	01-APR-2014	16-SEP-2014	✓
PARCEL13 LOT463 TP7 1-1.1,	PARCEL13 LOT463 QA1							
Soil Glass Jar - Unpreserved (EG005T)				17.050.0014			17.050.0011	
PARCEL13 LOT463 TP7 0-0.3,	PARCEL13 LOT463 TP9 0.5-0.6 GU,	21-MAR-2014	31-MAR-2014	17-SEP-2014	-	01-APR-2014	17-SEP-2014	✓
PARCEL13 LOT462 TPC 0.3-0.5,	PARCEL13 LOT462 SP3							
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T)								
PARCEL13 LOT463 TP1 0.2-0.3,	PARCEL13 LOT463 TP4 0.6-0.7,	20-MAR-2014	31-MAR-2014	17-APR-2014	1	01-APR-2014	17-APR-2014	✓
PARCEL13 LOT463 TP7 1-1.1,	PARCEL13 LOT463 QA1							
Soil Glass Jar - Unpreserved (EG035T)		04 MAD 0044	31-MAR-2014	18-APR-2014		01-APR-2014	18-APR-2014	
PARCEL13 LOT463 TP7 0-0.3,	PARCEL13 LOT463 TP9 0.5-0.6 GU,	21-MAR-2014	31-WAR-2014	10-AFR-2014	~	01-APR-2014	10-AFR-2014	✓
PARCEL13 LOT462 TPC 0.3-0.5,	PARCEL13 LOT462 SP3							
EP004: Organic Matter								
Soil Glass Jar - Unpreserved (EP004)		04 MAD 0044	04 400 0044				40.400.0044	
PARCEL 13 LOT 463 TP3 0.3-0.4		21-MAR-2014	01-APR-2014	18-APR-2014	-	01-APR-2014	18-APR-2014	✓
EP068A: Organochlorine Pesticides (OC)								
Soil Glass Jar - Unpreserved (EP068)								
PARCEL13 LOT463 TP1 0.2-0.3		20-MAR-2014	28-MAR-2014	03-APR-2014		29-MAR-2014	07-MAY-2014	✓
Soil Glass Jar - Unpreserved (EP068)		04 MAD 0044	00 140 0044			00 110 0044	07 MAX 2014	
PARCEL13 LOT463 TP5 1.1-1.3,	PARCEL13 LOT463 TP9 0.5-0.6 GU,	21-MAR-2014	28-MAR-2014	04-APR-2014	~	29-MAR-2014	07-MAY-2014	✓
PARCEL13 LOT462 SP3								
EP068B: Organophosphorus Pesticides (OP)								
Soil Glass Jar - Unpreserved (EP068)				02 400 2014			07 MAX 2014	
PARCEL13 LOT463 TP1 0.2-0.3		20-MAR-2014	28-MAR-2014	03-APR-2014		29-MAR-2014	07-MAY-2014	✓
Soil Glass Jar - Unpreserved (EP068)		21-MAR-2014	28-MAR-2014	04-APR-2014	1	29-MAR-2014	07-MAY-2014	
PARCEL13 LOT463 TP5 1.1-1.3, PARCEL13 LOT462 SP3	PARCEL13 LOT463 TP9 0.5-0.6 GU,	21-WAR-2014	20-IVIAR-2014	04-7111-2014	~	25-WAR-2014	07-10141-2014	✓
EP080/071: Total Petroleum Hydrocarbons				I				
Soil Glass Jar - Unpreserved (EP071)		20-MAR-2014	27-MAR-2014	03-APR-2014	1	29-MAR-2014	06-MAY-2014	
PARCEL13 LOT463 TP1 0.2-0.3,	PARCEL13 LOT463 TP4 0.6-0.7,	20-IVIAR-2014	27-WAR-2014	03-AFT-2014	~	29-WAR-2014	00-IVIA 1-2014	✓
PARCEL13 LOT463 TP7 1-1.1,	PARCEL13 LOT463 QA1							
Soil Glass Jar - Unpreserved (EP071) PARCEL13 LOT463 TP7 0-0.3.	PARCEL13 LOT463 TP9 0.5-0.6 GU.	21-MAR-2014	27-MAR-2014	04-APR-2014	1	29-MAR-2014	06-MAY-2014	1
PARCEL13 LOT462 TPC 0.3-0.5,	PARCEL13 LOT462 SP3	21-10/01/-2014	27-10210-2014	0174112011	v	23-111/21014	00 100 12011	•
EP075(SIM)B: Polynuclear Aromatic Hydrocarbo	ns					1		
Soil Glass Jar - Unpreserved (EP075(SIM)) PARCEL13 LOT463 TP1 0.2-0.3,	PARCEL13 LOT463 TP4 0.6-0.7,	20-MAR-2014	27-MAR-2014	03-APR-2014	1	29-MAR-2014	06-MAY-2014	1
	,	20-WAN-2014	27-WAX-2014	00-7111-2014	√	20-10412-2014	JU-INIA 1-2014	✓
PARCEL13 LOT463 TP7 1-1.1, Soil Glass Jar, Uppreserved (EP075(SIM))	PARCEL13 LOT463 QA1							
Soil Glass Jar - Unpreserved (EP075(SIM)) PARCEL13 LOT463 TP7 0-0.3,	PARCEL13 LOT463 TP9 0.5-0.6 GU,	21-MAR-2014	27-MAR-2014	04-APR-2014	1	29-MAR-2014	06-MAY-2014	1
PARCEL13 LOT462 TPC 0.3-0.5.	PARCEL13 LOT462 SP3				-			•
17110LL10L01702 1F0 0.3-0.3,								

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Matrix: SOIL Evaluation: * = Holding time breach ; \checkmark = 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 EP080: BTEXN Soil Glass Jar - Unpreserved (EP080) PARCEL13 LOT463 TP1 0.2-0.3, 20-MAR-2014 28-MAR-2014 03-APR-2014 29-MAR-2014 03-APR-2014 1 PARCEL13 LOT463 TP4 0.6-0.7, \checkmark PARCEL13 LOT463 TP7 1-1.1, PARCEL13 LOT463 QA1 Soil Glass Jar - Unpreserved (EP080) 21-MAR-2014 28-MAR-2014 04-APR-2014 29-MAR-2014 04-APR-2014 PARCEL13 LOT463 TP7 0-0.3, 1 PARCEL13 LOT463 TP9 0.5-0.6 GU, \checkmark PARCEL13 LOT462 TPC 0.3-0.5, PARCEL13 LOT462 SP3 EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Soil Glass Jar - Unpreserved (EP080) 20-MAR-2014 28-MAR-2014 03-APR-2014 1 29-MAR-2014 03-APR-2014 PARCEL13 LOT463 TP1 0.2-0.3, PARCEL13 LOT463 TP4 0.6-0.7, \checkmark PARCEL13 LOT463 TP7 1-1.1, PARCEL13 LOT463 QA1 Soil Glass Jar - Unpreserved (EP080) 21-MAR-2014 28-MAR-2014 04-APR-2014 29-MAR-2014 04-APR-2014 PARCEL13 LOT463 TP7 0-0.3, PARCEL13 LOT463 TP9 0.5-0.6 GU, 1 \checkmark PARCEL13 LOT462 TPC 0.3-0.5. PARCEL13 LOT462 SP3



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.

Quality Control Sample Type			ount	Rate (%)			Quality Control Specification		
Analytical Methods	Method	00	Reaular	Actual	Expected	Evaluation			
Laboratory Duplicates (DUP)									
Exchangeable Cations	ED007	1	5	20.0	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		
Organic Matter	EP004	1	7	14.3	10.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
PAH/Phenols (SIM)	EP075(SIM)	2	17	11.8	10.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
Pesticides by GCMS	EP068	2	18	11.1	10.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
Н (1:5)	EA002	2	20	10.0	10.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
otal Mercury by FIMS	EG035T	2	20	10.0	10.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
otal Metals by ICP-AES	EG005T	2	20	10.0	10.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
PH - Semivolatile Fraction	EP071	2	16	12.5	10.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
PH Volatiles/BTEX	EP080	2	20	10.0	10.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
aboratory Control Samples (LCS)									
Exchangeable Cations	ED007	1	5	20.0	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
rganic Matter	EP004	1	7	14.3	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
AH/Phenols (SIM)	EP075(SIM)	1	17	5.9	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
esticides by GCMS	EP068	1	18	5.6	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
otal Mercury by FIMS	EG035T	1	20	5.0	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
otal Metals by ICP-AES	EG005T	1	20	5.0	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
PH - Semivolatile Fraction	EP071	1	16	6.3	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
PH Volatiles/BTEX	EP080	1	20	5.0	5.0	✓ ✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
lethod Blanks (MB)									
xchangeable Cations	ED007	1	5	20.0	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
Organic Matter	EP004	1	7	14.3	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
AH/Phenols (SIM)	EP075(SIM)	1	17	5.9	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
esticides by GCMS	EP068	1	18	5.6	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
otal Mercury by FIMS	EG035T	1	20	5.0	5.0	 ✓ 	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
otal Metals by ICP-AES	EG005T	1	20	5.0	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
PH - Semivolatile Fraction	EP071	1	16	6.3	5.0		NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
PH Volatiles/BTEX	EP080	1	20	5.0	5.0	 ✓ 	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
latrix Spikes (MS)									
organic Matter	EP004	1	7	14.3	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
AH/Phenols (SIM)	EP075(SIM)	1	17	5.9	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
esticides by GCMS	EP068	1	18	5.6	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
otal Mercury by FIMS	EG035T	1	20	5.0	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
otal Metals by ICP-AES	EG005T	1	20	5.0	5.0	 ✓ 	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
PH - Semivolatile Fraction	EP071	1	16	6.3	5.0	✓ ✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement		
PH Volatiles/BTEX	EP080	1	20	5.0	5.0	1	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
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
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).
Asbestos Identification in bulk solids	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples
Asbestos - Quantitative Analysis	* EA200Q	SOIL	Asbestos Materials Content with Confirmation of Identification by AS 4964 - 2004 Asbestos
Exchangeable Cations	ED007	SOIL	Rayment & Lyons (2011) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Organic Matter	EP004	SOIL	AS1289.4.1.1 - 1997., Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3)
Pesticides by GCMS	EP068	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TPH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)
Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
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.



Preparation Methods	Method	Matrix	Method Descriptions
Organic Matter	EP004-PR	SOIL	AS1289.4.1.1 - 1997., Dichromate oxidation method after Walkley and Black. This method is compliant with NEPM (2013) Schedule B(3) (Method 105)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids (Option A - Concentrating)	ORG17A	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial 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

Matrix: SOIL

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	ES1406239-001	PARCEL13 LOT463 TP1 0.2-0	Pyrene	129-00-0	66.8 %	70-130%	Recovery less than lower data quality
							objective

• For all matrices, no Method Blank value outliers occur.

- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control 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	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days	Date analysed	Due for analysis	Days
			overdue			overdue
EA002 : pH (Soils)						
Soil Glass Jar - Unpreserved						
PARCEL 13 LOT 463 TP3 0.3-0.4	31-MAR-2014	28-MAR-2014	3			

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.

	0 Stic Dreservood Blastic	oreserved Pla	- Aldreight Uni	o reserved; AP -	ber Glass Unpi	0 stlc: AG = Am Cl preserved i	0 0 de Preserved Piz ber Glass; H = H	TOTAL	Preserved; S = Sulfuric F	dium Hydroxide/Cd I ght Unpreserved Via	IORC; SH = So ved; AV = Airfrei	DRC = Ninc Preserve	served Plaslic; (eserved; VS = V(Walk Container Codes: P = Unpreserved Plastic: N = Nitic Preserved ORC; SH = Sodium Hydroxida/Cd Preserved; S = Sodium Hydroxida/Cd Preserved Plastic: O <th>Water Container Codes: P = Water Container Codes: P = V = VOA VIAI HCI Preserved: N Z = Zinc Acetate Preserved Bo</th>	Water Container Codes: P = Water Container Codes: P = V = VOA VIAI HCI Preserved: N Z = Zinc Acetate Preserved Bo
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		200N	sticides	ID			TOTAL BOTTLES	uiji	TYPE & PRESERVATIVE	TYPE & PR	- MANNY	Constrated Couriers	WO GW	SAMPLE ID	LAB ID
diversity or samples requiring specific OC analysis							\rightarrow	., \$.,, j		te:	/ Date: By / Dat	Relinquished By / Date:	Reli		
	Where Metale are required, spacify Tetal (unfiltered botte required) or Dissolved (had shered botte required).) or Dissolved (d bottle required	Total (unfilered	required, specify	horo Metala arc		FORMATION	MENIORN	Lan / spin	s-Ag	MATRIX Someony and Analysis: Ale MCCSILE / Cale of		MATRU	ALS USE ONLY
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	CERTIF	ICATE OF ANALYSIS	
Work Order	ES1407306	Page	: 1 of 14
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	EPO BOX 564	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	MAITLAND NSW, AUSTRALIA 2320		
E-mail	: scadman@environcorp.com	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 BUFFER ZONE INVESTIGATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: AS130348		
C-O-C number	:	Date Samples Received	: 03-APR-2014
Sampler	: K.WOODS/S.CADMAN	Issue Date	: 15-APR-2014
Site	:		
		No. of samples received	: 48
Quote number	: SY/433/13	No. of samples analysed	: 12

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

Signatories NATA Accredited Laboratory 825 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. Accredited for compliance with NATA ISO/IEC 17025. Signatories Position Accreditation Category Senior Spectroscopist Celine Conceicao Sydney Inorganics Senior Organic Chemist Pabi Subba Sydney Inorganics WORLD RECOGNISED ACCREDITATION Pabi Subba Senior Organic Chemist Sydney Organics Metals Coordinator Shobhna Chandra Sydney Inorganics

Address 277-289 Woodpark Road Smithfield NSW Australia 2164 PHONE +61-2-8784 8555 Facsimile +61-2-8784 8500 Environmental Division Sydney ABN 84 009 936 029 Part of the ALS Group An ALS Limited Company



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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.

- ALS is not NATA accredited for the analysis of Bifenthrin in soils when performed under ALS Method EP068D
- EA200 Legend
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Ch' Chrysotile (white asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' Asbestos fibres detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- EA200Q: ALS laboratory procedures and methods used for the identification and quantitation of asbestos are consistent with AS4964-2004 and the requirements of the 2013 NEPM for Assessment of Site Contamination
- EA200Q: Asbestos weights and percentages are not covered under the Scope of NATA Accreditation.
 Weights of Asbestos are based on extracted bulk asbestos, fibre bundles, and/or ACM and do not include respirable fibres (if present).
 Percentages for Asbestos content in ACM are based on the 2013 NEPM default values. All numerical results under this method are approximate and should be used as a guide only.



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL 13 LOT 460 TP4	PARCEL 13 LOT 460 TP8	PARCEL 13 LOT 459 TP11	PARCEL 13 LOT 459 QA1	PARCEL 13 LOT 459 TP12
	CI	ient sampli	ng date / time	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1407306-004	ES1407306-005	ES1407306-006	ES1407306-007	ES1407306-008
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	18.9	13.7	19.9	21.2	25.4
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	8	14	14	10	18
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	1
Chromium	7440-47-3	2	mg/kg	27	31	12	11	23
Copper	7440-50-8	5	mg/kg	<5	8	14	22	22
Lead	7439-92-1	5	mg/kg	14	16	13	21	56
Nickel	7440-02-0	2	mg/kg	4	4	6	7	13
Zinc	7440-66-6	5	mg/kg	362	119	283	455	535
EG035T: Total Recoverable Mercury	by FIMS							
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)							
alpha-BHC	319-84-6	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
[^] Total Chlordane (sum)		0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
↑ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2		<0.2	<0.2	<0.2

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL 13 LOT 460 TP4	PARCEL 13 LOT 460 TP8	PARCEL 13 LOT 459 TP11	PARCEL 13 LOT 459 QA1	PARCEL 13 LOT 459 TP12
	Cl	ient samplii	ng date / time	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1407306-004	ES1407306-005	ES1407306-006	ES1407306-007	ES1407306-008
EP068A: Organochlorine Pesticide	es (OC) - Continued							
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg	<0.2		<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Sum of DDD + DDE + DDT		0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesti	icides (OP)							
Dichlorvos	62-73-7	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2		<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2		<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg	<0.2		<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05		<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromat	ic Hydrocarbons							
Naphthalene	91-20-3	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL 13 LOT 460 TP4	PARCEL 13 LOT 460 TP8	PARCEL 13 LOT 459 TP11	PARCEL 13 LOT 459 QA1	PARCEL 13 LOT 459 TP12
	Cli	ient sampli	ng date / time	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1407306-004	ES1407306-005	ES1407306-006	ES1407306-007	ES1407306-008
EP075(SIM)B: Polynuclear Aromatic H	lydrocarbons - Cont	inued						
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Sum of polycyclic aromatic hydrocarbons	s	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
[^] Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
A Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6		0.6	0.6	0.6
A Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2		1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocar	bons							
C6 - C9 Fraction		10	mg/kg	<10		<10	<10	<10
C10 - C14 Fraction		50	mg/kg	<50		<50	<50	<50
C15 - C28 Fraction		100	mg/kg	<100		<100	<100	<100
C29 - C36 Fraction		100	mg/kg	<100		<100	<100	<100
[^] C10 - C36 Fraction (sum)		50	mg/kg	<50		<50	<50	<50
EP080/071: Total Recoverable Hydroc	arbons - NEPM 201	3						
C6 - C10 Fraction	C6_C10	10	mg/kg	<10		<10	<10	<10
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10		<10	<10	<10
>C10 - C16 Fraction	>C10_C16	50	mg/kg	<50		<50	<50	<50
>C16 - C34 Fraction		100	mg/kg	<100		<100	<100	<100
>C34 - C40 Fraction		100	mg/kg	<100		<100	<100	<100
^ >C10 - C40 Fraction (sum)		50	mg/kg	<50		<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)		50	mg/kg	<50		<50	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2		<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5



Sub-Matrix: SOIL (Matrix: SOIL)		Cli	ent sample ID	PARCEL 13 LOT 460 TP4	PARCEL 13 LOT 460 TP8	PARCEL 13 LOT 459 TP11	PARCEL 13 LOT 459 QA1	PARCEL 13 LOT 459 TP12
	Cli	ent sampli	ing date / time	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00	31-MAR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1407306-004	ES1407306-005	ES1407306-006	ES1407306-007	ES1407306-008
EP080: BTEXN - Continued								
[^] Sum of BTEX		0.2	mg/kg	<0.2		<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5		<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1		<1	<1	<1
EP068S: Organochlorine Pesticide S	urrogate							
Dibromo-DDE	21655-73-2	0.1	%	88.5		82.0	84.9	72.2
EP068T: Organophosphorus Pestici	de Surrogate							
DEF	78-48-8	0.1	%	88.6		82.8	78.6	79.5
EP075(SIM)S: Phenolic Compound S	urrogates							
Phenol-d6	13127-88-3	0.1	%	121		110	119	111
2-Chlorophenol-D4	93951-73-6	0.1	%	115		106	115	105
2.4.6-Tribromophenol	118-79-6	0.1	%	102		99.3	97.8	94.0
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	104		94.6	95.1	96.1
Anthracene-d10	1719-06-8	0.1	%	105		102	104	104
4-Terphenyl-d14	1718-51-0	0.1	%	120		116	117	117
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	111		85.1	89.8	85.5
Toluene-D8	2037-26-5	0.1	%	123		85.9	88.1	83.2
4-Bromofluorobenzene	460-00-4	0.1	%	119		81.4	79.7	79.6



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL 13 LOT 458 TP16	PARCEL 13 LOT 458 QA2	PARCEL 13 LOT 458 TP19	PARCEL 13 LOT 458 TP230	PARCEL 12 LOT 11 TP45
	Cl	ient sampli	ng date / time	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	02-APR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1407306-009	ES1407306-011	ES1407306-012	ES1407306-014	ES1407306-031
EA055: Moisture Content								
Moisture Content (dried @ 103°C)		1.0	%	5.5	5.6	8.1	14.7	12.1
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	15	6	
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	
Chromium	7440-47-3	2	mg/kg	9	5	10	16	
Copper	7440-50-8	5	mg/kg	<5	<5	34	16	
Lead	7439-92-1	5	mg/kg	12	9	17	25	
Nickel	7440-02-0	2	mg/kg	5	5	6	14	
Zinc	7440-66-6	5	mg/kg	160	130	362	572	
EG035T: Total Recoverable Mercury I	ov FIMS							
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	
EP068A: Organochlorine Pesticides (0	C)							
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05		<0.05	
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05		<0.05	
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05		<0.05	
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05		<0.05	
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05		<0.05	
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05		<0.05	
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05		<0.05	
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05		<0.05	
[^] Total Chlordane (sum)		0.05	mg/kg	<0.05	<0.05		<0.05	
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05		<0.05	
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05		<0.05	
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05		<0.05	
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05		<0.05	
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05		<0.05	
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05		<0.05	
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05		<0.05	
↑ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05		<0.05	
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05		<0.05	
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05		<0.05	
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05		<0.05	
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2		<0.2	

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL 13 LOT 458 TP16	PARCEL 13 LOT 458 QA2	PARCEL 13 LOT 458 TP19	PARCEL 13 LOT 458 TP230	PARCEL 12 LOT 11 TP45
	Cl	lient samplii	ng date / time	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	02-APR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1407306-009	ES1407306-011	ES1407306-012	ES1407306-014	ES1407306-031
EP068A: Organochlorine Pesticide	es (OC) - Continued							
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05		<0.05	
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2		<0.2	
Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05		<0.05	
Sum of DDD + DDE + DDT		0.05	mg/kg	<0.05	<0.05		<0.05	
EP068B: Organophosphorus Pesti	cides (OP)							
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05		<0.05	
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05		<0.05	
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2		<0.2	
Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05		<0.05	
Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05		<0.05	
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05		<0.05	
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2		<0.2	
Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05		<0.05	
Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05		<0.05	
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05		<0.05	
Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2		<0.2	
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05		<0.05	
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05		<0.05	
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05		<0.05	
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05		<0.05	
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05		<0.05	
Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05		<0.05	
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05		<0.05	
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05		<0.05	
EP075(SIM)B: Polynuclear Aromat	ic Hydrocarbons							
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5

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Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL 13 LOT 458 TP16	PARCEL 13 LOT 458 QA2	PARCEL 13 LOT 458 TP19	PARCEL 13 LOT 458 TP230	PARCEL 12 LOT 11 TP45
	Cl	ient sampli	ng date / time	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	02-APR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1407306-009	ES1407306-011	ES1407306-012	ES1407306-014	ES1407306-031
EP075(SIM)B: Polynuclear Aromatic H	ydrocarbons - Cont	inued						
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Sum of polycyclic aromatic hydrocarbons	s	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
[^] Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
A Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6		0.6	0.6
A Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2		1.2	1.2
EP080/071: Total Petroleum Hydrocar	bons							
C6 - C9 Fraction		10	mg/kg	<10	<10		<10	<10
C10 - C14 Fraction		50	mg/kg	<50	<50		<50	<50
C15 - C28 Fraction		100	mg/kg	<100	<100		<100	<100
C29 - C36 Fraction		100	mg/kg	<100	<100		<100	<100
[^] C10 - C36 Fraction (sum)		50	mg/kg	<50	<50		<50	<50
EP080/071: Total Recoverable Hydroc	arbons - NEPM 201	3						
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10		<10	<10
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10		<10	<10
>C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50		<50	<50
>C16 - C34 Fraction		100	mg/kg	<100	<100		<100	<100
>C34 - C40 Fraction		100	mg/kg	<100	<100		<100	<100
^ >C10 - C40 Fraction (sum)		50	mg/kg	<50	<50		<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)		50	mg/kg	<50	<50		<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2		<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5



Sub-Matrix: SOIL (Matrix: SOIL)		Cli	ent sample ID	PARCEL 13 LOT 458 TP16	PARCEL 13 LOT 458 QA2	PARCEL 13 LOT 458 TP19	PARCEL 13 LOT 458 TP230	PARCEL 12 LOT 11 TP45
	Cl	ient sampli	ing date / time	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	01-APR-2014 15:00	02-APR-2014 15:00
Compound	CAS Number	LOR	Unit	ES1407306-009	ES1407306-011	ES1407306-012	ES1407306-014	ES1407306-031
EP080: BTEXN - Continued								
[^] Sum of BTEX		0.2	mg/kg	<0.2	<0.2		<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5		<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1		<1	<1
EP068S: Organochlorine Pesticide	Surrogate							
Dibromo-DDE	21655-73-2	0.1	%	101	81.4		91.8	
EP068T: Organophosphorus Pestic	ide Surrogate							
DEF	78-48-8	0.1	%	104	80.3		82.3	
EP075(SIM)S: Phenolic Compound	Surrogates							
Phenol-d6	13127-88-3	0.1	%	116	116		116	111
2-Chlorophenol-D4	93951-73-6	0.1	%	110	108		111	105
2.4.6-Tribromophenol	118-79-6	0.1	%	95.3	88.7		94.7	97.2
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	94.8	93.1		94.4	103
Anthracene-d10	1719-06-8	0.1	%	95.6	101		104	96.2
4-Terphenyl-d14	1718-51-0	0.1	%	115	114		116	113
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	100	98.7		96.8	96.3
Toluene-D8	2037-26-5	0.1	%	97.8	94.0		93.5	93.2
4-Bromofluorobenzene	460-00-4	0.1	%	94.2	89.7		87.0	84.8



Sub-Matrix: SOIL (Matrix: SOIL)		Cli	ent sample ID	PARCEL 12 LOT 10 TP50	PARCEL 12 LOT 10 QA1				
	Cli	ent sampl	ing date / time	03-APR-2014 15:00	03-APR-2014 15:00				
Compound	CAS Number	LOR	Unit	ES1407306-035	ES1407306-036				
EA055: Moisture Content									
Moisture Content (dried @ 103°C)		1.0	%	27.0	18.2				
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg	<5	5				
Cadmium	7440-43-9	1	mg/kg	<1	<1				
Chromium	7440-47-3	2	mg/kg	7	13				
Copper	7440-50-8	5	mg/kg	16	23				
Lead	7439-92-1	5	mg/kg	<5	6				
Nickel	7440-02-0	2	mg/kg	4	8				
Zinc	7440-66-6	5	mg/kg	31	32				
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg	0.2	0.3				
EP075(SIM)B: Polynuclear Aromatic Hy	vdrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	0.8	<0.5				
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5				
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5				
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5				
Phenanthrene	85-01-8	0.5	mg/kg	7.0	0.8				
Anthracene	120-12-7	0.5	mg/kg	0.6	<0.5				
Fluoranthene	206-44-0	0.5	mg/kg	1.6	<0.5				
Pyrene	129-00-0	0.5	mg/kg	0.6	<0.5				
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5				
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5				
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5				
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5				
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5				
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5				
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5				
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5				
Sum of polycyclic aromatic hydrocarbons		0.5	mg/kg	10.6	0.8				
A Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5				
A Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6	0.6				
A Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	1.2	1.2				
EP080/071: Total Petroleum Hydrocarb	oons								



Sub-Matrix: SOIL (Matrix: SOIL)		Clie	ent sample ID	PARCEL 12 LOT 10 TP50	PARCEL 12 LOT 10 QA1	 	
	Cli	ent sampli	ng date / time	03-APR-2014 15:00	03-APR-2014 15:00	 	
Compound	CAS Number	LOR	Unit	ES1407306-035	ES1407306-036	 	
EP080/071: Total Petroleum Hydrocarl	oons - Continued						
C6 - C9 Fraction		10	mg/kg	<10	<10	 	
C10 - C14 Fraction		50	mg/kg	<50	<50	 	
C15 - C28 Fraction		100	mg/kg	<100	<100	 	
C29 - C36 Fraction		100	mg/kg	<100	<100	 	
[^] C10 - C36 Fraction (sum)		50	mg/kg	<50	<50	 	
EP080/071: Total Recoverable Hydroc	arbons - NEPM 201	3					
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	 	
C6 - C10 Fraction minus BTEX	C6_C10-BTEX	10	mg/kg	<10	<10	 	
(F1)							
>C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	<50	 	
>C16 - C34 Fraction		100	mg/kg	<100	<100	 	
>C34 - C40 Fraction		100	mg/kg	<100	<100	 	
>C10 - C40 Fraction (sum)		50	mg/kg	<50	<50	 	
^ >C10 - C16 Fraction minus Naphthalene		50	mg/kg	<50	<50	 	
(F2)							
EP080: BTEXN							
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	 	
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	 	
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	 	
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	 	
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	 	
[^] Sum of BTEX		0.2	mg/kg	<0.2	<0.2	 	
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	 	
Naphthalene	91-20-3	1	mg/kg	<1	<1	 	
EP075(SIM)S: Phenolic Compound Su	rrogates						
Phenol-d6	13127-88-3	0.1	%	111	118	 	
2-Chlorophenol-D4	93951-73-6	0.1	%	104	112	 	
2.4.6-Tribromophenol	118-79-6	0.1	%	94.0	97.8	 	
EP075(SIM)T: PAH Surrogates							
2-Fluorobiphenyl	321-60-8	0.1	%	90.5	96.6	 	
Anthracene-d10	1719-06-8	0.1	%	98.5	104	 	
4-Terphenyl-d14	1718-51-0	0.1	%	112	117	 	
EP080S: TPH(V)/BTEX Surrogates							
1.2-Dichloroethane-D4	17060-07-0	0.1	%	81.8	95.6	 	



Sub-Matrix: SOIL (Matrix: SOIL)	Client sample ID		PARCEL 12 LOT 10	PARCEL 12 LOT 10	 		
				TP50	QA1		
Client sampling date / time				03-APR-2014 15:00	03-APR-2014 15:00	 	
Compound	CAS Number	LOR	Unit	ES1407306-035	ES1407306-036	 	
EP080S: TPH(V)/BTEX Surrogates - Conti	inued						
Toluene-D8	2037-26-5	0.1	%	83.2	93.3	 	
4-Bromofluorobenzene	460-00-4	0.1	%	79.9	88.9	 	



Surrogate Control Limits

Sub-Matrix: SOIL	Γ	Recovery	Limits (%)
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrog	ate		
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	72.8	133.2
Toluene-D8	2037-26-5	73.9	132.1
4-Bromofluorobenzene	460-00-4	71.6	130.0



QUALITY CONTROL REPORT

Work Order	ES1407306	Page	: 1 of 15
Client		Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	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 BUFFER ZONE INVESTIGATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	:		
C-O-C number	:	Date Samples Received	: 03-APR-2014
Sampler	: K.WOODS/S.CADMAN	Issue Date	: 15-APR-2014
Order number	: AS130348		
		No. of samples received	: 48
Quote number	: SY/433/13	No. of samples analysed	: 12

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



Signatories NATA Accredited

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out ir Laboratory 825 compliance with procedures specified in 21 CFR Part 11.

Accredited for	Signatories	Position	Accreditation Category
compliance with ISO/IEC 17025.	Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
150/IEC 17025.	Pabi Subba	Senior Organic Chemist	Sydney Inorganics
	Pabi Subba	Senior Organic Chemist	Sydney Organics
	Shobhna Chandra	Metals Coordinator	Sydney Inorganics

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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 Co	ntent (QC Lot: 3378696)									
ES1407278-003	Anonymous	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	<1.0	<1.0	0.0	No Limit	
ES1407278-014	Anonymous	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	<1.0	<1.0	0.0	No Limit	
A055: Moisture Co	ntent (QC Lot: 3378697)									
ES1407306-012	PARCEL 13 LOT 458 TP19	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	8.1	8.9	8.5	No Limit	
ES1407368-007	Anonymous	EA055-103: Moisture Content (dried @ 103°C)		1.0	%	<1.0	<1.0	0.0	No Limit	
G005T: Total Meta	Is by ICP-AES (QC Lot: 338'	1850)								
ES1407266-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit	
		EG005T: Chromium	7440-47-3	2	mg/kg	<2	<2	0.0	No Limit	
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.0	No Limit	
	EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit		
	EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.0	No Limit		
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit	
	EG005T: Zinc	7440-66-6	5	mg/kg	<5	<5	0.0	No Limit		
ES1407302-006 Anonymous	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit	
		EG005T: Chromium	7440-47-3	2	mg/kg	14	15	7.6	No Limit	
		EG005T: Nickel	7440-02-0	2	mg/kg	48	46	4.4	0% - 20%	
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit	
		EG005T: Copper	7440-50-8	5	mg/kg	29	28	0.0	No Limit	
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit	
		EG005T: Zinc	7440-66-6	5	mg/kg	46	45	3.4	No Limit	
G005T: Total Meta	Is by ICP-AES (QC Lot: 338	1852)								
ES1407306-012	PARCEL 13 LOT 458 TP19	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit	
		EG005T: Chromium	7440-47-3	2	mg/kg	10	10	0.0	No Limit	
		EG005T: Nickel	7440-02-0	2	mg/kg	6	6	0.0	No Limit	
		EG005T: Arsenic	7440-38-2	5	mg/kg	15	14	0.0	No Limit	
		EG005T: Copper	7440-50-8	5	mg/kg	34	36	7.7	No Limit	
		EG005T: Lead	7439-92-1	5	mg/kg	17	25	38.6	No Limit	
		EG005T: Zinc	7440-66-6	5	mg/kg	362	354	2.3	0% - 20%	
S1407325-007	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit	
		EG005T: Chromium	7440-47-3	2	mg/kg	29	26	11.9	0% - 50%	
		EG005T: Nickel	7440-02-0	2	mg/kg	17	15	10.7	No Limit	
		EG005T: Arsenic	7440-38-2	5	mg/kg	5	<5	0.0	No Limit	
		EG005T: Copper	7440-50-8	5	mg/kg	20	17	18.0	No Limit	
		EG005T: Lead	7439-92-1	5	mg/kg	13	11	10.7	No Limit	
		EG005T: Zinc	7440-66-6	5	mg/kg	45	51	11.8	0% - 50%	

Page	÷ 4 of 15
Work Order	ES1407306
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION



Sub-Matrix: SOIL						Laboratory I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG035T: Total Reco	verable Mercury by FIMS (0	QC Lot: 3381851)							
ES1407266-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1407302-006	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Reco	verable Mercury by FIMS (C								
ES1407306-012	PARCEL 13 LOT 458 TP19	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1407325-007	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP068A: Organochic	orine Pesticides (OC) (QC L	,			0.0				
ES1407420-003	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
	, and y mode	EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	< 0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES1407420-011	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.25	<0.25	0.0	No Limit

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Work Order	: ES1407306
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION



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 (%)
EP068A: Organochl	orine Pesticides (OC)	(QC Lot: 3378345) - continued							
ES1407420-011	Anonymous	EP068: Endrin	72-20-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068B: Organopho	osphorus Pesticides (C	DP) (QC Lot: 3378345)							
ES1407420-003	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	< 0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES1407420-011	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.25	<0.25	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.25	<0.25	0.0	No Limit

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Work Order	: ES1407306
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION



ub-Matrix: SOIL				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EP068B: Organopho	osphorus Pesticides (OP) (QC Lot: 3378345) - continued								
ES1407420-011	Anonymous	EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.25	<0.25	0.0	No Limit	
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.25	<0.25	0.0	No Limit	
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.25	<0.25	0.0	No Limit	
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.25	<0.25	0.0	No Limit	
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit	
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit	
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit	
EP075(SIM)B: Polyn	uclear Aromatic Hydrocarb	ons (QC Lot: 3378351)								
ES1407306-004	PARCEL 13 LOT 460 TP4	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		hydrocarbons								
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
ES1407420-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	0.9	58.3	No Limit	
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	0.6	0.7	17.9	No Limit	
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	1.4	1.4	0.0	No Limit	
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	1.3	1.3	0.0	No Limit	
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	0.8	0.8	0.0	No Limit	
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	0.8	0.8	0.0	No Limit	
		EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	1.1	1.1	0.0	No Limit	
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.8	0.8	0.0	No Limit	

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Work Order	: ES1407306
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION



Sub-Matrix: SOIL			[Laboratory	Duplicate (DUP) Report	1	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polyn	uclear Aromatic Hydrocarb	ons (QC Lot: 3378351) - continued							
ES1407420-001	Anonymous	EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	0.6	0.6	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic		0.5	mg/kg	7.4	8.4	12.6	0% - 50%
		hydrocarbons							
		EP075(SIM): Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	1.0	1.0	0.0	No Limit
EP080/071: Total Pet	troleum Hydrocarbons (QC	C Lot: 3377659)							
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.0	No Limit
ES1407368-021	Anonymous	EP080: C6 - C9 Fraction		10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Pet	troleum Hydrocarbons (QC	C Lot: 3378350)							
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: C15 - C28 Fraction		100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction		100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction		50	mg/kg	<50	<50	0.0	No Limit
ES1407420-001	Anonymous	EP071: C15 - C28 Fraction		100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction		100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction		50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Re	coverable Hydrocarbons - I	NEPM 2013 (QC Lot: 3377659)							
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES1407368-021	Anonymous	EP080: C6 - C10 Fraction	 C6 C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Re	coverable Hydrocarbons - I	NEPM 2013 (QC Lot: 3378350)	_						
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: >C16 - C34 Fraction		100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction		100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	>C10 C16	50	mg/kg	<50	<50	0.0	No Limit
ES1407420-001	Anonymous	EP071: >C16 - C34 Fraction		100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction		100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	>C10 C16	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC	Lot: 3377659)		_		0.0				
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
201407000 004		EP080: Toluene	108-88-3	0.5	mg/kg	<0.2	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		El 000. meta- a para-xylene	106-42-3	0.0		0.0	0.0	0.0	
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES1407368-021	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

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Work Order	: ES1407306
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION



Sub-Matrix: SOIL			Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 3377659) - continued									
ES1407368-021	Anonymous	EP080: Naphthalene	91-20-3	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 Sample (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)	Laboratory Control Spike (LCS) Report			
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 33818	50)							
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	109	92	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	106	87	121
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	99.5	80	136
EG005T: Copper	7440-50-8	5	mg/kg	<5	32.0 mg/kg	120	93	127
EG005T: Lead	7439-92-1	5	mg/kg	<5	40.0 mg/kg	100	86	124
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.0 mg/kg	107	93	131
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	108	81	133
EG005T: Total Metals by ICP-AES (QCLot: 33818	(52)							
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	112	92	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	110	87	121
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	103	80	136
EG005T: Copper	7440-50-8	5	mg/kg	<5	32.0 mg/kg	116	93	127
EG005T: Lead	7439-92-1	5	mg/kg	<5	40.0 mg/kg	108	86	124
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.0 mg/kg	110	93	131
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	108	81	133
EG035T: Total Recoverable Mercury by FIMS (Q	CLot: 3381851)							
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	89.6	70	105
EG035T: Total Recoverable Mercury by FIMS (Q	CL of: 3381853)							
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	89.5	70	105
EP068A: Organochlorine Pesticides (OC) (QCLot	t· 3378345)		0.0		0.0			
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	90.1	71	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	91.2	66	122
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	93.8	69	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	91.1	71	115
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	85.2	65	113
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.9	68	116
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	89.6	68	118
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	87.2	68	116
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.6	68	120
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.5	69	119
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	85.7	67	121
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	85.2	66	118
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	87.6	69	117
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.4	67	123

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Work Order	: ES1407306
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION



Sub-Matrix: SOIL				Method Blank (MB)		Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High		
EP068A: Organochlorine Pesticides (OC) (QC	CLot: 3378345) - continued									
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	89.5	76	120		
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.4	76	120		
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	86.5	57.3	115		
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	76.9	60	124		
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	80.2	67	127		
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	83.1	65	123		
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	78.8	65	129		
EP068B: Organophosphorus Pesticides (OP)	(QCLot: 3378345)									
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	81.3	56	126		
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.7	64	128		
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	78.4	54	122		
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	74.6	64	124		
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	77.4	73	117		
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	83.7	55	119		
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	78.6	69	123		
P068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	75.1	70	120		
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	84.2	71	115		
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	81.6	68	114		
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	81.9	68	122		
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	82.1	69	115		
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	81.4	70	118		
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	80.7	68	116		
P068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	87.4	64	120		
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	80.8	68	116		
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	83.3	70	118		
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	82.4	67	123		
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	82.2	42	126		
EP075(SIM)B: Polynuclear Aromatic Hydroca	rbons (QCLot: 3378351)									
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	4 mg/kg	94.6	80	124		
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	4 mg/kg	93.8	77	123		
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	4 mg/kg	88.8	79	123		
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	4 mg/kg	85.5	77	123		
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	4 mg/kg	93.5	79	123		
P075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	4 mg/kg	92.5	79	123		
P075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	4 mg/kg	94.0	79	123		
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	4 mg/kg	93.7	79	125		
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	4 mg/kg	91.8	73	121		
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	4 mg/kg	94.5	81	123		
EP075(SIM): Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	4 mg/kg	85.8	70	118		

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Work Order	: ES1407306
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION



Sub-Matrix: SOIL				Method Blank (MB)	Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbo	ons (QCLot: 3378351) - con	tinued							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	4 mg/kg	91.9	77	123	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	4 mg/kg	85.2	76	122	
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	4 mg/kg	82.7	71	113	
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	4 mg/kg	82.2	71.7	113	
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	4 mg/kg	84.6	72.4	114	
EP080/071: Total Petroleum Hydrocarbons (QCI	Lot: 3377659)								
EP080: C6 - C9 Fraction		10	mg/kg	<10	26 mg/kg	117	68.4	128	
EP080/071: Total Petroleum Hydrocarbons (QCI	Lot: 3378350)								
EP071: C10 - C14 Fraction		50	mg/kg	<50	200 mg/kg	87.2	71	131	
EP071: C15 - C28 Fraction		100	mg/kg	<100	300 mg/kg	90.5	74	138	
EP071: C29 - C36 Fraction		100	mg/kg	<100	200 mg/kg	82.6	64	128	
EP080/071: Total Recoverable Hydrocarbons - N	EPM 2013 (QCLot: 3377659))							
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	116	68.4	128	
EP080/071: Total Recoverable Hydrocarbons - N	EPM 2013 (QCLot: 3378350))							
EP071: >C10 - C16 Fraction	>C10_C16	50	mg/kg	<50	250 mg/kg	85.0	70	130	
EP071: >C16 - C34 Fraction		100	mg/kg	<100	350 mg/kg	90.0	74	138	
EP071: >C34 - C40 Fraction		100	mg/kg	<100					
		50	mg/kg		150 mg/kg	72.9	63	131	
EP080: BTEXN (QCLot: 3377659)									
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	111	62	116	
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	108	62	128	
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	107	58	118	
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	104	60	120	
	106-42-3								
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	106	60	120	
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	97.6	62	138	

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	ıb-Matrix: SOIL			Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Recovery L	imits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
EG005T: Total Me	tals by ICP-AES (QCLot: 3381850)							
ES1407266-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	97.3	70	130	
	EG005T: Cadmium	7440-43-9	50 mg/kg	96.3	70	130		
		EG005T: Chromium	7440-47-3	50 mg/kg	99.5	70	130	



Sub-Matrix: SOIL				Matrix Spike (MS) Report				
					Spike SpikeRecovery(%)		Limits (%)	
aboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
G005T: Total Met	als by ICP-AES (QCLot: 3381850) - continued							
ES1407266-001	Anonymous	EG005T: Copper	7440-50-8	125 mg/kg	106	70	130	
		EG005T: Lead	7439-92-1	125 mg/kg	95.1	70	130	
		EG005T: Nickel	7440-02-0	50 mg/kg	86.4	70	130	
		EG005T: Zinc	7440-66-6	125 mg/kg	93.8	70	130	
EG005T: Total Met	als by ICP-AES (QCLot: 3381852)							
ES1407306-012	PARCEL 13 LOT 458 TP19	EG005T: Arsenic	7440-38-2	50 mg/kg	100	70	130	
		EG005T: Cadmium	7440-43-9	50 mg/kg	103	70	130	
		EG005T: Chromium	7440-47-3	50 mg/kg	106	70	130	
		EG005T: Copper	7440-50-8	125 mg/kg	102	70	130	
		EG005T: Lead	7439-92-1	125 mg/kg	104	70	130	
		EG005T: Nickel	7440-02-0	50 mg/kg	97.9	70	130	
		EG005T: Zinc	7440-66-6	125 mg/kg	83.9	70	130	
-G035T: Total Re	coverable Mercury by FIMS (QCLot: 3381851)							
ES1407266-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	97.6	70	130	
			1400 01 0	o mg/kg	51.0	10	100	
	coverable Mercury by FIMS (QCLot: 3381853)							
ES1407306-012	PARCEL 13 LOT 458 TP19	EG035T: Mercury	7439-97-6	5 mg/kg	99.0	70	130	
EP068A: Organocl	nlorine Pesticides (OC) (QCLot: 3378345)							
ES1407420-003	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	102	70	130	
		EP068: Heptachlor	76-44-8	0.5 mg/kg	104	70	130	
		EP068: Aldrin	309-00-2	0.5 mg/kg	107	70	130	
		EP068: Dieldrin	60-57-1	0.5 mg/kg	103	70	130	
		EP068: Endrin	72-20-8	2 mg/kg	104	70	130	
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	84.3	70	130	
EP068B: Organop	nosphorus Pesticides (OP) (QCLot: 3378345)							
ES1407420-003	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	101	70	130	
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	78.9	70	130	
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	106	70	130	
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	71.3	70	130	
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	82.4	70	130	
EP075(SIM)B: Poly	nuclear Aromatic Hydrocarbons (QCLot: 3378351)			1			
ES1407306-004	PARCEL 13 LOT 460 TP4	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	92.4	70	130	
201407300-004		EP075(SIM): Acenaphinene EP075(SIM): Pyrene	129-00-0	10 mg/kg	97.2	70	130	
			120 00 0	is ingrig	51.2		100	
	etroleum Hydrocarbons (QCLot: 3377659)						1.5	
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: C6 - C9 Fraction		32.5 mg/kg	84.1	70	130	
EP080/071: Total F	etroleum Hydrocarbons (QCLot: 3378350)							
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: C10 - C14 Fraction		640 mg/kg	90.8	73	137	
		EP071: C15 - C28 Fraction		3140 mg/kg	101	53	131	

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Work Order	: ES1407306
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION



Sub-Matrix: SOIL				Matrix Spike (MS) Report				
				Spike	SpikeRecovery(%)	Recovery I	imits (%)	
aboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
EP080/071: Total F	Petroleum Hydrocarbons (QCLot: 3378350) - conti	nued						
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: C29 - C36 Fraction		2860 mg/kg	97.2	52	132	
EP080/071: Total F	Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3	377659)						
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	80.9	70	130	
EP080/071: Total F	Recoverable Hydrocarbons - NEPM 2013 (QCLot: 3	378350)						
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: >C10 - C16 Fraction	>C10_C16	850 mg/kg	112	73	137	
		EP071: >C16 - C34 Fraction		4800 mg/kg	98.9	53	131	
		EP071: >C34 - C40 Fraction		2400 mg/kg	82.0	52	132	
EP080: BTEXN (Q	QCLot: 3377659)							
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: Benzene	71-43-2	2.5 mg/kg	72.1	70	130	
		EP080: Toluene	108-88-3	2.5 mg/kg	72.2	70	130	
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	75.2	70	130	
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	74.1	70	130	
			106-42-3					
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	76.0	70	130	
		EP080: Naphthalene	91-20-3	2.5 mg/kg	70.7	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.

ub-Matrix: SOIL					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
				Spike	Spike Red	covery (%)	Recovery	Limits (%)	RPI	Ds (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP080/071: Total P	Petroleum Hydrocarbons (QCLot: :	3377659)								
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: C6 - C9 Fraction		32.5 mg/kg	84.1		70	130		
EP080/071: Total F	Recoverable Hydrocarbons - NEPN	2013 (QCLot: 3377659)								
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	80.9		70	130		
EP080: BTEXN (Q	CLot: 3377659)									
ES1407306-004	PARCEL 13 LOT 460 TP4	EP080: Benzene	71-43-2	2.5 mg/kg	72.1		70	130		
		EP080: Toluene	108-88-3	2.5 mg/kg	72.2		70	130		
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	75.2		70	130		
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	74.1		70	130		
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	76.0		70	130		
		EP080: Naphthalene	91-20-3	2.5 mg/kg	70.7		70	130		
EP068A: Organocl	hlorine Pesticides (OC) (QCLot: 33	378345)								
ES1407420-003	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	102		70	130		



Sub-Matrix: SOIL					Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report					
				Spike	Spike Re	Recovery (%) Recovery		Limits (%)	RP	'Ds (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EP068A: Organoch	Norine Pesticides (OC) (QCLot: 3	3378345) - continued								
ES1407420-003	Anonymous	EP068: Heptachlor	76-44-8	0.5 mg/kg	104		70	130		
		EP068: Aldrin	309-00-2	0.5 mg/kg	107		70	130		
		EP068: Dieldrin	60-57-1	0.5 mg/kg	103		70	130		
		EP068: Endrin	72-20-8	2 mg/kg	104		70	130		
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	84.3		70	130		
EP068B: Organoph	nosphorus Pesticides (OP) (QCL	ot: 3378345)								
ES1407420-003 An	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	101		70	130		
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	78.9		70	130		
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	106		70	130		
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	71.3		70	130		
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	82.4		70	130		
EP080/071: Total P	etroleum Hydrocarbons (QCLot:	: 3378350)								
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: C10 - C14 Fraction		640 mg/kg	90.8		73	137		
		EP071: C15 - C28 Fraction		3140 mg/kg	101		53	131		
		EP071: C29 - C36 Fraction		2860 mg/kg	97.2		52	132		
FP080/071: Total R	ecoverable Hydrocarbons - NEPI	M 2013 (QCI of: 3378350)								
ES1407306-004	PARCEL 13 LOT 460 TP4	EP071: >C10 - C16 Fraction	>C10 C16	850 mg/kg	112		73	137		
		EP071: >C16 - C34 Fraction		4800 mg/kg	98.9		53	131		
		EP071: >C34 - C40 Fraction		2400 mg/kg	82.0		52	132		
EP075(SIM)B. Poly	nuclear Aromatic Hydrocarbons			0.0						_
ES1407306-004	PARCEL 13 LOT 460 TP4	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	92.4		70	130		
201407000 004		EP075(SIM): Acenaphinene EP075(SIM): Pyrene	129-00-0	10 mg/kg	97.2		70	130		
			120 00 0	. ogg	02					
EG0051: Total Meta ES1407266-001	als by ICP-AES (QCLot: 3381850)	-	7440-38-2	E0 malka	97.3		70	130		
ES1407200-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg 50 mg/kg	97.3		70	130		
		EG005T: Cadmium	7440-43-9	50 mg/kg	90.3		70	130		
		EG005T: Chromium	7440-47-3	125 mg/kg	106		70	130		
		EG005T: Copper EG005T: Lead	7440-30-8	125 mg/kg	95.1		70	130		
		EG0051: Lead EG005T: Nickel	7439-92-1	50 mg/kg	86.4		70	130		
		EG005T: Zinc	7440-66-6	125 mg/kg	93.8		70	130		
				120 mg/ng	00.0		10	100		
EG0351: Total Rec ES1407266-001	coverable Mercury by FIMS (QCL		7439-97-6	5 ma/ka	97.6		70	130		
	Anonymous	EG035T: Mercury	7439-97-0	5 mg/kg	97.0		70	130		
	als by ICP-AES (QCLot: 3381852)									
ES1407306-012	PARCEL 13 LOT 458 TP19	EG005T: Arsenic	7440-38-2	50 mg/kg	100		70	130		
		EG005T: Cadmium	7440-43-9	50 mg/kg	103		70	130		
		EG005T: Chromium	7440-47-3	50 mg/kg	106		70	130		
		EG005T: Copper	7440-50-8	125 mg/kg	102		70	130		
		EG005T: Lead	7439-92-1	125 mg/kg	104		70	130		

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Work Order	: ES1407306
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION



Sub-Matrix: SOIL			Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report							
				Spike	Spike Rec	overy (%)	Recovery	Limits (%)	RPL	Ds (%)
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
EG005T: Total Meta	Is by ICP-AES (QCLot: 3381852) - contir									
ES1407306-012	PARCEL 13 LOT 458 TP19	EG005T: Nickel	7440-02-0	50 mg/kg	97.9		70	130		
		EG005T: Zinc	7440-66-6	125 mg/kg	83.9		70	130		
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3381853)										
ES1407306-012	PARCEL 13 LOT 458 TP19	EG035T: Mercury	7439-97-6	5 mg/kg	99.0		70	130		



INTERPRETIVE QUALITY CONTROL REPORT								
Work Order	: ES1407306	Page	: 1 of 7					
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney					
Contact	: MR STEVE CADMAN	Contact	: Client Services					
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164					
E-mail	: scadman@environcorp.com	E-mail	: sydney@alsglobal.com					
Felephone	: +61 02 49344354	Telephone	: +61-2-8784 8555					
Facsimile	: +61 02 49344359	Facsimile	: +61-2-8784 8500					
Project Site	: HYDRO BUFFER ZONE INVESTIGATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement					
C-O-C number	:	Date Samples Received	: 03-APR-2014					
Sampler	: K.WOODS/S.CADMAN	Issue Date	: 15-APR-2014					
Order number	: AS130348							
		No. of samples received	: 48					
Quote number	: SY/433/13	No. of samples analysed	: 12					

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

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Analysis Holding Time Compliance

Matrix: SOII

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 <u>VOC in soils</u> 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 <u>or</u> Vinyl Chloride and Styrene are not key analytes of interest/concern.

Evaluation: * = Holding time breach ; \checkmark = Within holding time.

Matrix: SOIL			-		Evaluation	: × = Holding time	breach ; 🗸 = Withir	n holding tim
Method		Sample Date	Sample Date Extraction / Preparation				Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content								
Soil Glass Jar - Unpreserved (EA055-103)								
PARCEL 13 LOT 458 TP16,	PARCEL 13 LOT 458 QA2,	01-APR-2014				07-APR-2014	15-APR-2014	✓
PARCEL 13 LOT 458 TP19,	PARCEL 13 LOT 458 TP230							
Soil Glass Jar - Unpreserved (EA055-103)								
PARCEL 12 LOT 11 TP45		02-APR-2014				07-APR-2014	16-APR-2014	 ✓
Soil Glass Jar - Unpreserved (EA055-103)								
PARCEL 12 LOT 10 TP50,	PARCEL 12 LOT 10 QA1	03-APR-2014				07-APR-2014	17-APR-2014	✓
Soil Glass Jar - Unpreserved (EA055-103)								
PARCEL 13 LOT 460 TP4,	PARCEL 13 LOT 460 TP8,	31-MAR-2014				07-APR-2014	14-APR-2014	✓
PARCEL 13 LOT 459 TP11,	PARCEL 13 LOT 459 QA1,							
PARCEL 13 LOT 459 TP12								
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T)								
PARCEL 13 LOT 458 TP16,	PARCEL 13 LOT 458 QA2,	01-APR-2014	09-APR-2014	28-SEP-2014	1	09-APR-2014	28-SEP-2014	✓
PARCEL 13 LOT 458 TP19,	PARCEL 13 LOT 458 TP230							
Soil Glass Jar - Unpreserved (EG005T)								
PARCEL 12 LOT 10 TP50,	PARCEL 12 LOT 10 QA1	03-APR-2014	09-APR-2014	30-SEP-2014	✓	09-APR-2014	30-SEP-2014	✓
Soil Glass Jar - Unpreserved (EG005T)								
PARCEL 13 LOT 460 TP4,	PARCEL 13 LOT 460 TP8,	31-MAR-2014	09-APR-2014	27-SEP-2014	-	09-APR-2014	27-SEP-2014	✓
PARCEL 13 LOT 459 TP11,	PARCEL 13 LOT 459 QA1,							
PARCEL 13 LOT 459 TP12								
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T)								
PARCEL 13 LOT 458 TP16,	PARCEL 13 LOT 458 QA2,	01-APR-2014	09-APR-2014	29-APR-2014	1	10-APR-2014	29-APR-2014	✓
PARCEL 13 LOT 458 TP19,	PARCEL 13 LOT 458 TP230							
Soil Glass Jar - Unpreserved (EG035T)								
PARCEL 12 LOT 10 TP50,	PARCEL 12 LOT 10 QA1	03-APR-2014	09-APR-2014	01-MAY-2014	✓	10-APR-2014	01-MAY-2014	✓
Soil Glass Jar - Unpreserved (EG035T)								
PARCEL 13 LOT 460 TP4,	PARCEL 13 LOT 460 TP8,	31-MAR-2014	09-APR-2014	28-APR-2014	1	10-APR-2014	28-APR-2014	✓
PARCEL 13 LOT 459 TP11,	PARCEL 13 LOT 459 QA1,							
PARCEL 13 LOT 459 TP12								

Page	: 3 of 7
Work Order	: ES1407306
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION



Matrix: SOIL					Evaluation	: × = Holding time	breach ; 🗸 = Within	n holding time
Method		Sample Date	Sample Date Extraction / Preparation					
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP068A: Organochlorine Pesticides (OC)								
Soil Glass Jar - Unpreserved (EP068) PARCEL 13 LOT 458 TP16, PARCEL 13 LOT 458 TP230	PARCEL 13 LOT 458 QA2,	01-APR-2014	07-APR-2014	15-APR-2014	~	08-APR-2014	17-MAY-2014	~
Soil Glass Jar - Unpreserved (EP068) PARCEL 13 LOT 460 TP4, PARCEL 13 LOT 459 QA1,	PARCEL 13 LOT 459 TP11, PARCEL 13 LOT 459 TP12	31-MAR-2014	07-APR-2014	14-APR-2014	~	08-APR-2014	17-MAY-2014	~
EP068B: Organophosphorus Pesticides (OP)								
Soil Glass Jar - Unpreserved (EP068) PARCEL 13 LOT 458 TP16, PARCEL 13 LOT 458 TP230	PARCEL 13 LOT 458 QA2,	01-APR-2014	07-APR-2014	15-APR-2014	~	08-APR-2014	17-MAY-2014	~
Soil Glass Jar - Unpreserved (EP068) PARCEL 13 LOT 460 TP4, PARCEL 13 LOT 459 QA1,	PARCEL 13 LOT 459 TP11, PARCEL 13 LOT 459 TP12	31-MAR-2014	07-APR-2014	14-APR-2014	~	08-APR-2014	17-MAY-2014	~
EP080/071: Total Recoverable Hydrocarbons - N	EPM 2013							
Soil Glass Jar - Unpreserved (EP071) PARCEL 13 LOT 458 TP16, PARCEL 13 LOT 458 TP230	PARCEL 13 LOT 458 QA2,	01-APR-2014	07-APR-2014	15-APR-2014	1	08-APR-2014	17-MAY-2014	~
Soil Glass Jar - Unpreserved (EP071) PARCEL 12 LOT 11 TP45		02-APR-2014	07-APR-2014	16-APR-2014	1	08-APR-2014	17-MAY-2014	~
Soil Glass Jar - Unpreserved (EP071) PARCEL 12 LOT 10 TP50,	PARCEL 12 LOT 10 QA1	03-APR-2014	07-APR-2014	17-APR-2014	1	08-APR-2014	17-MAY-2014	✓
Soil Glass Jar - Unpreserved (EP071) PARCEL 13 LOT 460 TP4, PARCEL 13 LOT 459 QA1,	PARCEL 13 LOT 459 TP11, PARCEL 13 LOT 459 TP12	31-MAR-2014	07-APR-2014	14-APR-2014	1	08-APR-2014	17-MAY-2014	1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbo	ns							
Soil Glass Jar - Unpreserved (EP075(SIM)) PARCEL 13 LOT 458 TP16, PARCEL 13 LOT 458 TP230	PARCEL 13 LOT 458 QA2,	01-APR-2014	07-APR-2014	15-APR-2014	~	08-APR-2014	17-MAY-2014	~
Soil Glass Jar - Unpreserved (EP075(SIM)) PARCEL 12 LOT 11 TP45		02-APR-2014	07-APR-2014	16-APR-2014	1	08-APR-2014	17-MAY-2014	~
Soil Glass Jar - Unpreserved (EP075(SIM)) PARCEL 12 LOT 10 TP50,	PARCEL 12 LOT 10 QA1	03-APR-2014	07-APR-2014	17-APR-2014	1	08-APR-2014	17-MAY-2014	1
Soil Glass Jar - Unpreserved (EP075(SIM)) PARCEL 13 LOT 460 TP4, PARCEL 13 LOT 459 QA1.	PARCEL 13 LOT 459 TP11, PARCEL 13 LOT 459 TP12	31-MAR-2014	07-APR-2014	14-APR-2014	1	08-APR-2014	17-MAY-2014	~

Page	: 4 of 7
Work Order	: ES1407306
Client	: ENVIRON AUSTRALIA PTY LTD
Project	: HYDRO BUFFER ZONE INVESTIGATION



Matrix: SOIL					Evaluation	: × = Holding time	breach ; ✓ = Withir	holding time
Method	Sample Date Extraction			traction / Preparation				
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN								
Soil Glass Jar - Unpreserved (EP080) PARCEL 13 LOT 458 TP16,	PARCEL 13 LOT 458 QA2,	01-APR-2014	07-APR-2014	15-APR-2014	~	08-APR-2014	15-APR-2014	~
PARCEL 13 LOT 458 TP230								
Soil Glass Jar - Unpreserved (EP080) PARCEL 12 LOT 11 TP45		02-APR-2014	07-APR-2014	16-APR-2014	1	08-APR-2014	16-APR-2014	~
Soil Glass Jar - Unpreserved (EP080) PARCEL 12 LOT 10 TP50,	PARCEL 12 LOT 10 QA1	03-APR-2014	07-APR-2014	17-APR-2014	~	08-APR-2014	17-APR-2014	1
Soil Glass Jar - Unpreserved (EP080) PARCEL 13 LOT 460 TP4, PARCEL 13 LOT 459 QA1,	PARCEL 13 LOT 459 TP11, PARCEL 13 LOT 459 TP12	31-MAR-2014	07-APR-2014	14-APR-2014	~	08-APR-2014	14-APR-2014	~
EP080/071: Total Recoverable Hydrocarbons - N	IEPM 2013							
Soil Glass Jar - Unpreserved (EP080) PARCEL 13 LOT 458 TP16, PARCEL 13 LOT 458 TP230	PARCEL 13 LOT 458 QA2,	01-APR-2014	07-APR-2014	15-APR-2014	~	08-APR-2014	15-APR-2014	~
Soil Glass Jar - Unpreserved (EP080) PARCEL 12 LOT 11 TP45		02-APR-2014	07-APR-2014	16-APR-2014	1	08-APR-2014	16-APR-2014	1
Soil Glass Jar - Unpreserved (EP080) PARCEL 12 LOT 10 TP50,	PARCEL 12 LOT 10 QA1	03-APR-2014	07-APR-2014	17-APR-2014	1	08-APR-2014	17-APR-2014	~
Soil Glass Jar - Unpreserved (EP080) PARCEL 13 LOT 460 TP4, PARCEL 13 LOT 459 QA1,	PARCEL 13 LOT 459 TP11, PARCEL 13 LOT 459 TP12	31-MAR-2014	07-APR-2014	14-APR-2014	~	08-APR-2014	14-APR-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.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	00	Reaular	Actual	Expected	Evaluation	
aboratory Duplicates (DUP)							
Moisture Content	EA055-103	4	40	10.0	10.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PAH/Phenols (SIM)	EP075(SIM)	2	18	11.1	10.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	2	18	11.1	10.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fotal Mercury by FIMS	EG035T	4	34	11.8	10.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	4	34	11.8	10.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	2	20	10.0	10.0	~	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PH Volatiles/BTEX	EP080	2	19	10.5	10.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
aboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	5.6	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	18	5.6	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	34	5.9	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fotal Metals by ICP-AES	EG005T	2	34	5.9	5.0	~	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	20	5.0	5.0	~	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	5.3	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	5.6	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	18	5.6	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fotal Mercury by FIMS	EG035T	2	34	5.9	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	34	5.9	5.0	~	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
IPH - Semivolatile Fraction	EP071	1	20	5.0	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	5.3	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	5.6	5.0	1	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	18	5.6	5.0	 ✓ 	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Fotal Mercury by FIMS	EG035T	2	34	5.9	5.0	 ✓ 	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	34	5.9	5.0		NEPM 2013 Schedule B(3) and ALS QCS3 requirement
PH - Semivolatile Fraction	EP071	1	20	5.0	5.0		NEPM 2013 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	19	5.3	5.0	1	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).
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Pesticides by GCMS	EP068	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TPH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TPH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 501)
Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids (Option A - Concentrating)	ORG17A	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17B	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial 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.

		5470-2171	5607	,
Fadi Soro		<u> </u>		FADi the
From: Sent: To: Subject:	Jacob Waugh Thursday, 17 April 201 Fadi Soro FW: ES1407306 - ASET	4 4:28 PM 38505 - ALS-Final Repo	ort - 16-4-14	17/4/14 4:45
Fadi,		• .		
Please re-batch this sa	mple (ES1407306-008) as per the b	elow email.		
Thanks.			<u>.</u>	
Sent: Thursday, 17 Ap To: Jacob Waugh	d [mailto:kgreenfield@environcorp ril 2014 2:49 PM 06 - ASET38505 - ALS-Final Repo	-		
Hi Jacob,				
I'd like to request some and CEC.	e additional analysis for Batch ES1	407306 – testing of sa	بې mple Parcel 13 Lot 459) TP12 for pH
Please let me know if t	hat can be arranged.			
Thanks,				
<u></u>				ental Division
			Sy	dney
ENVIRON Australia F Eastpoint Complex 3 50 Glebe Road The	Suite 19B, Level 2 Junction, NSW 2291 02 4962 5888 M: 0407 149 17	6	ES14	k Order 408784
			Telephone :	+ 61-2-8784 8555
From: Kate Woods Sent: Wednesday, 16 / To: Kirsty Greenfield		rt - 16-4-14		
Subject: FW: ES14073 Importance: High	06 - ASET38505 - ALS-Final Repo	11 - 70-4-14		

This just came through - the revised results for asbestos for the hydro sampling I did in April.

From: Jacob Waugh [mailto:Jacob.Waugh@alsglobal.com] Sent: Wednesday, 16 April 2014 1:27 PM To: Kate Woods Subject: FW: ES1407306 - ASET38505 - ALS-Final Report - 16-4-14 Importance: High

Hi Kate,

Youw ould have received the asbestos report for work order ES1407306 this morning but a second amended version has just come through from the subcontracting lab this afternoon. The correct file is attached here in this email.

The charange made on this version is listed in the email below. Sorry for any inconvenience.

Jaco 🗗 Waugh

Laboratory Co-ordinator ALS | Environmental Division

277-289 Woodpark Road Smithfield NSW 2164 Australia

How was your customer experience? Please send us your feedback

Enviro Mail 68 - Sampling and Analysis Implications of the new NEPM - July 2013

Enviro Mail 69 - Testing Requirements of the new NEPM - July 2013

Enviro Mail 70 - Variation of Naphthalene by SVOC and VOC Methods in Water - July 2013

Enviro Mail 71 - Cryptosporidium Infectivity - July 2013

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Winner of the inaugural CARE Award 2011 - Sustainable Technology & Innovation: Reduction in Sample Volumes - Improving quality, safety, efficiency and sustainability in environmental practices



From: Australian Safer Environment and Technology [mailto:aset@bigpond.net.au]
Sent: Wednesday, 16 April 2014 11:58 AM
To: subresults syd
Cc: Jacob Waugh
Subject: ES1407306 - ASET38505 - ALS-Final Report - 16-4-14
Importance: High

Dear Jacob

Please forward this amended report for the report issued late in the afternoon yesterday.

Sample #23 was missing the weights and sorry for any inconvenience caused.

Thanks & regards

Mahen-De-Silva---BSc,-MSc,-Grad-Dip-(Occ-Hyg)------Occupational Hygienist.

AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD



SUITE 710 / 90 GEORGE STREET, HORNSBY NSW 2077 - P.O. BOX 1644 HORNSBY WESTFIELD NS PHONE: (02) 99872183 FAX: (02)99872151 EMAIL: aset@bigpond.net.au



CERTIFICATE OF ANALYSIS									
Work Order	ES1408784	Page	: 1 of 3						
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney						
Contact	: MR STEVE CADMAN	Contact	: Client Services						
Address	: PO BOX 564	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164						
	MAITLAND NSW, AUSTRALIA 2320								
E-mail	: scadman@environcorp.com	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 BUFFER ZONE INVESTIGATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement						
Order number	: AS130348								
C-O-C number	:	Date Samples Received	: 17-APR-2014						
Sampler	: KW/SC	Issue Date	: 30-APR-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

	NATA Accredited Laboratory 825	<i>Signatories</i> This document has been electronically	y signed by the authorized signatories	indicated below. Electronic signing has been					
NATA	Accredited for compliance with ISO/IEC 17025.		carried out in compliance with procedures specified in 21 CFR Part 11.						
		Ashesh Patel	Inorganic Chemist	Sydney Inorganics					
WORLD RECOGNISED		Wisam Marassa	Inorganics Coordinator	Sydney Inorganics					

Address 277-289 Woodpark Road Smithfield NSW Australia 2164 PHONE +61-2-8784 8555 Facsimile +61-2-8784 8500 Environmental Division Sydney ABN 84 009 936 029 Part of the ALS Group An ALS Limited Company



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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)		Clie	ent sample ID	PARCEL 13 LOT 459 TP12	 	
	Cli	ent sampli	ng date / time	01-APR-2014 15:00	 	
Compound	CAS Number	LOR	Unit	ES1408784-001	 	
EA002 : pH (Soils)						
pH Value		0.1	pH Unit	4.9	 	
ED008: Exchangeable Cations						
Exchangeable Calcium		0.1	meq/100g	13.4	 	
Exchangeable Magnesium		0.1	meq/100g	0.7	 	
Exchangeable Potassium		0.1	meq/100g	0.6	 	
Exchangeable Sodium		0.1	meq/100g	<0.1	 	
Cation Exchange Capacity		0.1	meq/100g	14.7	 	



QUALITY CONTROL REPORT

Work Order	: ES1408784	Page	: 1 of 4
Client	ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: scadman@environcorp.com	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 BUFFER ZONE INVESTIGATION	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	:		
C-O-C number	:	Date Samples Received	: 17-APR-2014
Sampler	: KW/SC	Issue Date	: 30-APR-2014
Order number	: AS130348		
		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 Signatories

Laboratory 825 This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out ir compliance with procedures specified in 21 CFR Part 11.

Accredited for	Signatories	Position	Accreditation Category
compliance with ISO/IEC 17025.	Ashesh Patel	Inorganic Chemist	Sydney Inorganics
130/IEC 17023.	Wisam Marassa	Inorganics Coordinator	Sydney Inorganics

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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 I	Duplicate (DUP) Report		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002 : pH (Soils)	(QC Lot: 3404776)								
ES1408528-001	Anonymous	EA002: pH Value		0.1	pH Unit	3.8	3.7	0.0	0% - 20%
ES1408791-001	Anonymous	EA002: pH Value		0.1	pH Unit	3.2	3.6	12.3	0% - 20%
ED008: Exchangeab	ole Cations (QC Lot: 34	403160)							
ES1408782-001	Anonymous	ED008: Exchangeable Calcium		0.1	meq/100g	4.6	4.6	0.0	0% - 20%
		ED008: Exchangeable Magnesium		0.1	meq/100g	0.3	0.2	0.0	0% - 20%
		ED008: Exchangeable Potassium		0.1	meq/100g	<0.1	<0.1	0.0	0% - 20%
		ED008: Exchangeable Sodium		0.1	meq/100g	<0.1	<0.1	0.0	0% - 20%
		ED008: Cation Exchange Capacity		0.1	meq/100g	4.9	4.9	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)	k (MB) Laboratory Control Spike (LCS) Report				
				Report	Spike	Spike Recovery (%)	Recovery	Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High	
ED008: Exchangeable Cations (QCLot: 3403160)									
ED008: Exchangeable Calcium		0.1	meq/100g	<0.1	1 meq/100g	109	90	128	
ED008: Exchangeable Magnesium		0.1	meq/100g	<0.1	1.67 meq/100g	104	86	120	
ED008: Exchangeable Potassium		0.1	meq/100g	<0.1	0.51 meq/100g	120	85	135	
ED008: Exchangeable Sodium		0.1	meq/100g	<0.1	0.87 meq/100g	108	86	128	
ED008: Cation Exchange Capacity		0.1	meq/100g	<0.1					

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.

• No Matrix Spike (MS) Results are required to be reported.

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.

• No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.



Work Order	ES1408784	Page	: 1 of 5
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE CADMAN	Contact	: Client Services
Address	PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	277-289 Woodpark Road Smithfield NSW Australia 2164
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Project Site		QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
C-O-C number	:	Date Samples Received	: 17-APR-2014
Sampler	: KW/SC	Issue Date	: 30-APR-2014
Order number	: AS130348		
		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

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Analysis Holding Time Compliance

Matrix: SOIL

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 <u>VOC in soils</u> 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 <u>or</u> Vinyl Chloride and Styrene are not key analytes of interest/concern.

Evaluation: * = Holding time breach ; \checkmark = Within holding time.

				E valaation.	Thoraing anno		i norang amo
Method	Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved (EA002) PARCEL 13 LOT 459 TP12	01-APR-2014	24-APR-2014	08-APR-2014	*	24-APR-2014	24-APR-2014	✓
ED008: Exchangeable Cations							
Soil Glass Jar - Unpreserved (ED008) PARCEL 13 LOT 459 TP12	01-APR-2014	24-APR-2014	29-APR-2014	1	24-APR-2014	29-APR-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 Co	ntrol frequency n	ot within specification ; \checkmark = Quality Control frequency within specification.
Quality Control Sample Type		Co	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Exchangeable Cations with pre-treatment	ED008	1	3	33.3	10.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	2	20	10.0	10.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Exchangeable Cations with pre-treatment	ED008	1	3	33.3	5.0	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Exchangeable Cations with pre-treatment	ED008	1	3	33.3	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
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Exchangeable Cations with pre-treatment	ED008	SOIL	Rayment & Higginson (1992) Method 15A2. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (2013) Schedule B(3) (Method 301)
Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
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

Matrix: SOII

• 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.

Method	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days	Date analysed	Due for analysis	Days
			overdue			overdue
EA002 : pH (Soils)						
Soil Glass Jar - Unpreserved						
PARCEL 13 LOT 459 TP12	24-APR-2014	08-APR-2014	16			

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 F QA/QC Assessment

APPENDIX F

DATA QUALITY OBJECTIVES

To ensure that reliable data of adequate type was collected and assessed for the investigation, the seven-step Data Quality Objective (DQO) approach, endorsed in the 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 conditions at Parcel 13.

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

Step 1 – State the Problem

Based on the information available from the Phase 1 ESA, uses of Parcel 13 include rural residential landuse, including poultry farming, from the 1970s to the present day. These uses of Parcel 13 require confirmation via a site walkover. In addition, the potential for fluoride in surface soils from dust deposition from the Hydro smelter requires assessment.

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

The following decisions are to be made from this study:

- Are the current and former uses of Parcel 13 consistent with site observations?
- Has Parcel 13 been impacted by fluoride from dust deposition from the Hydro smelter?
- Has Parcel 13 been impacted by other contaminants?
- Is Parcel 13 suitable for low rural residential landuse?

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

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

- A site walkover, including collection of field notes and photographs;
- Results of surface soil samples collected for fluoride analysis;
- Results of other soil samples from fill/ hummocky ground collected for suitable analysis during the site walkover;
- 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 Parcel 13, as shown on Figure 1.

Vertical boundaries – as areas of concern at Parcel 13 are restricted to surface soils, the vertical boundary of the study is the top 200mm unless subsurface contamination issues are identified during the site walkover.

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

Constraints within the study boundaries – This investigation does not require investigation of subsurface soils or groundwater.

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 site conceptual model and assessing the suitability of Parcel 13 for low rural residential landuse, then an assessment of the suitability of Parcel 13 for low rural residential landuse will be made;
- If it is determined that the data generated through this investigation is not suitable, comprehensive or reliable for use in producing a site conceptual model, then further investigations may be recommended prior to the development of a site conceptual model and assessment of the suitability of Parcel 13 for low rural residential landuse.

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

Acceptable limits on decision errors 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 minimized by:

- Completion of a QA/QC assessment of the investigation data to assess if the data satisfies the DQIs;
- Assessment of whether appropriate sampling and analytical densities were completed for the purpose of the investigation; and
- Ensuring that the criteria set for the investigation were appropriate for the proposed use of Parcel 13.

Minimization of the potential for significant decision errors limits the potential that a conclusive statement may be incorrect.

Step 7 – Optimisation of the Design of Collection of Data

The collection of data was optimized by the completion of a Phase 1 ESA, data gap review and development of a sampling strategy. Attainment of the DQOs has been assessed by reference to the DQIs, presented below.

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-compliances with acceptance limits are to be documented and discussed in the report. The DQIs are presented in Table A.

DQI	Field	Laboratory	Acceptability Limits
	All critical locations sampled	All critical samples analysed and all	As per NEPM (2013)
	All samples collected	analytes analysed according to	
	Experienced sampler	Standard Operating Procedures	
S	Documentation correct	(SOPs)	
Completeness		Appropriate Practical Quantitation	
ster		Limits (PQLs)	
ple		Sample documentation complete	
ω		Sample holding times complied	
0		with	
	Experienced sampler	Same analytical methods used	As per NEPM (2013)
>	In the event of multiple sampling	Same PQLs	
oilit [.]	events:	Same units	
rak	Same types of samples collected	Same primary and secondary	
Comparability	Same sampling methodologies	laboratories	
μο	used		
0	Climatic conditions		
e e	Appropriate media sampled	All samples analysed according to	
res ver	Relevant media sampled	SOPs	
Represe ntativene ss			
шсо			
	Collection of duplicate samples	Analysis of:	
	Sampling methodologies	Blind duplicate samples at rate of 1	RPD of 30 to 50%
ion	appropriate and complied with	in 10 samples	
Precision		Split duplicate samples at rate of 1	RPD of 30 to 50%
^o re		in 20 samples	
-		Laboratory duplicate samples	RPD of 30 to 50%
	Sampling methodologies	Analysis of:	
	appropriate and complied with.	Method blanks	Non-detect
		Matrix spikes	70 to 130%
acy		Surrogate spikes	70-130%
Accuracy		Laboratory control samples	70 to 130%
ACC		Reagent blanks	
`		Reference material	

AS130348

QUALITY ASSURANCE AND QUALITY CONTROL

A quality assurance assessment for this report is presented in Table A and B 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.

Table A: QA/QC – Sampling and Analysis Methodology Assessment						
Sampling Methodology	ENVIRON Assessment					
Sampling Pattern and Locations	Surface soil sampling was undertaken on a grid pattern across the site to assess the impact of particulate fallout from Hydro Aluminium Smelter.					
	Sampling of fill material was completed on a targeted basis.					
Sampling Density	Six soil samples were collected from a grid across the entire site which is approximately 20 ha. The purpose of the sampling was to assess for impacts from smelter particulate fallout and therefore is considered suitable in density and spatial layout.					
	Twenty six representative soil samples were collected from test pits that encountered fill. Given the homogeneous nature of the fill and its limited vertical distribution, this sampling density is considered adequate.					
Sample depths	Surface soil samples were collected from a grid across the entire site from surface soils.					
	Fill soil samples were collected from within 2.7m of the ground surface, which constitutes the maximum depth of fill.					
Sample Collection Method	Surface soil samples across Parcel 13 were collected directly from the ground surface using using dedicated disposable gloves and a hand trowel. The hand trowel was brushed clean prior to sample collection. Soil samples were collected into laboratory supplied, acid rinsed glass jars.					
	Fill soil samples were collected from the centre of the back hoe bucket using dedicated disposable gloves. Soil samples were collected into laboratory supplied, acid rinsed glass jars.					
Decontamination Procedures	Surface soil samples across Parcel 13 were collected directly from the ground surface using using dedicated disposable gloves and a hand trowel. The hand trowel was brushed clean prior to sample collection.					
	As fill soil samples were collected from the centre of the back hoe bucket, decontamination of the back hoe was not required.					
Sample handling and containers	All soil samples were placed into laboratory-supplied paper bags. 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	Field screening for volatiles was not completed during soil					

Table A: QA/QC – Sampling and Analysis Methodology Assessment	
Sampling Methodology	ENVIRON Assessment
screening protocols	sampling as volatile contaminants were not the main chemical of concern.
Calibration of field equipment	Field equipment requiring calibration was hired from a rental company who calibrated the equipment prior to hire.
Sampling Logs	The lithology of surface soil samples was documented on the field information sheets, which are included in Appendix C.

Table B: QA/QC – Field and Lab Quality Assurance and Quality Control	
Field and Lab QA/QC	ENVIRON Comments
Field quality control samples	Three intra-laboratory duplicate soil sample was collected at Parcel 13 during the fill soil sampling, with duplicates collected at a rate of one per 10 primary samples. No rinsate blank samples were collected.
Field quality control results	The Relative Percent Differences (RPDs) between the primary and duplicate pair were less than 50% for all analytes.
NATA registered laboratory and NATA endorsed methods	ALS was used as the primary laboratory. ALS laboratory certificates are NATA stamped and the lab is 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 all soil analytes were below Parcel 13 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 and that the data is of suitable quality to meet the project objectives.

Appendix G

Hazardous Materials Audit



Hazardous Materials Audit Parcel 13

Prepared for: Hydro Aluminium Kurri Kurri Pty Limited

> Prepared by: ENVIRON Australia Pty Ltd

> > Date: August 2014

Project Number: AS130348


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Document File Name	Date Issued	Version	Author	Reviewer
Parcel 13 Draft Hazardous	15 August 2014	Draft 1	S Taylor	F Robinson
Materials Audit				

VERSION CONTROL RECORD

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Figure 1: Parcel 13

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Appendix B:	Hazardous Materials Register
Appendix C:	Laboratory Certificates

Acronyms and Abbreviations

- ACM: Asbestos containing material
- EMP: Employment Parcel
- LBP: Lead based paint
- PCB: Polychlorinated biphenyl compounds
- SMF: Synthetic mineral fibre

1 Introduction

ENVIRON Australia Pty Ltd (ENVIRON) was engaged by Hydro Aluminium Kurri Kurri Pty Ltd (Hydro) to undertake a hazardous materials audit of the buildings located within Parcel 13, within the buffer zone of the former Hydro Aluminium smelter at Kurri Kurri, NSW.

1.1 Objectives and Scope of Work

The survey was undertaken in order for Hydro Aluminium to effectively manage its compliance obligations with respect to asbestos containing materials (ACM), and to identify and manage risks associated with other hazardous materials potentially present in the buildings to an acceptable level.

Hazardous materials other than ACM were polychlorinated biphenyl compounds (PCB), synthetic mineral fibre (SMF), and lead based paint (LBP).

1.2 Legislative Requirements, Standards and Codes of Practice

In NSW, management of asbestos is governed by the following principal legislation and guidance documents:

- Workplace Health and Safety Regulation 2011 (Part 8)
- Code of Practice for the Management and Control of Asbestos in Workplace (NOHSC, 2005a).
- NOHSC Code of Practice for the Safe Removal of Asbestos 2nd Edition (NOHSC, 2005b).

The following codes of practice and standards apply to the other hazardous materials:

- National Code of Practice for the Safe Use of Synthetic Mineral Fibres (NOHSC, 1990).
- Identification Of PCB-Containing Capacitors (ANZECC, 1997).
- Australian Standard AS4361.2 Guide to Lead Paint Management Residential and Commercial Buildings.

1.3 Survey Methodology

The hazardous materials survey was undertaken of structures within Parcel 13.

The survey methodology involved the following:

- An inspection of the accessible sections of the outside and inside of all buildings, as well as any accessible power boxes on power poles within the properties.
- Wherever possible, confirmation of the presence or absence of asbestos in a material was via identification in the field.
- Where the presence or absence of asbestos could not be determined in the field, a sample was taken for laboratory analysis.
- The age of the building and the condition of any fluorescent lights was observed and the likelihood for them to contain PCB noted.
- Visual confirmation of SMF.
- The age of the building and the condition of the paint was observed and the likelihood of lead-based paint being present noted.

1.4 Survey Limitations

Any restrictions or limitations on the survey, such as access not gained to areas or areas not accessible due to safety restrictions, are outlined in Section 2.2 of this report. The reader is also referred to ENIVRON's limitations in Appendix Section 6.

2 Surveys Details

2.1 Buildings Descriptions

The hazardous materials survey was undertaken on 11 November 2013, 10 June 2014 and 16 June 2014 by ENVIRON Senior Environmental Scientist Shaun Taylor.

Table 1 describes the following:

- The building type (such as residential home, shed, garage).
- Main construction materials used in construction of the building.
- An estimate as to whether the structure was build prior to 1990 (1990 is commonly regarded as a 'cut-off date' for asbestos in construction materials. It is also a good indicator as to the likelihood of PCBs being used in fluorescent lighting capacitors).
- Any areas not accessible within the building.

A total of 14 buildings within six properties were inspected for hazardous materials.

2.2 Survey Methodology

The methodology undertaken for the survey is described as follows.

Develop Project OHS Plan, and Survey Protocol and Survey Templates

A Health and Safety Plan was developed for the contamination and hazardous materials investigations within the buffer zone in advance of the works commencing and endorsed internally.

A hazardous materials protocol and data collection template specific to the project was developed, to ensure a consistent approach to the surveys and data collection.

Project Scheduling and Communications

Tenants' contact details were provided by Hydro and a scheduled date for the survey agreed to between ENVIRON and the tenant. Each tenant was notified of the survey program and process by Hydro (via the real estate agent) in advance. Prior to the scheduled date, ENVIRON contacted the tenant to confirm the date, arrival time, and any likely access issues or restricted areas.

Conduct Hazardous Materials Survey

The survey included a thorough visual inspection of all accessible areas of the buildings and structures, and collection of representative samples for the purpose of analytical confirmation where materials could not be visually identified.

As the majority of houses were inhabited by tenants, some areas (such as the ceiling cavity) were inaccessible due to the location of furniture and appliances. For this reason sampling of some material was also not appropriate as it would require disturbance of material that was not damaged.

Data Collection

Survey data collected included the type, form, location, extent/ quantity, condition and accessibility of ACM and synthetic mineral fibre products, the likely presence of PCB in fluorescent light fittings, and the likely presence of LBP. Photographs were also taken of the observed potential/ confirmed hazardous materials.

In addition, any other observations of concern (such as potential for contamination in the surrounding area) were documented.

Sample Analysis

Any asbestos sample analysis was undertaken using polarised light microscopy, in conjunction with dispersion staining techniques. Where possible, the presence of asbestos (but not the type of asbestos) was confirmed in the field.

SMF and PCB were visually identified during the surveys. The presence of lead in paint was assumed based on the likely age of the building and the condition of painted surfaces.

Areas not Accessed

During the audit, all areas of the buildings and structures within the area which were both readily accessible and safe to access were inspected. Where access was not available to areas which could potentially hazardous materials, the locations and the reasons inaccessibility were noted. Any areas not accessed are documented within Table 1.

Other Observations

In addition to the survey of structures within the property, the surveyor also noted potential issues of concern, such as:

- Evidence of subsurface hazardous materials (such as ACM service conduits).
- Evidence of hazardous material fragments/ waste in soils or elsewhere within the property.
- Other potential issues of concern (such as possible soil contamination).

2.3 Sample Collection and Laboratory Analysis

During the survey one sample was collected and analysed for the presence of asbestos (all forms) at a NATA accredited asbestos identification facility. The results of the analysis is summarised in Section 3, with the supporting laboratory analytical certificate contained in Appendix C.

The remaining ACM were confirmed through visual confirmation of the presence of asbestos (but not the type of asbestos) in the field.

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Property	Building Type/s	Main Construction Materials	Estimated Pre or Post 1990 construction	Any Inaccessible Areas
		Parcel 13		
8 Bowditch Avenue	House	Cement sheeting Corrugated iron Timber Brick Concrete	Pre-1990	Ceiling and wall cavities
	Garage	Cement sheeting Corrugated iron Timber Concrete	Pre-1990	Ceiling and wall cavities
	Shed	Cement sheeting Corrugated iron Timber Concrete	Pre-1990	Ceiling and wall cavities
10 Bowditch Avenue	Shed	Corrugated iron Timber Concrete Metal	Pre-1990	N/A
12 Bowditch Avenue	House	Cement sheeting Roof tiles Timber Brick Concrete	Pre-1990	Ceiling and wall cavities
	Garage	Cement sheeting Corrugated iron Timber Brick Concrete	Pre-1990	Inside garage

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Property	Building Type/s	Main Construction Materials	Estimated Pre or Post 1990 construction	Any Inaccessible Areas
		Parcel 13		
14 Bowditch Avenue	House	Timber Brick Concrete Cement sheeting Roof tiles Plasterboard	Pre-1990	Ceiling and wall cavities
	Shed	Timber Brick Concrete	Pre-1990	N/A
16 Bowditch Avenue	House	Cement sheeting Corrugated iron Brick and concrete Plasterboard	Pre-1990	Ceiling and wall cavities
	Shed	Cement sheeting Corrugated iron Timber Concrete	Pre-1990	Inside shed
18 Bowditch Avenue	Chicken sheds (x2)	Cement sheeting Corrugated iron	Pre-1990	Shed interiors (sheds were stocked)
	House	Cement sheeting Cement sheeting panels (hardplank) Corrugated iron Brick and concrete Plasterboard	Pre-1990	Ceiling and wall cavities
	Doghouse	Cement sheeting Corrugated iron Timber	Pre-1990	N/A

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Table 1: Hazardous Materials Audit Building Details					
Property	Building Type/s	Main Construction Materials	Estimated Pre or Post 1990 construction	Any Inaccessible Areas	
Parcel 13					
	Open garage/ carport	Corrugated iron Timber	Pre-1990	N/A	

3 Findings

3.1 Hazardous Materials Register

The results of the survey are presented in Appendix B.

The following provides a summary of the hazardous materials identified. Representative photographs of the identified hazardous materials are provided in Appendix A.

3.2 Asbestos Containing Materials

Asbestos cement sheeting was found in the following locations:

- 8 Bowditch Avenue: ACM sheeting was used throughout the exterior and interior of the house and garage on the property: in the majority of internal walls and ceilings of the house; and to all the external walls and eaves.
- 12 Bowditch Avenue: ACM sheeting was used in the exterior and interior of the house and garage on the property: in some of the internal walls and ceilings of the house; and to the external walls and eaves.
- 14 Bowditch Avenue: ACM sheeting was used in the exterior and interior of the house on the property: in some of the internal walls and the kitchen ceiling of the house; and to the exterior of the downer windows on the first floor.
- 16 Bowditch Avenue: ACM sheeting was used in the exterior and interior of the house and garage on the property: in some of the internal walls and ceilings of the house; and to the external walls and eaves.
- 18 Bowditch Avenue: ACM sheeting was used throughout the exterior and interior of the house and chicken sheds on the property: in some of the internal walls and ceilings of the house; the external walls and eaves of the house; and the exterior walls of the chicken sheds.

Four samples was collected for laboratory analysis. Three were taken at t18 Bowditch Avenue: one from a doghouse (no asbestos was detected); one from the southern chicken shed (asbestos detected), and the exterior wall panels to the house (asbestos detected). One sample was taken at 16 Bowditch Avenue: from the walls and ceiling to the enclosed back verandah (asbestos detected). The laboratory certificates are presented in Appendix C.

3.3 Synthetic Mineral Fibre Materials

No SMF were observed. However, the ceiling and wall cavities of the houses and some garages could not be accessed, and there is potential that SMF was used as insulation in these spaces.

3.4 Polychlorinated Biphenyls

Due to the age of the buildings and likely age of the light fittings, there is potential that the fluorescent lights observed in the structures within Parcel 13 have capacitors that contain PCBs.

3.5 Lead Based Paint

- The vast majority of the exterior paints (which could potentially be LBP) were applied to ACM. Therefore:
 - In the event that the building is to be demolished, these materials would be managed in accordance with Section 4.1.2 as asbestos containing materials. These management procedures are considered appropriate for LBP.
 - If the building is to be retained and surfaces repainted, no abrasion (mechanical or manual) should be applied to these surfaces. This is required to avoid both the generation of airborne asbestos fibres and potentially lead bearing particles.
- Abrasion should not be used on any of the remaining paint on non-asbestos containing material surfaces to avoid the potential generation of lead bearing particles without previously testing to confirm that LBP are absent.
- In the event that the building is demolished, the PPE to be worn when managing ACM and SMF would appropriately protect demolition personnel from LBP.

3.6 Other Observations

In addition to the hazardous materials observed in the buildings within the parcel, the following potential issues of concern were also identified:

- Drums and other wastes were located in the west of 18 Bowditch Avenue.
- In addition to the filling undertaken to facilitate construction of the chicken sheds, there were hummocks that appeared to be from fill or buried materials at locations within 18 Bowditch Avenue.

4 **Recommendations**

The following are general management measures to be implemented for hazardous materials management, either in the event that the building is to be retained and occupied, or the building is to be demolished.

4.1 Asbestos Containing Materials

4.1.1 Building Maintenance/ Retention

- The majority of ACM do not pose a health risk provided they are not subjected to damage or inappropriate alteration. However some of the ACM identified pose a health risk due to their poor condition and location. This includes the exterior wall linings of the chicken sheds at 18 Bowditch Avenue; and much of the ACM sheeting at 8 Bowditch Avenue
- Damaged ACM should be removed and replaced. Where damage is minor (such as minor cracks, drilled holes or worn edges to sections of the walls and ceilings within the former dairy shed and to laundry walls to the house) any cracks should be sealed with a PVA glue and painted (no sanding of materials prior to painting) as a temporary measure. However it is recommended that a program for removal of these materials also be developed and implemented.
- A copy of the asbestos and hazardous materials register is to be kept at the Hydro Aluminium Smelter and made available to employees or contractors undertaking work on the buildings.
- No sanding, blasting, drilling, or similar abrasive activity is to be undertaken on any identified ACMs.
- The National Code of Practice for the Management and Control of Asbestos in Workplaces recommends, and the Work Health and Safety Regulation 2011 requires, labelling of any identified ACM in the workplace where practicable.

While such labelling is not required in a rental property under the regulation (and notification of tenants on the presence of asbestos is not required by the NSW Department of Fair Trading), Hydro should consider labelling the ACM.

- If installed, periodically reinspect asbestos warning labels so that they are legible and in good condition.
- In the event that any of the ACM is damaged while the buildings are still occupied by tenants, the material should be immediately removed.
- As the chicken sheds are a workplace, Hydro should advise the tenants of 18 Bowditch Avenue of the presence of ACM, particularly those in locations where it is easily accessible and more likely to be damaged or impacted (such as the walls) or has already been damaged (such as the upper panels to the side of walls of the chicken sheds). They would then be required to manage the asbestos in accordance with the Work Health and Safety Regulation 2011.

4.1.2 Building Demolition

- If demolition or refurbishment works are to be undertaken, samples should be taken for analysis of those materials noted as "assumed" as ACM in the register (refer to Section 2.2 as to why some materials were not sampled). Areas that were inaccessible should also be examined to confirm if any ACM is present.
- If necessary due to demolition or refurbishment works, remove identified ACMs under controlled condition using an appropriately licensed removal contractor.
- Any asbestos work is carried out in accordance with the Code of Practice for the Management and Control of Asbestos in the Workplace [NOHSC: 2018 (2005)].
- Ensure appropriately licenced removalists are used for any planned removal, and that any removal works are undertaken in accordance with the NOHSC Code of Practice for the Safe Removal of Asbestos 2nd Edition [NOHSC:2002(2005)].

4.2 Synthetic Mineral Fibre Materials

- Apply caution when entering ceiling voids and ensure contractors or persons entering ceiling voids or performing work on synthetic mineral fibre materials wear appropriate PPE, particularly if they have breathing disorders such as asthma.
- Remove any SMF debris as part of routine site housekeeping.
- Ensure contractors or persons performing work on SMF materials adhere to the guidelines outlined in the National Code of Practice for Synthetic Mineral Fibres [NOHSC 1004 (1990)], May 1990; and the Industry code of Practice for the Safe Use of Glass Wool and Rock Wool Insulation Products, April, 2003.

4.3 Polychlorinated Biphenyls

- Undamaged capacitors (containing PCBs) are unlikely to pose a health risk. Therefore they are unlikely to pose a risk if they remain in-situ.
- In the event that the light fittings are to be removed, and it is confirmed that the capacitors contain PCBs, the requirements of the *Identification Of PCB-Containing Capacitors* should be implemented for removal, temporary storage, transportation and disposal.

4.4 Lead Based Paint

- The majority of the exterior paints (which are the most likely to be LBP) were applied to ACM. Therefore:
 - In the event that the building is to be demolished, these materials would be managed in accordance with Section 4.1.2 as asbestos containing materials.
 - If the building is to be retained and surfaces repainted, no abrasion (mechanical or manual) should be applied to these surfaces. This is required to avoid both the generation of airborne asbestos fibres and potentially lead bearing particles.
- Abrasion should not be used on any of the remaining paint on non-asbestos containing material surfaces to avoid the potential generation of lead bearing particles without previously testing to confirm that LBP are absent.

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 In the event that the building is demolished, the PPE to be worn when managing ACM and SMF would be appropriately protect demolition personnel from LBP.

5 References

- Australian and New Zealand Council Environment Conservation Council (ANZECC). 1997. "Identification Of PCB-Containing Capacitors".
- National Occupational Health and Safety Council. (NOHSC). 1990. "National Code of Practice for the Safe Use of Synthetic Mineral Fibres".
- National Occupational Health and Safety Council. (NOHSC). 2005a. "Code of Practice for the Management and Control of Asbestos in Workplace.
- National Occupational Health and Safety Council. (NOHSC). 2005b. "Code of Practice for the Safe Removal of Asbestos 2nd Edition".
- Standards Australia. 1998. "AS4361.2 Guide to Lead Paint Management Residential and Commercial Buildings"

6 Limitations

ENVIRON Australia prepared this report in accordance with the scope of work as outlined in our proposal to Hydro Aluminium Kurri Kurri Pty Limited dated 18 September 2013 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 judgement 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.

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

6.1 General Limitations regarding Sampling

It is not always possible to locate all hazardous materials in the course of an inspection, due to factors such as:

- Restrictions on access to internal construction components and other inaccessible parts of structures.
- Restrictions to access due to presence of tenant's belongings.
- The need to avoid damage in occupied buildings, such as when attempting to inspect behind wall panels or under carpets.
- Minimising inconvenience when premises are occupied or are in use whilst an inspection is being conducted.
- The availability of building/plant construction plans.

6.2 User Reliance

This report has been prepared exclusively for Hydro Aluminium Kurri Kurri Pty Ltd and may not be relied upon by any other person or entity without ENVIRON's express written permission.

Figures

Hazardous Materials Audit



Figure 1. Parcel 13

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Appendix A

Photographs



Photo 1: 18 Bowditch Avenue - Example of ACM sheeting on exterior wall lining to the southern chicken shed



Photo 2: 18 Bowditch Avenue - Example of ACM sheeting on exterior wall lining to the southern chicken shed. Note varying sized fragments in the adjacent soils

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Photo 3: 18 Bowditch Avenue - Example of ACM sheeting on exterior wall lining to the northern chicken shed



Photo 4: 18 Bowditch Avenue - Example of ACM sheeting on exterior wall lining to the northern chicken shed



Photo 5: 18 Bowditch Avenue - zelemite electrical backing board



Photo 6: 18 Bowditch Avenue – example of ACM panels to the exterior of the house



Photo 7: 18 Bowditch Avenue - example of ACM sheeting used for eaves to the house



Photo 8: 18 Bowditch Avenue - photo showing the two forms of ACM sheeting within the shower area (separate to bathroom)



Photo 9: 18 Bowditch Avenue - example of ACM sheeting walls in bathroom



Photo 10: 18 Bowditch Avenue - ACM sheeting fragments in space below house floor



Photo 11: 8 Bowditch Avenue - fluorescent light in front room to the house



Photo 12: 8 Bowditch Avenue - Example of AC sheeting lining to wall in front (western) room to the house

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Photo 13: 8 Bowditch Avenue - section of AC sheeting lining to wall and ceiling to bedroom adjacent to the front (western) room of the house



Photo 14: 8 Bowditch Avenue - AC sheeting lining the walls and ceiling to the front (eastern) room of the house



Photo 15: 8 Bowditch Avenue - AC sheeting lining the walls and ceiling to hallway off living room in the house



Photo 16: 8 Bowditch Avenue - AC sheeting lining the walls and ceiling to the living room in the house. Also shown is a fluorescent light that is assumed to have a capacitor containing PCBs

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Photo 17: 8 Bowditch Avenue - AC sheeting (including the floral patterned sections) lining the walls, ceiling and shower partition to the bathroom of the house.



Photo 18: 8 Bowditch Avenue - AC sheeting lining the walls and ceiling to the kitchen of the house.



Photo 19: 8 Bowditch Avenue - AC sheeting lining the walls and ceiling to the back room of the house.



Photo 20: 8 Bowditch Avenue - section of AC sheeting lining the exterior walls to the house



Photo 21: 8 Bowditch Avenue - section of the AC sheeting used in the eaves to the house.



Photo 22: 8 Bowditch Avenue - section of corrugated AC sheeting used as infill panel near the steps to the side entry to the house.



Photo 23: 8 Bowditch Avenue - Section of the AC sheeting lining the walls to the garage.



Photo 24: 8 Bowditch Avenue - Section of the damaged AC sheeting lining the walls to the shed.



Photo 25: 8 Bowditch Avenue - fluorescent light and AC sheeting lining the ceiling in the front (south) room of the shed.



Photo 26: 12 Bowditch Avenue – ACM panels to the exterior walls of the house



Photo 27: 12 Bowditch Avenue – ACM sheeting used in the eaves of all sides to the house



Photo 28: 12 Bowditch Avenue - one of the gable ends to the sides of the house constructed of ACM sheeting.

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Photo 29: 12 Bowditch Avenue – Zelemite backing board to the older power box on the house



Photo 30: 12 Bowditch Avenue – ACM sheeting lining the walls to the toilet room in the rear of the house



Photo 31: 12 Bowditch Avenue – ACM sheeting lining the walls and ceiling to the laundry in the house



Photo 32: 12 Bowditch Avenue – Fluorescent light to the ceiling in the kitchen of the house


Photo 33: 12 Bowditch Avenue – A section of the ACM sheeting lining the exterior of the garage



Photo 34: 12 Bowditch Avenue – Some of the ACM sheeting fragments The large white fragments and many of the smaller white fragments) near the front gate

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Photo 35: 14 Bowditch Avenue – ACM sheeting lining to rear wall of garage to house



Photo 36: 14 Bowditch Avenue –Section of the ACM sheeting lining the walls to the laundry in the house, showing the section in front of the bathroom.

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Photo 37: 14 Bowditch Avenue – Section of the ACM sheeting lining the walls to the laundry in the house



Photo 38: 14 Bowditch Avenue – ACM sheeting to the walls of the ground floor bathroom of the house



Photo 39: 14 Bowditch Avenue – ACM square panels use in false ceiling above the kitchen in the house.



Photo 40: 14 Bowditch Avenue – one of the two fluorescent lights in the first floor living room



Photo 41: 14 Bowditch Avenue – Painted and tiled ACM sheeting lining the walls in the first floor bathroom of the house







Photo 43: 14 Bowditch Avenue – ACM panelling used in the side walls and eaves to first floor dormer windows at the rear of the house



Photo 44: 14 Bowditch Avenue – ACM sheeting lining the underside to the ground floor awning of the house



Photo 45: 14 Bowditch Avenue – ACM square panels (appear to be as use in false ceiling above the kitchen in the house) on the ground in the shed at rear of the house.



Photo 46: 16 Bowditch Avenue – ACM sheeting (blue patterned) in the toilet room of the house



Photo 47: 16 Bowditch Avenue – ACM sheeting lining the walls of the bathroom in the house



Photo 48: 16 Bowditch Avenue – ACM sheeting lining the walls and ceiling of the laundry in the house



Photo 49: 16 Bowditch Avenue – ACM sheeting lining wall and ceiling of enclosed back verandah of the house.



Photo 50: 16 Bowditch Avenue – ACM flat sheeting lining wall (panel above weatherboards) and ceiling of enclosed back verandah of the house. Also showing corrugated ACM sheeting of "weatherboard" appearance.



Photo 51: 16 Bowditch Avenue – ACM sheeting lining wall and ceiling of small room adjacent to enclosed back verandah



Photo 52: 16 Bowditch Avenue – Vinyl floor tiles that are potentially ACM (undamaged and due to location in inhabited house no sample taken) at the front door of the house



Photo 53: 16 Bowditch Avenue – Section of the ACM sheeting used to eaves to all sides of the house



Photo 54: 16 Bowditch Avenue – Corrugated ACM sheeting of "weatherboard" appearance to the exterior walls of the house.



Photo 55: 16 Bowditch Avenue – Corrugated ACM sheeting to the gable ends of the house.



Photo 56: 16 Bowditch Avenue – Zelemite backing board to the power box of the house

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Photo 57: 16 Bowditch Avenue – Flat ACM sheeting to the back door wall of the house.



Photo 58: 16 Bowditch Avenue – ACM sheeting used to the sides and rear walls of the shed/ garage.

Appendix B

Hazardous Materials Register

				Type of Haz								T
Date of Audit	Parcel	Property Address	Building Name/ No.	Mat	Form of Haz Mat	Location	Description/ Condition	Accessibility	Est. Quantity	Photo Ref	Sample No.	Result
11/11/20	13 Parcel 13	18 Bowditch Avenue	Doghouse	ACM	Sheeting	Walls to all sides	Unpainted, major damage	At ground level	30m2	N/A	EMP13-ACM-01	NAD
11/11/20	13 Parcel 13	18 Bowditch Avenue	Chicken Shed (south)	ACM	Sheeting	Exterior side walls (end walls corrugated iron)	Unpainted, major damage, with some fragments on/in the ground near base of wall	At ground level to 2.2m above ground level	300m2	1 and 2	EMP13-ACM-02	ACM
	13 Parcel 13	18 Bowditch Avenue	Chicken Shed (north)	ACM	Sheeting	Exterior side walls (end walls corrugated iron)	Unpainted, some damage	At ground level to 2.2m above ground level	400m2	3 and 4	Field	ACM
	13 Parcel 13	18 Bowditch Avenue	House	ACM	Zelemite	Backing to power board	Minimal damage, except for drilled holes	1.5m above ground level From ground level to approx max 3.5m above ground	0.5m2	5	Field	ACM
	13 Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting (boards)	Panelling to exterior walls to house, all sides	Painted, limited damage	level	150m2	6	EMP13-ACM-03	ACM
11/11/20	13 Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides	Painted, no apparent damage	Approx. max 3.5m above ground level	15m2	7	Assumned	ACM
11/11/20	13 Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to toilet, laundry and shower	Painted, no damage, edges covered; shower section patterned surface	From ground level to approx 3m from floor	50m2	8	Assumed	ACM
11/11/20	13 Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to bathroom	Painted, no damage, edges covered	From ground level to approx 3m from floor, tiled to 1.6m from floor	20m2	9	Assumed	ACM
11/11/20	13 Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	On ground under the house (northeastern section)	Fragments of various sizes	On ground, in floor space approx 0.6m above ground	3m2	10	Assumed	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	РСВ	PCB	Light to front room	Appears to be of appropriate age	3m above ground level	1	11	Potential	РСВ
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	АСМ	Sheeting	Walls and ceiling to front bedroom (western room)	Painted, edge strips	3m above ground level	80m2	12	Assumed	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to adjacent bedroom	Painted, no strips to edges, hole (appeared recent) in one wall	Floor - 3m above ground level	80m2	13	Field	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Eastern front room walls and ceiling (apart above the fireplace)	Painted, no strips to edges	Floor - 3m above ground level	100m2	14	Field	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	PCB	PCB	Light in eastern front room	Appears to be of appropriate age	3m above ground level	1	14	Potential	PCB
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to living room	Painted, no strips to edges, holes in a few locations	Floor - 3m above ground level	100m2	15 and 16	Field	ACM
	14 Parcel 13	8 Bowditch Avenue	House	PCB	PCB	Light in living room	Appears to be of appropriate age	3m above ground level	1	16	Assumed	PCB
							Painted, no strips to edges. Also includes patterned sheet to shower recess					
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to bathroom (except wall adjacent to toilet)	with one wall tiled	Floor - 3m above ground level	40m2	17	Assumed	ACM
	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to kitchern and back room	Painted and wallpaper, edges with strips, paint peeling in areas	Floor - 3m above ground level	120m2	18 and 19	Field	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Exterior walls to all side of house	Painted, some damage	0.5m - 4m above ground level	300m2	20	Field	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides of house (including above back room)	Painted, no damage	4m above ground level	30m2	21	Assumed	ACM
16/05/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting (corrugated)	Adjacent to brick step to side door, infill panel between house and ground	Under house, unpainted	At ground level	3m2	22	Field	ACM
	14 Parcel 13	8 Bowditch Avenue	Garage	ACM	Sheeting	Side walls and gable end to garage	Poor, unpainted, damaged	From ground to 3m above ground level	30m2	23	Field	ACM
			Shed			Exterior walls (including corner moulding) to all sides of the						ACM
	14 Parcel 13	8 Bowditch Avenue	Sned	ACM	Sheeting	and a	Poor, unpainted, damaged	From ground to 3m above ground level	50m2	24	Field	ACM
	14 Parcel 13	8 Bowditch Avenue	Shed	ACM	Sheeting	Ceiling to front (south) room of shed	Painted, minor damage	2.4m above ground level	15m2	25	Assumed	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	Shed	PCB	PCB	Light to front room of the shed	Appears to be of appropriate age	2.4m above ground level	1	25	Potential	РСВ
10/06/20	16 Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting (panels)	Exterior walls to all sides of the house	Painted, minor damage	0.5m - 4m above ground level	240m2	26	Field	ACM
10/06/20	16 Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides including the awning at front of house	Painted, minor damage	4m above ground level	40m2	27	Field	ACM
10/06/20	16 Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Gable ends to sides of the house	Painted, no damage	4 - 6m above ground level	60m2	28	Assumed	ACM
10/06/20	16 Parcel 13	12 Bowditch Avenue	House	ACM	Zelemite	Backing board in the older power box	Fair, drilled holes	1.6m above ground level	1	29	Field	ACM
16/06/20	14 Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Walls to toilet room at rear of house	Painted, minor damage	Floor - 3m above ground level	10m2	30	Assumed	ACM
16/06/20	14 Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to the laundry	Painted, minor damage with edge strips	Floor - 3.2m above ground level	50m2	31	Field	ACM
16/06/20	14 Parcel 13	12 Bowditch Avenue	House	PCB	PCB	Fluorescent lights to kitchen and adjoining room	Appears to be of appropriate age	2.4m above ground level	2	32	Assumed	РСВ
10/06/20	16 Parcel 13	12 Bowditch Avenue	Garage	ACM	Sheeting	Exterior walls to garage (including corner moulding)	Painted but damaged	From ground to 3m above ground level	100m2	33	Field	ACM
16/06/20	14 Parcel 13	12 Bowditch Avenue	Ground near driveway entry	ACM	Sheeting	Fragments at front driveway gate	Fragments of varying sizes	On ground	1	34	Field	ACM
10/06/20	16 Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Back wall of the garage	Unpainted, generally good condition, plastic edge strips, minor damge, hole	Floor - 3m above ground level	30m2	35	Field	ACM
10/06/20	16 Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to laundry (including area in front of bathroom)	Painted, edge strips, undamaged	Floor - 3m above ground level	20m2	36 and 37	Assumed	ACM
	16 Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to downstairs bathroom	Painted or tiled, undamaged	Floor - 3m above ground level	15m2	38	Assumed	ACM
											Field (refer to panels in	
	16 Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	False ceiling to kitchen Fluorescent lighst to 1st floor living room	Square sheets within a frame Appears to be of appropriate age	3m above ground level 3m above ground level	20m2	39	shed) Potential	ACM
20,00,20	16 Parcel 13	14 Bowditch Avenue	House	ACM	PCB	Huorescent light to 1st floor living room	Appears to be of appropriate age Undamaged, tiled to 1.7m from the floor, then painted	Sm above ground level Floor - 3m above ground level	2 10m2	40	Potential	ACM
	16 Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to upstairs ensuite	Undamaged, tiled to 1.7m from the floor, then painted Undamaged, tiled to 1.7m from the floor, then painted	Floor - 3m above ground level	10m2	41	Assumed	ACM
						Exterior side walls and eaves to 1st floor dormer windows to						
10/06/20	16 Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting (panels)	front and rear of the house	Painted, no damage	5 above ground level	10m2	43	Assumed	ACM

				Type of Haz								
Date of Audit	Parcel	Property Address	Building Name/ No.		Form of Haz Mat	Location	Description/ Condition	Accessibility	Est. Quantity	Photo Ref	Sample No.	Result
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Underside to ground floor front awning	Painted with some minor damage	3m above ground level	25m2	44	Assumed	ACM
						3 squares on ground in outer section of back shed, appear the						
10/06/2016	Parcel 13	14 Bowditch Avenue	Shed	ACM	Sheeting	same as those used in kitchen	Poor, damaged	On ground	15m2	45	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls to the toilet	Blue patterned, with edges covered	Floor - 1.8m above ground level	10m2	46	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls to the bathroom	Painted, minor damage	Floor - 2.4m above ground level	20m2	47	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to the laundry	Painted, undamaged	Floor - 3m above ground level	20m2	48	Assumed	ACM
						Walls and ceiling to enclosed back verandah (including panel						
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	above "weatherboard" sheeting)	Painted, undamaged, edge strips	Floor - 3m above ground level	50m2	49 and 50	LP13-ACM-20	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Eastern wall to enclosed back verandah	"Weatherboard" looking corrugated sheeting, painted with minor damage	0.5m - 3.5m above ground level	150m2	50	Field	ACM
						Walls and ceiling to small room adjacent to enclosed back						
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting		Painted, undamaged, edge strips	Floor - 3m above ground level	25m2	51	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	VFT	At front door	Minimal damage	On floor	1m2	52	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides	Painted, undamaged	3m above ground level	30m2	53	Assumed	ACM
10/06/2016		16 Bowditch Avenue	House	ACM	Sheeting		"Weatherboard" looking corrugated sheeting, painted with some damage		150m2	54	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Gable ends to the sides	Corrugated, painted, undamaged	0.5m - 3.5m above ground level	70m2	55	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Zelemite	Backing board to the power box	Fair, drilled holes	1.5m above ground level	1m2	56	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Side wall (around back door) to extension	Minor damage	0.5m - 2.5m above ground level	5m2	57	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	Shed/ Garage	ACM	Sheeting	Side and rear walls	Painted, some damage	Ground - 2.5m above ground level	100m2	58	Field	ACM
10/00/2010	i dicci 13	10 Downlein Avenue	Sincey Garage	ACT.	Sheeting		rance, some camage		100/112	55	T ICIU	- Com
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Glossary of Terms and Abbreviations Used in Registers

The following provides an explanation of terms and abbreviations used in the registers.

Location	The location within the building (e.g bathroom) and the use of the material (e.g. floor covering, soffit lining, pipe lagging)
ACM	Asbestos containing material
Bonded	Refers to ACM with its fibres firmly bound within the host media.
AC sheeting	Asbestos cement sheeting
Condition	Refers to the physical state or condition of the material in accordance with the following:
	Good – material shows no, or very minor damage and/or deterioration
	Fair – material shows signs of minor damage and/or deterioration
	• Poor – material shows sign of significant damaged and/or deterioration or the material is partly or wholly unserviceable for its intended use.
Description	Description of the material identified e.g. vinyl tile, fibre cement sheeting etc.
Friable	ACM that may be crumbled pulverised or reduced to powder by hand pressure.
LBP	Lead based paint:
Result	Refers to result of ACM or LBP analysis.
	• For asbestos, this is the type identified during laboratory analysis. The three main commercial asbestos types found in Australia area: chrysotile (CH-white), amosite (A-brown or grey), and crocidolite (C-blue).
	NAD means no asbestos was detected during laboratory analysis.
	• Materials shown as 'Refer to' have not been sampled but visually appear the same as other material previously sampled.
	• 'Assumed' refers to those materials not sampled (e.g. for safety reasons or restricted access) and which are not similar to previously sampled materials; or refers to paint that is assumed to be LBP due to building age and paint condition.
	• 'Field' means ACM where asbestos fibres identified in field but the type of asbestos no confirmed.
	• 'Potential' refers to fluorescent lights where it is assumed that PCBs are present due to their apparent age.
РСВ	Polychlorinated Biphenyls
Risk	Refers to the level of risk posed by the material based on its condition. friability, accessibility and other factors such as exposure to disturbance. The levels of risk adopted for the survey are Urgent (U), High (H), Medium (M) and low (L) as defined in Appendix C of this report.
SMF	Synthetic mineral fibre
Type of Material	The type of hazardous material (ACM, SMF, PCB or LBP).

Appendix C

Laboratory Certificates

	ALS Laboratory: please tick →	Ph; 0849 0850 E adelacie@ataglobai.com DBRISEAU2 zhys Nerel Safford CD 4053 Ph; 07 9243 7222 E samples bristane@ataglobai.com DGLADSTONE 46 Collemontah Ddive Clinkon (DD 4660 Ph; 07 7271 2600 E; diatatarongataslobai.com (D 4660	@arsgropas.com afford QLD 4053 brisbane@alsglob a@alsglobal.com		DMELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples melbourne@alsglobal.com DMUDGEE 129 Sydney Road Mudgee NSW 2860 Ph: 02 6372 6735 E: mudgee mal@alsglobal.com	om 1	IN OWRA 4/13 Gory Place North Nowra NSW 2541 INOWRA 4/13 Gory Place North Nowra (NSW 2541 Ph. 02 4432 2063 E: norwe@galsglobal.com DPERTH 10 Hod Viay Malaga WA 6000 Ph: 09 3209 765E : samples petth@alsglobal.com Ph: 09 3209 765E : samples petth@alsglobal.com	TO WASVILLE 1.4 i5 Desma Court Boih GLD 4418 GTOWRSVILLE 1.4 i5 Desma Court Boih GLD 418 Ph. 07 4796 0600 E. Isomersville environmental@alsglobal.com DWOLLONGONG 98 Kenny Street Wollongong NSW 2500 Ph. 02 4232 3125 E. wollongong@alsglobal.com Ph. 02 4232 3125 E. wollongong@alsglobal.com
CLIENT: ENVIRON Australia Pty Ltd	tralia Pty Ltd		TURNARO	TURNAROUND REQUIREMENTS :	Standard TAT (List due date):	Jate):		FOR LABORATORY USE ONLY (Circle)
OFFICE: Newcastle			(Standard TAT may be ion e.g Ultra Trace Organics)	ger for some tests	Non Standard or urgent	TAT (List due date):	date):	Custody Seal Intact? Yes
PROJECT: Hydro Alumium Buffer Zone	ium Buffer Zone	PROJECT NO .: AS130348	ALS QUOTE NO .:	TE NO.:			COC SEQUENCE NUMBER (Circle)	Free ice / frozen ice bricks present upon Yes
ORDER NUMBER:	PURCHAS	PURCHASE ORDER NO .:	COUNTRY	COUNTRY OF ORIGIN: Australia			coc: 1 2 3 4 5 6	7 Random Sample Temperature on Receipt:
PROJECT MANAGER: Fiona Robinson	-iona Robinson	CONTACT F	CONTACT PH: 02 4962 5444	444	7		OF: 1 2 3 4 5 6	7 Other comment:
SAMPLER: Shaun Taylor	Y	SAMPLER N	SAMPLER MOBILE: 0408 386 663		RELINQUISHED			RELINQUISHED BY: RECEIVED BY:
COC Emailed to ALS? (YES /	YES / NO)	EDD FORM	EDD FORMAT (or default):	₽ 1 1 1		۱		
Email Reports to (will de	Email Reports to (will default to PM if no other addresses are listed); staylor@environcorp.com	listed): staylor@environcorp.	com	D	TIME	2	\	DATE/TIME: DATE/TIME:
Email Invoice to (will def	Email Invoice to (will default to PM if no other addresses are listed); klewis@environcorp.com	sted): klewis@environcorp.cc	m		0,01 2 121	,	13.3 Mr 10:05	
COMMENTS/SPECIAL H	COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:	F.			-			
ALS USE ONLY	SAMPLE MATRIX: So	SAMPLE DETAILS MATRIX: Solid(S) Water(W)		CONTAINER INFORMATION		NALYSIS RE Where Metais a	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).	es must be listed to attract suite price) Additional Information Dissolved (field filtered bottle required).
								Comments on likely contaminant levels, diutions, or samples requiring specific QC analysis etc.
LABID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES			
						Asbestos		
1	EMP13-ACM-01	4/03/2014 0:00	v	۵		×		
2	EMP13-ACM-02	4/03/2014 0:00	s	Ø		×		7
2	EMP13-ACM-03	4/03/2014 0:00	ø	σ		×		Environmental Division Newcastle
								Work Order
					-			Telephone : + 61 2 4014 0500
					TOTAL			

Approved Date: 27/08/2013



	CERTIFI	CATE OF ANALYSIS	
Work Order	[:] EN1400844	Page	: 1 of 3
Client	ENVIRON	Laboratory	: Environmental Division Newcastle
Contact	: FIONA ROBINSON	Contact	: Peter Keyte
Address	: PO Box 435	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
	THE JUNCTION NSW 2291		
E-mail	: frobinson@environcorp.com	E-mail	: peter.keyte@als.com.au
Felephone	: +61 02 4962 5444	Telephone	: 61-2-4968-9433
acsimile	: +61 02 4962 5888	Facsimile	: +61-2-4968 0349
Project	: AS130348 HYDRO ALUMIUM BUFFER ZONE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	:		
C-O-C number	:	Date Samples Received	: 13-MAR-2014
Sampler	: SHAUN TAYLOR	Issue Date	: 20-MAR-2014
Site	:		
		No. of samples received	: 3
Quote number	: SY/433/13	No. of samples analysed	: 3

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

• Descriptive Results

ΝΑΤΑ	NATA Accredited Laboratory 825 Accredited for compliance with	Signatories This document has been electron carried out in compliance with procedu		signatories indicated below. Electronic signing has b	been
NAIA	ISO/IEC 17025.	Signatories	Position	Accreditation Category	
		Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos	
WORLD RECOGNISED					

Address 5/585 Maitland Road Mayfield West NSW Australia 2304 | PHONE +61 2 4014 2500 | Facsimile +61 2 4968 0349 Environmental Division Newcastle ABN 84 009 936 029 Part of the ALS Group An ALS Limited Company



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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

- EA200 Legend
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Ch' Chrysotile (white asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' Asbestos fibres detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.



Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL)		Clie	ent sample ID	EMP13-ACM-01	EMP13-ACM-02	EMP13-ACM-03	
	Cl	ient sampli	ng date / time	04-MAR-2014 00:00	04-MAR-2014 00:00	04-MAR-2014 00:00	
Compound	CAS Number	LOR	Unit	EN1400844-001	EN1400844-002	EN1400844-003	
EA200: AS 4964 - 2004 Identification o	f Asbestos in bulk	samples					
Asbestos Detected	1332-21-4	0.1	g/kg	No	Yes	Yes	
Asbestos Type	1332-21-4	-		-	Ch + Am	Ch	
Sample weight (dry)		0.01	g	10.8	21.8	16.7	
APPROVED IDENTIFIER:		-		C.OWLER	C.OWLER	C.OWLER	

Analytical Results

Descriptive Results

Sub-Matrix: SOLID

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos	in bulk samples	
EA200: Description	EMP13-ACM-01 - 04-MAR-2014 00:00	Four pieces of organic fibre board approximately 50 x 40 x 4mm
EA200: Description	EMP13-ACM-02 - 04-MAR-2014 00:00	Four pieces of heavily degraded and friable asbestos cement sheeting approximately 50 x 50 x 4mm
EA200: Description	EMP13-ACM-03 - 04-MAR-2014 00:00	Two pieces of bonded asbestos cement sheeting approximately 90 x 25 x 5mm



QUALITY CONTROL REPORT

Work Order	EN1400844	Page	: 1 of 4
Client		Laboratory	: Environmental Division Newcastle
Contact	: FIONA ROBINSON	Contact	: Peter Keyte
Address	: PO Box 435 THE JUNCTION NSW 2291	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: frobinson@environcorp.com	E-mail	: peter.keyte@als.com.au
Telephone	: +61 02 4962 5444	Telephone	: 61-2-4968-9433
Facsimile	: +61 02 4962 5888	Facsimile	: +61-2-4968 0349
Project	: AS130348 HYDRO ALUMIUM BUFFER ZONE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	:		
C-O-C number	:	Date Samples Received	: 13-MAR-2014
Sampler	: SHAUN TAYLOR	Issue Date	: 20-MAR-2014
Order number	:		
		No. of samples received	: 3
Quote number	: SY/433/13	No. of samples analysed	: 3

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



Signatories NATA Accredited

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out ir Laboratory 825 compliance with procedures specified in 21 CFR Part 11.

Accredited for	Signatories	Position	Accreditation Category
compliance with ISO/IEC 17025.	Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos

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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%.

• No Laboratory Duplicate (DUP) Results are required to be reported.



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 Sample (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.

• No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.

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.

• No Matrix Spike (MS) Results are required to be reported.

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.

• No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.



		_	
Work Order	: EN1400844	Page	: 1 of 5
Client	ENVIRON	Laboratory	: Environmental Division Newcastle
Contact	: FIONA ROBINSON	Contact	: Peter Keyte
Address	: PO Box 435	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
	THE JUNCTION NSW 2291		
E-mail	: frobinson@environcorp.com	E-mail	: peter.keyte@als.com.au
Telephone	: +61 02 4962 5444	Telephone	: 61-2-4968-9433
Facsimile	: +61 02 4962 5888	Facsimile	: +61-2-4968 0349
Project	: AS130348 HYDRO ALUMIUM BUFFER ZONE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	:		
C-O-C number	:	Date Samples Received	: 13-MAR-2014
Sampler	: SHAUN TAYLOR	Issue Date	: 20-MAR-2014
Order number	:		
		No. of samples received	: 3
Quote number	: SY/433/13	No. of samples analysed	: 3

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

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Analysis Holding Time Compliance

Matrix: SOII

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 <u>VOC in soils</u> 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.

Evaluation: * = Holding time breach ; \checkmark = Within holding time.

Method Sample Date Extracted Due for extraction / Preparation Date analysed Analysis Evaluation Container / Client Sample ID(s) Date extracted Due for extraction Evaluation Date analysed Due for analysis Evaluation EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples Samp Lock Bag (EA200) O4-MAR-2014 31-AUG-2014 20-MAR-2014 16-SEP-2014						Eralaaton	i ioiaiiig airio		· ···o··ai.··g ai.··o·
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples Snap Lock Bag (EA200)	Method		Sample Date	Ex	traction / Preparation			Analysis	
Snap Lock Bag (EA200)	Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
	EA200: AS 4964 - 2004 Identification of Asbestos in b	ulk samples							
	EMP13-ACM-01,	EMP13-ACM-02,	04-MAR-2014		31-AUG-2014		20-MAR-2014	16-SEP-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:				Evaluation	: × = Quality Co	ntrol frequency no	ot within specification ; \checkmark = Quality Control frequency within specification.
Quality Control Sample Type		Co	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	



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
Asbestos Identification in bulk solids	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples



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.

	CHAIN OF CUSTODY	DACELAIDE 21 Burna Road Pooraka SA 5095 Ph. 08 8359 0860 E: adelaide@alsglobal.com DBRISBANE 2 Byth Street Stafford QLD 4053	Pooraka SA 5095 23alsglobal.com fford QLD 4053		umACNAY 1.6 ratioour road matcay ∪LD 4140 Ph: 07 4944 0177 E: mackay@alsglobal.com □MELBOURNE 2-4 Westall Road Springvale VIC 3171	4740 n le VIC 3171	ONEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph. 02 4968 9433 E. samples.newcastle@alsglobal.com DNOWRA 4/13 Geary Place North Nowra NSW 2541	prook NSW 2304 (alsglobal.com NSW 2541	EXPNEY 277-289 Woodpark Road Smithielo NSW 2164 Ph: 02 8784 8555 E: samples sydney@alsglobal com DOWNSVILLE 14-15 Desma Court Bohle QLD 4318	hithited NSW 2164 alsglobal.com hie QLD 4818
(212)	ALS Laboratory: prease rick 7	Ph: 07 3243 7222 E: samples britbane@alsglobal.com □GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com	orisbane@alsglobal.com ah Drive Clinton QLD 461 @alsglobal.com	80	rn. 03 83-99 9000 E. samples melbourhe@aisglobal DMUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E. mudgee.mai@aisglobal.com	aisglobal.com W 2850 al.com	Ph: 02 4423 2063 E: nowra@aisglooal com ❑PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples,perth@alsglobal.com	n obal.com	PT: U/ 4/90 UOUE: Towneswills environmental@aisgobal.com UWOLLONGONG 99 Kemry Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@aisgobal.com	ental@arcgoba.com illongong NSW 2500 lobal.com
CLIENT: ENVIRON Australia Pty Ltd	stralia Pty Ltd		TURNAROUND		Standard TAT (List due date):	ist due date):			FOR LABORATORY USE ONLY (Circle)	rcle)
OFFICE: Newcastle			(Standard TAT may e.g., Ultra Trace Org	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)		Non Standard or urgent TAT (List due date):	e date):		Custody Seal Intact?	Yes No NA
PROJECT: Hydro Alumium Buffer Zone	mium Buffer Zone	PROJECT NO.: AS130348	ALS QUOTE NO .:				COC SEQUENCE NUMBER (Circle)	(Circle)	Free ice / frozen ice bricks present upon receipt?	Yes No NA
ORDER NUMBER:	PURCHA	PURCHASE ORDER NO.:	COUNTRY OF ORIGIN: Australia	RIGIN: Australia			coc: 1 2 3 4	5 6 7	Random Sample Temperature on Receipt:	ç
PROJECT MANAGER: Fiona Robinson	: Fiona Robinson	CONTACT P	CONTACT PH: 02 4962 5444				OF: 1 2 3 4	5 6 7	Other comment:	
SAMPLER: Shaun Taylor	rlor	SAMPLER M	SAMPLER MOBILE: 0408 386 663		RELINQUISHED BY:		RECEIVED BY:	REL	RELINQUISHED BY:	RECEIVED BY:
COC Emailed to ALS? (YES / NO)	(YES / NO)	EDD FORMA	EDD FORMAT (or default):		Stores	Died	Le C			-
Email Reports to (will (Email Reports to (will default to PM if no other addresses are listed); staylor@environcorp.com	e listed): staylor@environcorp.c	mo	DA	DATE/TIME:		DATE/TIME:	DATI	DATE/TIME:	DATE/TIME:
Email Invoice to (will d	Email Invoice to (will default to PM if no other addresses are listed): klewis@environcorp.com	ilisted): klewis@environcorp.co	ε		18/6/14	Spm	18/1/1/ 1/20	20		
COMMENTS/SPECIAL	COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL	SAL:								
ALS USE ONLY	SAMPI MATRIX: S	SAMPLE DETAILS MATRIX: Solid(S) Water(W)		CONTAINER INFORMATION	WATION	ANALYSIS R Where Metals	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Meals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).	Suite Codes mu		Additional Information
D AB T	D V V V	DATF / TIMF	MATRI	TYPE & PRESERVATIVE					Commer	Comments on likely contaminant levels. dilutions, or samples requiring specific QC analysis etc.
1				(refer to codes below)	BOTTLES					
	LP13-ACM-20		ω	œ	-	9d2A ×				
									Environm	Environmentor
									Ner	Newcastle
									EN1	EN140200
						t i		1000 (C		
							5		Telephone : + 61 2 4014 2500	2 4014 2500
									-	
					TOTAL					
Water Container Codes: V = VOA Vial HCi Preserve Z = Zinc Acetate Preserved	P = Unpreserved Plastic; N = Nitric Preser d; VB = VOA Vial Sodium Bisuphate Preser Bottle: E = EDTA Preserved Bottles: ST = S	ved Plastic; ORC = Nitric Preserved rved; VS = VOA Vial Sulfuric Preser Sterile Bottle: ASS = Plastic Bad for	ORC; SH = Sodium /ed; AV = Airfreight Ui Acid Sulohate Soils: E	Hydroxide/Cd Preserved; S = npreserved Vial SG = Sulfuric I 1 = Unpreserved Bag: LI = Lugo	Sodium Hydroxide Pre Preserved Amber Gla IIs lodine Preserved E	sserved Plastic; AG = / ass; H = HCi preserve bottles: STT = Sterile S	Amber Glass Unpreserved; AP - Airfrei ad Plastic; HS = HCI preserved Specia odium Thiosulfate Preserved Bottles	ht Unpreserved F ion bottle; SP = S	Water Container Codes: P = Unpreserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved Plastic; AG = Amber Glass Unpreserved Plastic; AG = Amber Glass Unpreserved Plastic; AF = Aufricight Unpreserved AI = Nitric Preserved Biolitic AI = Nitric Preserved AI = Nitric Preserved AI = Nitric Preserved Biolitic AI = Nitric Preserved AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Static Biolitic AI = Nitric Preserved Biolitic AI = Static Biolitic AI = Nitric Preserved Biolitic AI = Static Biolitic AI = Nitric Preserved Biolitic AI = Static Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Static Biolitic AI = Nitric Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved Biolitic AI = Nitric Preserved	Preserved Glass;
ENFM (20411)					Forn Page 1 of 1					Approved Date: 27/08/2013



Work Order

Client

-

CERTIFICATE OF ANALYSIS Page : 1 of 3 **ENVIRON AUSTRALIA PTY LTD** Laboratory : Environmental Division Newcastle _

Contact	: FIONA ROBINSON	Contact	: Peter Keyte
Address	: PO BOX 564	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
	MAITLAND NSW, AUSTRALIA 2320		
E-mail	: frobinson@environcorp.com.au	E-mail	: peter.keyte@als.com.au
Telephone	: +61 02 49344354	Telephone	: 61-2-4968-9433
Facsimile	: +61 02 49344359	Facsimile	: +61-2-4968 0349
Project	: AS130348 - HYDRO ALUMIUM BUFFER ZONE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	:		
C-O-C number	:	Date Samples Received	: 18-JUN-2014
Sampler	: SHAUN TAYLOR	Issue Date	: 25-JUN-2014
Site	:		
		No. of samples received	:1
Quote number	: SY/578/14	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:

: EN1402089

- General Comments
- Analytical Results

• Descriptive Results

ΝΑΤΑ	NATA Accredited Laboratory 825 Accredited for compliance with	Signatories This document has been electron carried out in compliance with procedu		signatories indicated below. Electronic signing has b	been
NAIA	ISO/IEC 17025.	Signatories	Position	Accreditation Category	
		Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos	
WORLD RECOGNISED					

Address 5/585 Maitland Road Mayfield West NSW Australia 2304 PHONE +61 2 4014 2500 Facsimile +61 2 4968 0349 Environmental Division Newcastle ABN 84 009 936 029 Part of the ALS Group An ALS Limited Company



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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

- EA200 Legend
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Ch' Chrysotile (white asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' Asbestos fibres detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.



Analytical Results

Sub-Matrix: SOLID (Matrix: SOIL) Client sample ID		LP13-ACM-20	 	 		
	Cli	ient sampli	ng date / time	18-JUN-2014 15:00	 	
Compound	CAS Number	LOR	Unit	EN1402089-001	 	
EA200: AS 4964 - 2004 Identification of A	sbestos in bulk	samples				
Asbestos Detected	1332-21-4	0.1	g/kg	Yes	 	
Asbestos Type	1332-21-4	-		Ch	 	
Sample weight (dry)		0.01	g	0.09	 	
APPROVED IDENTIFIER:		-		C.OWLER	 	

Analytical Results

Descriptive Results

Sub-Matrix: SOLID

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos	in bulk samples	
EA200: Description	LP13-ACM-20 - 18-JUN-2014 15:00	Three small fragments of asbestos fibre board approximately 2 x 2 x 1mm



QUALITY CONTROL REPORT

Work Order	: EN1402089	Page	: 1 of 4
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Newcastle
Contact	: FIONA ROBINSON	Contact	: Peter Keyte
Address	: PO BOX 564 MAITLAND NSW, AUSTRALIA 2320	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: frobinson@environcorp.com.au	E-mail	: peter.keyte@als.com.au
Telephone	: +61 02 49344354	Telephone	61-2-4968-9433
Facsimile	: +61 02 49344359	Facsimile	: +61-2-4968 0349
Project	: AS130348 - HYDRO ALUMIUM BUFFER ZONE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	:		
C-O-C number	:	Date Samples Received	: 18-JUN-2014
Sampler	: SHAUN TAYLOR	Issue Date	: 25-JUN-2014
Order number	:		
		No. of samples received	: 1
Quote number	: SY/578/14	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 Signatories

Laboratory 825 This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out ir compliance with procedures specified in 21 CFR Part 11.

Accredited for	Signatories	Position	Accreditation Category
compliance with ISO/IEC 17025.	Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos

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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%.

• No Laboratory Duplicate (DUP) Results are required to be reported.



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.

• No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.

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.

• No Matrix Spike (MS) Results are required to be reported.

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.

• No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.



INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: EN1402089	Page	: 1 of 5
Client	: ENVIRON AUSTRALIA PTY LTD	Laboratory	: Environmental Division Newcastle
Contact	: FIONA ROBINSON	Contact	: Peter Keyte
Address	: PO BOX 564	Address	5/585 Maitland Road Mayfield West NSW Australia 2304
	MAITLAND NSW, AUSTRALIA 2320		
E-mail	: frobinson@environcorp.com.au	E-mail	: peter.keyte@als.com.au
Telephone	: +61 02 49344354	Telephone	: 61-2-4968-9433
Facsimile	: +61 02 49344359	Facsimile	: +61-2-4968 0349
Project	: AS130348 - HYDRO ALUMIUM BUFFER ZONE	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	:		
C-O-C number	:	Date Samples Received	: 18-JUN-2014
Sampler	: SHAUN TAYLOR	Issue Date	: 25-JUN-2014
Order number	:		
		No. of samples received	:1
Quote number	: SY/578/14	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

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Analysis Holding Time Compliance

Matrix: SOII

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 <u>VOC in soils</u> 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 <u>or</u> Vinyl Chloride and Styrene are not key analytes of interest/concern.

Evaluation: * = Holding time breach ; \checkmark = Within holding time.

				E valaation.	i fording arrie	broadin, a wham	moraling arrio.
Method	Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples							
Snap Lock Bag (EA200)							
LP13-ACM-20	18-JUN-2014		15-DEC-2014		25-JUN-2014	22-DEC-2014	\checkmark



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:				Evaluation	: × = Quality Co	ntrol frequency no	ot within specification ; \checkmark = Quality Control frequency within specification.
Quality Control Sample Type		Со	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	



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
Asbestos Identification in bulk solids	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples



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.

				Type of Haz								T
Date of Audit	Parcel	Property Address	Building Name/ No.	Mat	Form of Haz Mat	Location	Description/ Condition	Accessibility	Est. Quantity	Photo Ref	Sample No.	Result
11/11/20	13 Parcel 13	18 Bowditch Avenue	Doghouse	ACM	Sheeting	Walls to all sides	Unpainted, major damage	At ground level	30m2	N/A	EMP13-ACM-01	NAD
11/11/20	13 Parcel 13	18 Bowditch Avenue	Chicken Shed (south)	ACM	Sheeting	Exterior side walls (end walls corrugated iron)	Unpainted, major damage, with some fragments on/in the ground near base of wall	At ground level to 2.2m above ground level	300m2	1 and 2	EMP13-ACM-02	ACM
	13 Parcel 13	18 Bowditch Avenue	Chicken Shed (north)	ACM	Sheeting	Exterior side walls (end walls corrugated iron)	Unpainted, some damage	At ground level to 2.2m above ground level	400m2	3 and 4	Field	ACM
	13 Parcel 13	18 Bowditch Avenue	House	ACM	Zelemite	Backing to power board	Minimal damage, except for drilled holes	1.5m above ground level From ground level to approx max 3.5m above ground	0.5m2	5	Field	ACM
	13 Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting (boards)	Panelling to exterior walls to house, all sides	Painted, limited damage	level	150m2	6	EMP13-ACM-03	ACM
11/11/20	13 Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides	Painted, no apparent damage	Approx. max 3.5m above ground level	15m2	7	Assumned	ACM
11/11/20	13 Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to toilet, laundry and shower	Painted, no damage, edges covered; shower section patterned surface	From ground level to approx 3m from floor	50m2	8	Assumed	ACM
11/11/20	13 Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to bathroom	Painted, no damage, edges covered	From ground level to approx 3m from floor, tiled to 1.6m from floor	20m2	9	Assumed	ACM
11/11/20	13 Parcel 13	18 Bowditch Avenue	House	ACM	Sheeting	On ground under the house (northeastern section)	Fragments of various sizes	On ground, in floor space approx 0.6m above ground	3m2	10	Assumed	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	РСВ	PCB	Light to front room	Appears to be of appropriate age	3m above ground level	1	11	Potential	РСВ
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	АСМ	Sheeting	Walls and ceiling to front bedroom (western room)	Painted, edge strips	3m above ground level	80m2	12	Assumed	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to adjacent bedroom	Painted, no strips to edges, hole (appeared recent) in one wall	Floor - 3m above ground level	80m2	13	Field	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Eastern front room walls and ceiling (apart above the fireplace)	Painted, no strips to edges	Floor - 3m above ground level	100m2	14	Field	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	PCB	PCB	Light in eastern front room	Appears to be of appropriate age	3m above ground level	1	14	Potential	PCB
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to living room	Painted, no strips to edges, holes in a few locations	Floor - 3m above ground level	100m2	15 and 16	Field	ACM
	14 Parcel 13	8 Bowditch Avenue	House	PCB	PCB	Light in living room	Appears to be of appropriate age	3m above ground level	1	16	Assumed	PCB
							Painted, no strips to edges. Also includes patterned sheet to shower recess					
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to bathroom (except wall adjacent to toilet)	with one wall tiled	Floor - 3m above ground level	40m2	17	Assumed	ACM
	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to kitchern and back room	Painted and wallpaper, edges with strips, paint peeling in areas	Floor - 3m above ground level	120m2	18 and 19	Field	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Exterior walls to all side of house	Painted, some damage	0.5m - 4m above ground level	300m2	20	Field	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides of house (including above back room)	Painted, no damage	4m above ground level	30m2	21	Assumed	ACM
16/05/20	14 Parcel 13	8 Bowditch Avenue	House	ACM	Sheeting (corrugated)	Adjacent to brick step to side door, infill panel between house and ground	Under house, unpainted	At ground level	3m2	22	Field	ACM
	14 Parcel 13	8 Bowditch Avenue	Garage	ACM	Sheeting	Side walls and gable end to garage	Poor, unpainted, damaged	From ground to 3m above ground level	30m2	23	Field	ACM
		8 Bowditch Avenue	Shed	ACM		Exterior walls (including corner moulding) to all sides of the				24	Field .	ACM
	14 Parcel 13	8 Bowditch Avenue	sned	ACM	Sheeting	and a	Poor, unpainted, damaged	From ground to 3m above ground level	50m2	24	Field	ACM
	14 Parcel 13	8 Bowditch Avenue	Shed	ACM	Sheeting	Ceiling to front (south) room of shed	Painted, minor damage	2.4m above ground level	15m2	25	Assumed	ACM
16/06/20	14 Parcel 13	8 Bowditch Avenue	Shed	PCB	PCB	Light to front room of the shed	Appears to be of appropriate age	2.4m above ground level	1	25	Potential	PCB
10/06/20	16 Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting (panels)	Exterior walls to all sides of the house	Painted, minor damage	0.5m - 4m above ground level	240m2	26	Field	ACM
10/06/20	16 Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides including the awning at front of house	Painted, minor damage	4m above ground level	40m2	27	Field	ACM
10/06/20	16 Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Gable ends to sides of the house	Painted, no damage	4 - 6m above ground level	60m2	28	Assumed	ACM
10/06/20	16 Parcel 13	12 Bowditch Avenue	House	ACM	Zelemite	Backing board in the older power box	Fair, drilled holes	1.6m above ground level	1	29	Field	ACM
16/06/20	14 Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Walls to toilet room at rear of house	Painted, minor damage	Floor - 3m above ground level	10m2	30	Assumed	ACM
16/06/20	14 Parcel 13	12 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to the laundry	Painted, minor damage with edge strips	Floor - 3.2m above ground level	50m2	31	Field	ACM
16/06/20	14 Parcel 13	12 Bowditch Avenue	House	PCB	PCB	Fluorescent lights to kitchen and adjoining room	Appears to be of appropriate age	2.4m above ground level	2	32	Assumed	РСВ
10/06/20	16 Parcel 13	12 Bowditch Avenue	Garage	ACM	Sheeting	Exterior walls to garage (including corner moulding)	Painted but damaged	From ground to 3m above ground level	100m2	33	Field	ACM
16/06/20	14 Parcel 13	12 Bowditch Avenue	Ground near driveway entry	ACM	Sheeting	Fragments at front driveway gate	Fragments of varying sizes	On ground	1	34	Field	ACM
10/06/20	16 Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Back wall of the garage	Unpainted, generally good condition, plastic edge strips, minor damge, hole	Floor - 3m above ground level	30m2	35	Field	ACM
10/06/20	16 Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to laundry (including area in front of bathroom)	Painted, edge strips, undamaged	Floor - 3m above ground level	20m2	36 and 37	Assumed	ACM
	16 Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to downstairs bathroom	Painted or tiled, undamaged	Floor - 3m above ground level	15m2	38	Assumed	ACM
											Field (refer to panels in	
	16 Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	False ceiling to kitchen Fluorescent lighst to 1st floor living room	Square sheets within a frame Appears to be of appropriate age	3m above ground level 3m above ground level	20m2	39	shed) Potential	ACM
20,00,20	16 Parcel 13	14 Bowditch Avenue	House	ACM	PCB	Huorescent light to 1st floor living room	Appears to be of appropriate age Undamaged, tiled to 1.7m from the floor, then painted	Sm above ground level Floor - 3m above ground level	2 10m2	40	Potential	ACM
	16 Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Walls to upstairs ensuite	Undamaged, tiled to 1.7m from the floor, then painted Undamaged, tiled to 1.7m from the floor, then painted	Floor - 3m above ground level	10m2	41	Assumed	ACM
						Exterior side walls and eaves to 1st floor dormer windows to						
10/06/20	16 Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting (panels)	front and rear of the house	Painted, no damage	5 above ground level	10m2	43	Assumed	ACM

				Type of Haz								
Date of Audit	Parcel	Property Address	Building Name/ No.		Form of Haz Mat	Location	Description/ Condition	Accessibility	Est. Quantity	Photo Ref	Sample No.	Result
10/06/2016	Parcel 13	14 Bowditch Avenue	House	ACM	Sheeting	Underside to ground floor front awning	Painted with some minor damage	3m above ground level	25m2	44	Assumed	ACM
						3 squares on ground in outer section of back shed, appear the						
10/06/2016	Parcel 13	14 Bowditch Avenue	Shed	ACM	Sheeting	same as those used in kitchen	Poor, damaged	On ground	15m2	45	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls to the toilet	Blue patterned, with edges covered	Floor - 1.8m above ground level	10m2	46	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls to the bathroom	Painted, minor damage	Floor - 2.4m above ground level	20m2	47	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Walls and ceiling to the laundry	Painted, undamaged	Floor - 3m above ground level	20m2	48	Assumed	ACM
						Walls and ceiling to enclosed back verandah (including panel						
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	above "weatherboard" sheeting)	Painted, undamaged, edge strips	Floor - 3m above ground level	50m2	49 and 50	LP13-ACM-20	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Eastern wall to enclosed back verandah	"Weatherboard" looking corrugated sheeting, painted with minor damage	0.5m - 3.5m above ground level	150m2	50	Field	ACM
						Walls and ceiling to small room adjacent to enclosed back						
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	verandah	Painted, undamaged, edge strips	Floor - 3m above ground level	25m2	51	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	VFT	At front door	Minimal damage	On floor	1m2	52	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Eaves to all sides	Painted, undamaged	3m above ground level	30m2	53	Assumed	ACM
10/06/2016		16 Bowditch Avenue	House	ACM	Sheeting	Exterior walls to all sides	"Weatherboard" looking corrugated sheeting, painted with some damage		150m2	54	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Gable ends to the sides	Corrugated, painted, undamaged	0.5m - 3.5m above ground level	70m2	55	Assumed	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Zelemite	Backing board to the power box	Fair, drilled holes	1.5m above ground level	1m2	56	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	House	ACM	Sheeting	Side wall (around back door) to extension	Minor damage	0.5m - 2.5m above ground level	5m2	57	Field	ACM
10/06/2016	Parcel 13	16 Bowditch Avenue	Shed/ Garage	ACM	Sheeting	Side and rear walls	Painted, some damage	Ground - 2.5m above ground level	100m2	58	Field	ACM
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