

Core Project

Proposed Development

498-500 King Street, Newcastle West

Site Contamination Assessment

Report No. RGS01219.1-AF

4 April 2016

REGIONAL
GEOTECHNICAL SOLUTIONS





Manning-Great Lakes

Port Macquarie

Coffs Harbour

RGS01219.1-AF

4 April 2016

Core Project
122a Hannell Street
WICKHAM NSW 2293

Attention: Tom Elliot

Dear Tom

**RE: Site Contamination Assessment
Proposed Development – 498-500 King Street, Newcastle West**

Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a preliminary site contamination assessment at 498-500 King Street, Newcastle West where it is proposed to construct a new combined commercial and residential multistorey structure.

Specifically, the lots covered by this assessment include:

- Lot 1 DP222839,
- Lot 6-7 DP95174,
- Lot 8 DP95173,
- Lot 22 DP738575, and
- Lot A DP161300.

An assessment has also been undertaken on the remaining two lots at the site (Lot 2 DP542059 and Lot 9 DP446798), with the results being presented in a separate RGS report.

Presented herein is a summary of the work undertaken, the findings of the site investigation, and a review of the laboratory test results compared to the NEPM (2013) guidelines. The assessment found no contaminants that exceed the adopted guidelines for commercial or industrial land use.



If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Steven Morton

Principal



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1 INTRODUCTION

Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a preliminary site contamination assessment at 498-500 King Street, Newcastle West where it is proposed to construct a new combined commercial and residential (upper floor units) multistorey structure.

Specifically, the lots covered by this assessment include:

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- Lot 6-7 DP95174,
- Lot 8 DP95173,
- Lot 22 DP738575, and
- Lot A DP161300.

An assessment has also been undertaken on the remaining two lots at the site (Lot 2 DP542059 and Lot 9 DP446798), with the results being presented in a separate RGS report.

Specific details of the proposed development have not yet been provided, however, based on experience with similar sites nearby the new development is likely to be a combined commercial and residential (upper floor units) multistorey structure. The existing structures and hardstands located on the site are to be demolished as part of the development.

The purpose of the preliminary site contamination assessment was to provide discussions and recommendations regarding:

- Identification of Areas of Concern and Chemicals of Concern regarding site contamination;
- Evaluation of the analysis results against industry accepted criteria (NEPM 2013) for the proposed landuse;
- Conclusions regarding the presence of contamination at the site and its potential impacts on the proposed landuse;

The requirement for remediation, further investigation, or ongoing management of site contamination (if encountered).

2 METHODOLOGY

In accordance with the brief, the site was assessed using the following methodology:

- A brief study of site history, with the aim of identifying past activities on or near the site that might have the potential to cause contamination;
- Site walkover to assess visible surface conditions and identify any evidence of contamination, or past activities that may cause contamination;
- Search of the NSW WorkCover Stored Chemical Information and Dangerous Goods License Database and the Environmental Protection Authority (EPA) website for any contamination notices for the site;



- Search of government records of groundwater use in the area;
- Review of previous investigation and assessment reports undertaken by others relating to the existing underground fuel storage tanks on the site;
- Using the above information, characterise the site into Areas of Concern, in which the potential for contamination has been identified, and nominate Chemicals of Concern that might be associated with those activities; and
- Drilling of six boreholes to recover soil samples for subsequent laboratory testing.

3 SITE SETTING & HISTORY

3.1 Site setting

The approximately 9,380m² irregular shaped site is bound by King Street to the southwest, Stewart Avenue to the northwest, existing multistorey commercial developments and Hunter Street to the northeast and by multistorey commercial developments to the southeast.

The site is located within a region characterised by a flat alluvial plain associated with the Hunter River catchment. An aerial photograph from the NSW DPI 'Six Viewer' is reproduced below.



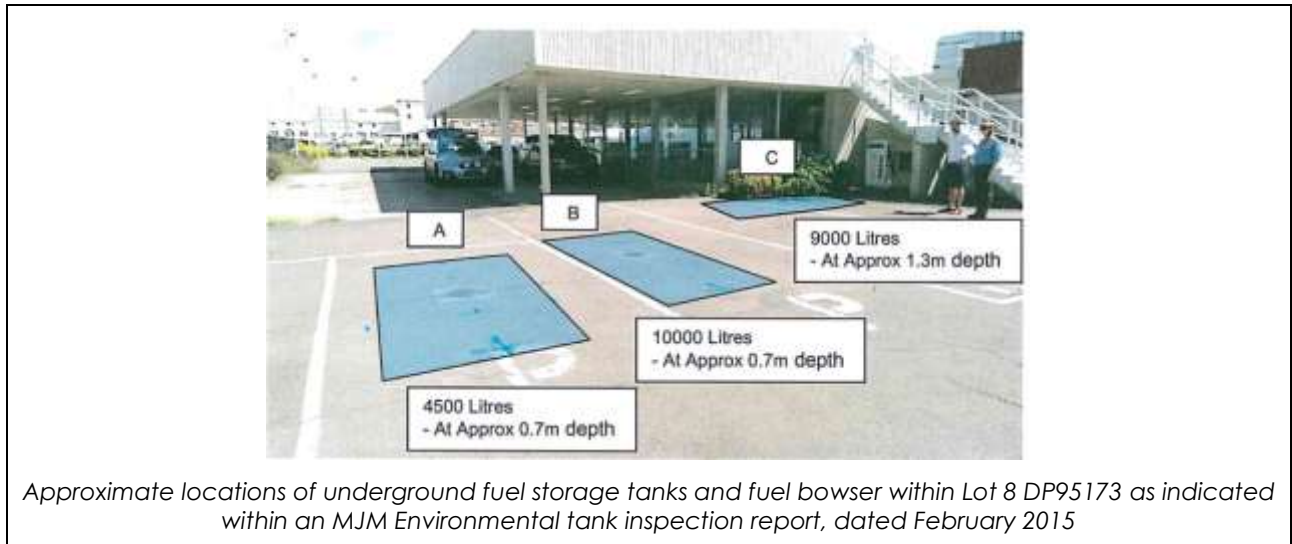
The site location is outlined in red

3.2 Site History

At the time of the assessment the majority of the site (Lot 8 DP95173 and Lot 6-7 DP95174) was occupied by the former Newcastle City Holden dealership. Discussions with long term residents indicates that the site has been occupied by a car dealership since at least the early 1960s. Four



existing underground fuel storage tanks are located within Lot 8 DP95173 with the locations of three of the tanks being illustrated below. Evidence of fourth tank (including a filling valve) was observed in the north of the lot and a patched rectangle of concrete is located about 20m to the south of the tank which may have been a former bowser.



Approximate locations of underground fuel storage tanks and fuel bowser within Lot 8 DP95173 as indicated within an MJM Environmental tank inspection report, dated February 2015

RGS was provided with the following reports relating to the underground tanks:

- MJM Environmental Pty Ltd dated 24 February 2015 *Rhaeto Pty Ltd – Underground Tank Inspection*
- MJM Environmental Pty Ltd Report 142-1323 dated 21 January 2015, *Groundwater Monitoring Report – December 2014*
- MJM Environmental Pty Ltd dated 12 February 2015 *Rhaeto Pty Ltd Proposal - UPSS Site Validation reporting.*

Based on these reports it is apparent that the existing fuel tanks are still in situ on the site. The work undertaken included location of three of the four tanks on site, and installation of three groundwater monitoring wells in the vicinity of the tanks. The results of groundwater sampling and analysis undertaken indicates some elevated heavy metal concentrations in groundwater beneath the site, however, no petroleum hydrocarbon or BTEX compounds were encountered in any of the samples tested, which would normally be expected if contamination due to leakage from underground fuel storage tanks was occurring.

Lot 1 DP222839 in the southeast of the site is currently occupied by a dilapidated weatherboard and brick structure. A plaque on the front of the building indicates that the structure was built in 1910 as an army training facility. The structure has an asbestos roof and a sign on the western side of the building states that there should be no admittance due to the presence of asbestos fibres.



*Army training hall in southeast corner of site with plaque indicating structure was built in 1910.
Note asbestos roof.*

The two lots that front Hunter Street (Lot 22 DP738575 and Lot A DP161300) host ageing single and double storey industrial/commercial structures that based on their condition and style of construction are likely to date back to the 1950s – 1980s.

A check with the NSW Office of Environment and Heritage website (www.environment.nsw.gov.au) revealed that no notices have been issued on the site under the Contaminated Land Management Act (1997).

A search of groundwater bores registered with the Department of Primary Industries Office of Water (<http://allwaterdata.water.nsw.gov.au/water.stm>) indicates that there are 16 groundwater bores within 500m of the site.

3.3 Site Observations

The site is near level with minor slope variations of less than 2°, predominantly comprising a slight slope to the south towards King Street. The site is covered with existing hardstand pavements and buildings, with minor garden beds along the King Street boundary.

The majority of the site was formerly occupied by a car dealership and comprises hardstand pavements and single storey structures. Ageing single and double storey structures and associated car parking cover the remainder of the site.

The eastern end of the site is occupied by the former army training hall building, which is weatherboard clad and has an asbestos roof. A sign on an entrance door on the western side of the building warns of asbestos fibres in the building.

To the north of the army hall is a large shed structure with warning signs on the door warning of flammable liquids. No staining was observed to suggest spillage or leakage of liquids onto the surrounding ground. At the western end of this building there was an empty housing that appeared to be a former compressor housing. It had a concrete slab floor and minor oil staining on the slab surface.



	
<i>Former compressor housing, northwest of former army training hall</i>	<i>Asbestos fibre warning sign on army hall door</i>

The presence of filler caps and breather vents and the condition of the bitumen in the vicinity of the former underground fuel tanks discussed in Section 3.2 indicated the tanks are still in the ground. An additional tank filler point was observed to the north of these tanks, indicating a likely additional tank in that area that had not been covered by previous validation works.

	
<i>Compressor housing and flammable liquid signs to north of army training hall.</i>	<i>Area north of previously identified fuel tanks, where additional fuel tank filler cap was observed (Red arrow).</i>

The remainder of the site comprised sealed parking areas that were in use for vehicle storage at the time of the fieldwork.



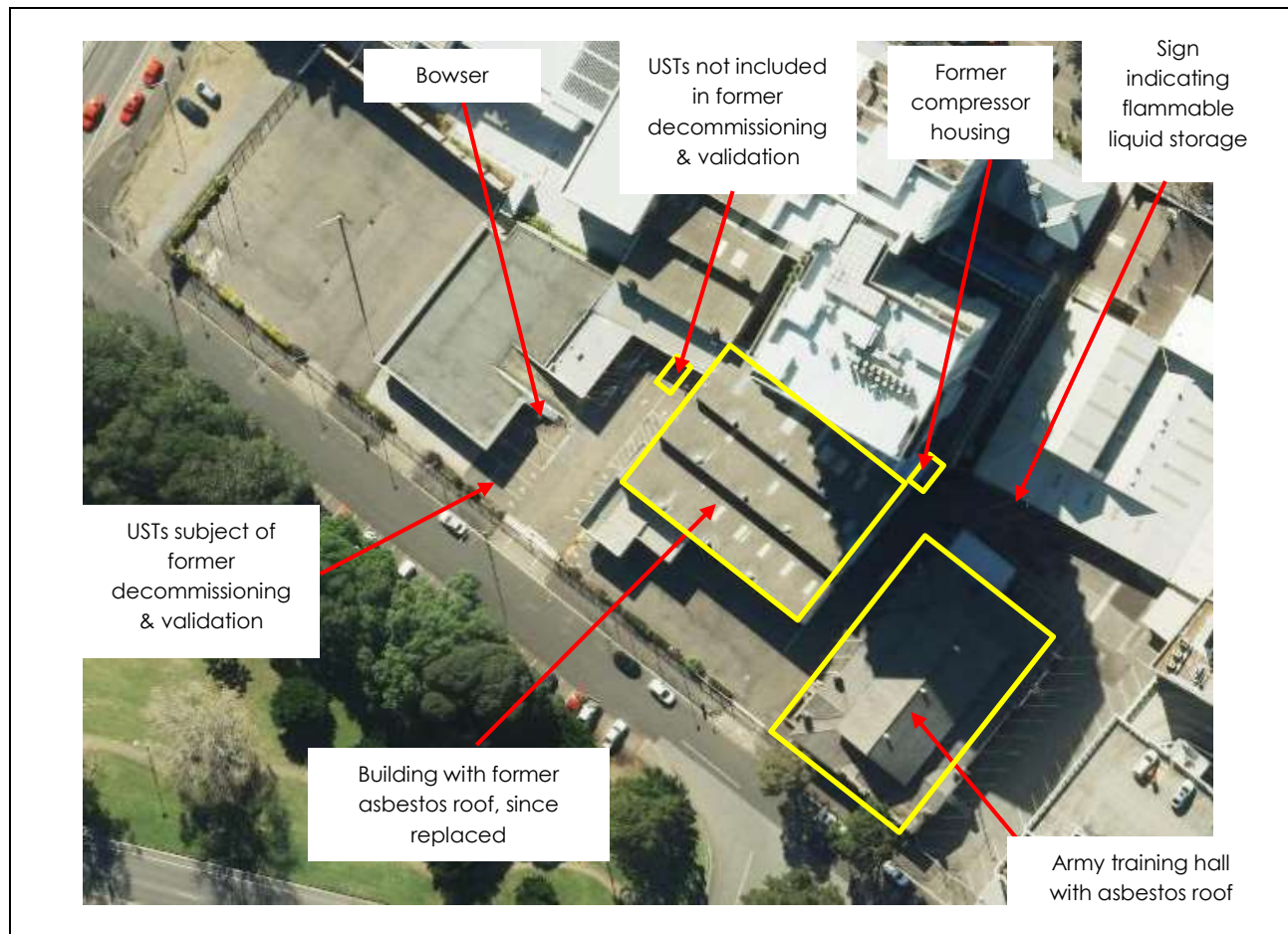
3.4 Areas of Environmental Concern

Based on the site observations and knowledge obtained about site activities as outlined above, potential Areas of Concern and Chemicals of Concern were identified for the assessment as outlined in Table 1.

Table 1: Areas of Concern & Chemicals of Concern

Area of Concern	Mode of Potential Contamination	Chemicals of Concern
Soil around the where signs indicated that flammable products have previously been stored. A small structure is also located to the west of this area that is likely to have been a former compressor shed. Staining is visible in front of the shed. (Sample location BH3)	Leakage of fuels and oil	Pb, TPH, BTEX, PAH
Soil around the location of BH5 which is close to the location of the additional underground storage tanks and fuel bowser	Potential spillage of fuel from fuel lines, tanks or the bowser	Pb, TPH, BTEX, PAH
In and around structure on Lot 6-7 DP95174 the former army training centre	Removal of former asbestos roof on structure on Lots 6-7 DP95174. Damage to existing asbestos roof on former army training centre	Asbestos
Remainder of the site	Leakage of fuels due to the sites former use as a car dealership and parking area	Pb, TPH, BTEX, PAH

The AEC's are shown on the aerial photograph below:



3.5 Subsurface Conditions

The 1:250,000 Geological Series Sheet of Newcastle indicates the site to be underlain by Quaternary marine and freshwater deposits comprising sand, silt, clay and gravel. The 100,000 Newcastle Coalfield Regional Geology Map indicates the Quaternary deposits are in turn underlain by the Lambton Subgroup (comprising the Borehole coal seam) and Waratah Sandstone which form the lower lithologies of the Newcastle Coal Measures.

The boreholes encountered a thin layer of gravelly clay fill overlying sand fill and gravelly sand fill to depths of between 0.5 and 1.6m. The fill overlies very loose to medium dense Aeolian sand to depths of between 3 and 5.4m that overlies marine sand. Groundwater was encountered at between 1.4 and 2.0m depth.

4 SAMPLING & ANALYSIS

4.1 Sample Media

The site history indicated the potential modes of contamination at this site to be:

- Surface spillage or leakage of fuels, oils or similar to the north of the army building;
- Surface spraying of pesticides;



- Importation of contaminants in fill soils;
- Presence of asbestos in soils in the vicinity of the army building or adjacent building to the west (low likelihood due to site being sealed);
- Dumping or scattering of asbestos in near surface soils;
- Leakage of fuels from underground tanks;
- Leakage of fuel or oil from vehicles stored on site.

The groundwater table was encountered at 1.5 to 2.5m below the ground surface in this investigation and the previous geotechnical assessment. There is potential for leakage from the USTs to enter groundwater. It is noted, however, that this has been addressed by others, as evidenced by three groundwater monitoring wells in existence at the time of this investigation and therefore groundwater has not been addressed as part of this Phase 1 assessment. It is recommended that copies of the groundwater monitoring and associated validation of the existing tanks be sought.

The sampling plan was therefore aimed at assessment of contaminants within the soils, with a contingency to investigate potential groundwater impact only if significant soil-borne contamination was encountered.

4.2 Sampling Plan

Based on the identified areas of concern as outlined above, six sampling locations were adopted as shown in Figure 1.

Sampling involved the drilling, logging, and sampling of a borehole at each of the six locations using a 4WD mounted auger rig. Sampling equipment was decontaminated between sample locations and a clean pair of nitrile gloves used for the collection of each sample into laboratory supplied glass sampling jars.

Samples were placed on ice on site and maintained on ice during transport to the testing laboratories. The sampling was carried out in accordance with stringent protocols for decontamination, Quality Control, and sample preservation. Quality Control procedures included taking one duplicate samples to aid in the assessment of data quality.

Sample locations are shown in the photographs below.





Looking northwest at the location of BH3



Looking southwest at the location of BH4



Looking north at the location of BH5



Looking southwest at the location of BH6

4.3 Laboratory Analysis

Nine soil samples taken from the six boreholes (plus one duplicate) were transported under chain-of-custody to ALS, a NATA accredited specialist chemical testing laboratory. The samples were analysed for the following suite of contaminants:

- Total Recoverable Hydrocarbons (TRH)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Pesticides
- Heavy Metals
- Asbestos
- BTEX Compounds

The results are presented in Appendix B.



4.4 Quality Control

Samples were obtained using industry accepted protocols for sample treatment, preservation, and equipment decontamination. One duplicate sample was submitted to the laboratory for analysis as shown below.

- Primary sample (BH1 0.5 – 0.7m) and duplicate sample (BH11 0.5 – 0.7m).

Comparison between the primary and duplicate samples show good correlation (See Table in Appendix B).

In addition to the field QC procedures, the laboratory conducted internal quality control testing including surrogates, blanks, and laboratory duplicate samples. The results are presented with the laboratory test results in Appendix B.

All laboratory quality control data is within acceptable limits for the tests carried out. Therefore, on the basis of the results of the field and laboratory quality control procedures and testing the data is considered to reasonably represent the concentrations of contaminants in the soils at the sample locations at the time of sampling and the results can be adopted for this assessment.

5 SITE CONTAMINATION ASSESSMENT

5.1 Guidelines and Assessment Criteria

The assessment was carried out in accordance with the National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013). The NEPM document provides a range of guidelines for assessment of contaminants for various land uses. It is proposed to construct a combined commercial and residential (upper units) development at the site. As the lower levels are to be used for commercial purposes, the investigation levels for "Commercial/Industrial" land use have been adopted as the primary investigation criteria. In accordance with the NEPM guidelines the following criteria were adopted for this assessment:

- Health Investigation Levels (HILs) for Commercial/Industrial land use were used to assess the potential human health impact of heavy metals and PAH;
- Health Screening Levels (HSLs) for coarse textured (sand or gravel) or fine textured (silt or clay) soils on a Commercial/Industrial site were adopted as appropriate for the soils encountered to assess the potential human health impact of petroleum hydrocarbons and BTEX compounds;
- Ecological Investigation Levels (EILs) for residential land use were used for evaluation of the potential ecological / environmental impact of heavy metals and PAH;
- Ecological Screening Levels (ESLs) for coarse textured (sand or gravel) or fine textured (silt or clay) soils on a Commercial/Industrial site were adopted as appropriate for the soils encountered, to assess the potential ecological / environmental impact of petroleum hydrocarbons and BTEX compounds;



The site is situated in a highly disturbed CBD location, with no sensitive ecological receptors on the site or immediate surrounding area. The nearest receptor off site would be the aquatic ecosystem of Newcastle Harbour located 350m to the northeast of the site. The land between the site and the harbour is highly developed, including the inner city commercial area and heavy rail corridor as well as former industrial port facilities. The site has been sealed for a number of decades and the future development will also result in the site surface being sealed by buildings or paving. Sediment run-off from the site to the harbour waterway is not considered feasible provided construction is undertaken in accordance with good sediment and erosion control practice.

Based on the above the assessment presented herein has been based on health based soil investigation criteria, except in cases where no health based criteria exists. In accordance with NEPM 2013, exceedance of the criteria does not necessarily mean that remediation or clean-up is required, but is a trigger for further assessment of the extent of contamination and associated risks. The adopted criteria are presented in Table 2.

Table 2: Adopted Soil Investigation Criteria (mg/kg)

Analyte	Adopted Soil Investigation Criteria	Analyte	Adopted Soil Investigation Criteria
Benzene	3	Chlordane	530
Toluene	135(1)	Heptachlor	50
Ethyl-benzene	165(1)	Copper	240,000
Xylene	230	Lead	1,500
TPH C6 – C10 (F1)	215(1)	Zinc	400,000
TPH C10 – C16 (F2)	170(1)	Cadmium	900
TPH C16 – C34 (F3)	1,700(1)	Chromium (VI)	3,600
TPH C34 – C40 (F4)	3,300(1)	Arsenic	3,000
Benzo-a-pyrene	40	Nickel	6,000
Phenol	240,000	Mercury	730
DDT+DDE+DDD	3,600	Asbestos	Not Present
Aldrin / Dieldrin	45		

NOTES: Based on ecological screening levels (ESL).

5.2 Test Results

An evaluation of the laboratory test results against the adopted soil assessment criteria as presented in Table 2 is provided in the summary table in Appendix B. The findings are summarised below:

- Results of heavy metal analysis revealed some slightly elevated levels, however, the concentrations were well below the adopted assessment criteria;



- Results of BTEX analysis revealed concentrations below the limit of laboratory detection and hence well below the adopted assessment criteria;
- Results of TRH C6-C10 (F1) analysis revealed concentrations below the limit of laboratory detection and hence well below the adopted assessment criteria;
- Results of TRH C10-C16 (F2) analysis revealed concentrations below the limit of laboratory detection and hence well below the adopted assessment criteria;
- Results of TRH C16-C34 (F3) analysis revealed some slightly elevated levels, however, the concentrations were well below the adopted assessment criteria;
- Results of TRH C34-C40 (F4) analysis revealed some slightly elevated levels, however, the concentrations were well below the adopted assessment criteria;
- Results of PAH analysis revealed some slightly elevated levels, however, the concentrations were well below the adopted health based assessment criteria;
- Results of organochlorine and organophosphorus pesticide analysis recorded values below level of recording for all samples tested; and
- Asbestos was not detected within any of the assessed samples.

It is noted that PAH concentrations at locations BH4, BH5, and BH6 exceeded the ecological assessment criteria, but were well below the health based criteria, which were the criteria adopted for this assessment, except in cases where no health based criteria exists.

5.3 Assessment & Conclusions

For all samples tested, the analyses found that heavy metals, TPH, BTEX, PAH, OC/OP pesticides and the presence of asbestos were either at concentrations below the laboratory detection limits or at concentrations below the adopted assessment criteria for commercial/industrial land use.

Asbestos was not identified in any of the soil samples tested during the investigation. Asbestos will be encountered during demolition of existing structures, however, particularly the former army training centre structure on Lot 1 DP222839. Demolition should be undertaken in accordance with an asbestos management plan prepared and carried out by an appropriately licensed person. After the demolition and removal of the building, some soil sampling within the building footprint should be undertaken to verify that there is no asbestos remaining within the soils underlying the building.

On the basis of the assessment undertaken the material meets the requirements for a Commercial/Industrial site as detailed in the NEPM 2013 guidelines.

6 EXCAVATION & DISPOSAL OF FUEL TANKS & SITE SOILS

6.1 Fuel Tanks and Surrounding Soils

Previous validation of three of the four underground fuel storage tanks was undertaken by MJM Environmental Pty Ltd, with no apparent impact on groundwater encountered in the form of hydrocarbon or BTEX contamination. The soils immediately around the existing underground fuel



storage tanks and associated infrastructure on Lot 8 DP95173 are likely to contain potentially small areas of contamination in the form of TPH, lead and PAH even though the tanks and infrastructure have been previously validated. It is therefore recommended that during the removal of the tanks and excavation of the surrounding soils (if required), the following process be undertaken:

- An experienced environmental consultant be engaged to work with the contractor removing the tanks to develop a site management and validation plan;
- The tank removal is to be undertaken by an appropriately licensed contractor, experienced in the decommissioning and removal of underground fuel storage tanks;
- Excavation and removal of the tanks is to be undertaken in accordance with NSW State Government regulations and Newcastle City Council requirements. The tanks and associated piping are to be removed from the site to an appropriately licensed landfill or recycling facility;
- The process is to be undertaken in the presence of an environmental consultant who will monitor the soils surrounding the tanks for the presence of contamination by visual assessment and screening of soil vapours by Photoionisation Detector. Affected soils should be removed to an appropriate off site location in accordance with the management plan prepared for the work (Step 1 above);
- Soils remaining within the sides and base of the excavation are to be sampled in accordance with industry protocols to confirm that soils remaining on site meet the NEPM 2013 guidelines for the proposed commercial land use. Should results indicate soils remain that exceed these guidelines, additional soil should be excavated until remaining soils meet the guideline limits.

6.2 Virgin Excavated Natural Material (VENM)

The Protection of the Environment Operations Act 1997 (POEO Act) defines virgin excavated natural material (VENM) as 'natural material (such as clay, gravel, sand, soil or rock fines):

- (a) that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities and
- (b) that does not contain any sulfidic ores or soils or any other waste

The existing fill at the site does not meet the requirements for VENM.

As detailed within the acid sulfate soil assessment undertaken by RGS (Report RGS01219.AE), the natural soil at the site at depths of greater than 2m below current levels is considered to be a potential acid sulfate soil and therefore does not meet the requirements for VENM in its natural state.

After neutralising the sulfuric acidity with lime in accordance with the required acid sulfate soil management plan, the natural Aeolian and marine soils at the site may be classified as Virgin Excavated Material (VENM) and may be disposed of accordingly.



6.3 Excavated Natural Material

The soils encountered at the site have been assessed in relation to the 'Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 - The excavated natural material order 2014', with a view of granting an exemption under the 'Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014 - The excavated natural material exemption 2014' to allow the potential re-use of the material for engineering fill or earthworks within the area.

The Excavated Natural Material (ENM) Exemption applies to naturally occurring soil and rock that has:

- a) Been excavated from the ground;
- b) Contains at least 98% (by weight) natural material; and
- c) Does not meet the definition of Virgin Excavated Natural Material (VENM) in the Act.

The boreholes drilled during the investigation indicate that the predominantly sand and gravel fill material contains greater than 2% foreign materials (in the form of concrete, coal and slag). Based on the investigations undertaken to date, the fill material does not meet the requirements for Excavated Natural Material (ENM).

Further more detailed investigations and sampling can be undertaken which may delineate areas of fill that do and do not meet the requirements for ENM.

6.4 Waste Classification

Table 2 of the 'Waste Classification Guidelines (2009)' nominates a suite of analytes to be tested (Column 1) and also provides the maximum specific contaminant concentration for classification without the need for additional toxicity characteristics leaching procedure (TCLP) testing for both general solid waste (Column 2) and restricted solid waste (Column 3) for each analyte.

The results indicate that fill from two locations (BH3 0.3-0.5m and BH5 0.4-0.6m) lead concentrations exceed the 'Maximum values of specific contaminant concentration (SCC) without TCLP testing' for general solid waste but meet the requirements for restricted solid waste. All other analytes tested did not exceed the maximum concentrations for general solid waste.

Without further testing the fill at the site would be classified as Restricted Solid Waste while the underlying natural soils would be classified as General Solid Waste (non-putrescible) in accordance with the 'Waste Classification Guidelines (2009)'.

If the existing fill is to be removed from the site and taken to landfill, the material will likely meet the requirements for General Solid Waste (non-putrescible), however, Toxicity Characteristics Leaching Procedure (TCLP) testing would be required to be undertaken on samples collected from the upper fill profile near BH3 and BH5.



7 LIMITATIONS

The findings presented in the report and used as the basis for recommendations presented herein were obtained using normal, industry accepted geotechnical practises and standards. To our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points. If site conditions encountered during construction vary significantly from those discussed in this report, Regional Geotechnical Solutions Pty Ltd should be contacted for further advice.

This report alone should not be used by contractors as the basis for preparation of tender documents or project estimates. Contractors using this report as a basis for preparation of tender documents should avail themselves of all relevant background information regarding the site before deciding on selection of construction materials and equipment.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Steven Morton

Principal



Figures



	Client:	Core Project Group	Job No.	RGS01219.1
	Project:	Proposed Development	Drawn By:	SK
		498-500 King Street, Newcastle West	Scale:	As Shown
	Title:	Test Location Plan	Date:	23-Mar-16
			Drawing No.	Figure 1



Appendix A

Results of Field Investigations



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH01**

CLIENT: Core Project Group

PAGE: 1 of 1

PROJECT NAME: Commercial Development

JOB NO: RGS01219.1

SITE LOCATION: King Street, Newcastle East

LOGGED BY: GM

TEST LOCATION: Refer to Figure 1

DATE: 14/3/16

DRILL TYPE: 4WD Mounted Drill Rig

EASTING:

SURFACE RL:

BOREHOLE DIAMETER: 100 mm

INCLINATION: 90°

NORTHING:

DATUM:

AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
Auger	Not Encountered	0.50m		0.5		GP	0.05m ASPHALT:	M				FILL
		SP	0.15m FILL: Gravelly CLAY, low plasticity, orange/red, Gravel is medium grained FILL: SAND, Fine to medium grained, dark brown, dark grey, Quartz and some organic matter with some fine to medium grained Gravel									
		E 0.70m					0.80m Hole Terminated at 0.80 m					
				1.0								
				1.5								
				2.0								
				2.5								
				3.0								
				3.5								
				4.0								

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

Moisture Condition

- D Dry
- M Moist
- W Wet
- W_p Plastic Limit
- W_L Liquid Limit

Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense

- Density Index <15%
- Density Index 15 - 35%
- Density Index 35 - 65%
- Density Index 65 - 85%
- Density Index 85 - 100%

CLIENT:	Core Project Group
PROJECT NAME:	Commercial Development
SITE LOCATION:	King Street, Newcastle East
TEST LOCATION:	Refer to Figure 1

PAGE: 1 of 1
JOB NO: RGS01219.1
LOGGED BY: GM
DATE: 14/3/16

DRILL TYPE: 4WD Mounted Drill Rig

EASTING:

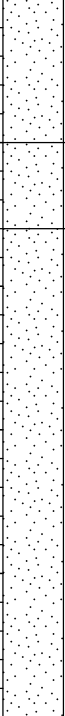
SURFACE RL:

BOREHOLE DIAMETER: 100 mm

INCLINATION: 90°

NORTHING:

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
Auger		0.40m E		0.5		GC SP	0.05m 0.10m ASPHALT: FILL: Gravelly CLAY, low plasticity, orange/red, Gravel is medium grained FILL: SAND, Fine to medium grained, dark grey, traces of gravel, coal, minor slag	M				FILL
		0.50m				SP	0.50m SAND: Fine to medium grained, pale grey Quartzose, minor shell fragments	M				AEOLIAN
		1.40m E 1.50m		1.5		SP	1.00m SAND: Fine to medium grained, dark brown, trace organic cementation, Quartzose	M				
				2.0		SP	1.30m SAND: Fine to medium grained, pale yellow, pale orange, Quartzose, trace shell fragments	M - W				
				3.0			3.00m Hole Terminated at 3.00 m					
				3.5								
				4.0								

LEGEND:

Water

-  Water Level
 (Date and time shown)
-  Water Inflow
-  Water Outflow

Strata Changes

- — Gradational or transitional strata
— Definitive or distinct strata change

Notes, Samples and Tests

- | | |
|-----------------|-----------------------------|
| U ₅₀ | 50mm Diameter tube sample |
| CBR | Bulk sample for CBR testing |
| E | Environmental sample |
| ASS | Acid Sulfate Soil Sample |
| B | Bulk Sample |

Field Tests

- | | |
|----------|---|
| PID | Photoionisation detector reading (ppm) |
| DCP(x-y) | Dynamic penetrometer test (test depth interval shown) |
| HP | Hand Penetrometer test (UCS kPa) |

Consistency

- | | |
|-----|------------|
| VS | Very Soft |
| S | Soft |
| F | Firm |
| St | Stiff |
| VSt | Very Stiff |
| H | Hard |
| Fb | Friable |

UCS (kPa)

- <25
25 - 50
50 - 100
100 - 200
200 - 400
>400

Moisture Condition

- | | |
|-------|---------------|
| D | Dry |
| M | Moist |
| W | Wet |
| W_p | Plastic Limit |
| W_l | Liquid Limit |

- | <u>Density</u> | | | |
|----------------|--------------|---------------|-----------|
| V | Very Loose | Density Index | <15% |
| L | Loose | Density Index | 15 - 35% |
| MD | Medium Dense | Density Index | 35 - 65% |
| D | Dense | Density Index | 65 - 85% |
| VD | Very Dense | Density Index | 85 - 100% |



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH03**

CLIENT: Core Project Group
PROJECT NAME: Commercial Development
SITE LOCATION: King Street, Newcastle East
TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
JOB NO: RGS01219.1
LOGGED BY: GM
DATE: 14/3/16

DRILL TYPE: 4WD Mounted Drill Rig

EASTING:

SURFACE RL:

BOREHOLE DIAMETER: 100 mm

INCLINATION: 90°

NORTHING:

DATUM:

AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
Auger							0.10m ASPHALT:					FILL
							0.30m CONCRETE:					CONCRETE
		0.30m E 0.50m		0.5		GP	FILL: Sandy GRAVEL, medium grained, dark brown, dark grey, gravel is angular, composed of concrete, coal, slag, river pebbles etc. Sand is fine to medium grained, increasing content at base	M				FILL
		0.90m ASS 1.00m		1.0								
		1.40m E 1.50m		1.5								
						SP	1.60m SAND: Fine to medium grained, pale brown, Quartzose	M				AEOLIAN
		1.90m ASS 2.00m		2.0		SP	1.80m SAND: Fine to medium grained, pale grey, Quartzose	W				
				2.5								
		2.90m ASS 3.00m		3.0								
		3.90m ASS 4.00m		4.0			4.00m					
							Hole Terminated at 4.00 m					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

Moisture Condition

- D Dry
- M Moist
- W Wet
- W_p Plastic Limit
- W_L Liquid Limit

Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense

- Density Index <15%
- Density Index 15 - 35%
- Density Index 35 - 65%
- Density Index 65 - 85%
- Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH04**

CLIENT: Core Project Group
PROJECT NAME: Commercial Development
SITE LOCATION: King Street, Newcastle East
TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
JOB NO: RGS01219.1
LOGGED BY: GM
DATE: 14/3/16

DRILL TYPE: 4WD Mounted Drill Rig

EASTING:

SURFACE RL:

BOREHOLE DIAMETER: 100 mm

INCLINATION: 90°

NORTHING:

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
Auger							0.10m ASPHALT:					FILL
						GP	0.20m FILL: Gravelly CLAY, low plasticity, pale orange, gravel is medium grained, rounded					
		0.40m E 0.50m		0.5		SP	FILL: SAND, fine to medium grained, dark grey, trace of plastic	M				
		0.90m ASS 1.00m		1.0								
		1.40m E 1.50m		1.5		SP	SAND: Fine to medium grained, pale yellow, pale grey, Quartzose	M				
		1.90m ASS 2.00m		2.0		SP	SAND: Fine to medium grained, pale grey, Quartzose	M - W				
	2.40m ASS 3.00m 3.40m ASS 4.00m		2.5 3.0 3.5 4.0									
							Hole Terminated at 4.00 m					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

Moisture Condition

- D Dry
- M Moist
- W Wet
- W_p Plastic Limit
- W_L Liquid Limit

Density

- V Very Loose
 - L Loose
 - MD Medium Dense
 - D Dense
 - VD Very Dense
- Density Index <15%
Density Index 15 - 35%
Density Index 35 - 65%
Density Index 65 - 85%
Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH06**

CLIENT: Core Project Group
PROJECT NAME: Commercial Development
SITE LOCATION: King Street, Newcastle East
TEST LOCATION: Refer to Figure 1

PAGE: 1 of 1
JOB NO: RGS01219.1
LOGGED BY: GM
DATE: 14/3/16

DRILL TYPE: 4WD Mounted Drill Rig

EASTING:

SURFACE RL:

BOREHOLE DIAMETER: 100 mm

INCLINATION: 90°

NORTHING:

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
Auger		0.40m E 0.50m		0.5		GC	0.10m ASPHALT:					FILL
						SP	0.20m FILL: Gravelly CLAY, low plasticity, pale orange, gravel medium to coarse grained, some sand					AEOLIAN
						SP	0.50m FILL: SAND, fine grained, dark grey, Quartzose					INDURATED SAND
						SP	0.80m SAND: Fine to medium grained, dark brown, organic rich, cemented					
						SP	1.0 SAND: Fine to medium grained, pale yellow, pale orange, Quartzose, trace shell					
						SP	2.40m SAND: Fine to medium grained, pale orange, pale grey, Quartzose					
		1.40m E 1.50m		3.0			3.00m Hole Terminated at 3.00 m					
				3.5								
				4.0								

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

Moisture Condition

- D Dry
- M Moist
- W Wet
- W_p Plastic Limit
- W_L Liquid Limit

Density

- V Very Loose
 - L Loose
 - MD Medium Dense
 - D Dense
 - VD Very Dense
- Density Index <15%
Density Index 15 - 35%
Density Index 35 - 65%
Density Index 65 - 85%
Density Index 85 - 100%



Appendix B

Laboratory Test Result Sheets

Report No. **RGS01177.1**

NOTES:

	Denotes concentration exceeds health based guideline for Industrial/Commercial land use
	Denotes concentration exceeds ecological guideline for Industrial/ Commercial land use
	Denotes concentration exceeds health and ecological based guideline for Industrial/ Commercial land use

NL	No Limit available
LOR	Limit of Reporting
TRH health based guidelines for upper 1m of soil	

CERTIFICATE OF ANALYSIS

Work Order	: ES1605611	Page	: 1 of 23
Client	: REGIONAL GEOTECHNICAL SOLUTION	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE MORTON	Contact	:
Address	: 44 BENT STREET	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	WINGHAM NSW, AUSTRALIA 2429		
Telephone	: +61 02 6553 5641	Telephone	: +61-2-8784 8555
Project	: RGS01219.1 COMMERCIAL DEVELOPMENT	Date Samples Received	: 14-Mar-2016 14:10
Order number	: ----	Date Analysis Commenced	: 16-Mar-2016
C-O-C number	: ----	Issue Date	: 23-Mar-2016 17:42
Sampler	: ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 18		
No. of samples analysed	: 18		

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Satishkumar Trivedi	Acid Sulfate Soils Supervisor	Brisbane Acid Sulphate Soils, Stafford, QLD
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW



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.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

- ASS: EA033 (CRS Suite): Retained Acidity not required because pH KCl greater than or equal to 4.5
- **EA200: As only one sample container was submitted for multiple tests, sub sampling was conducted prior to Asbestos analysis. As this has the potential to understate detection, results should be scrutinised accordingly and NATA accreditation does not apply to analysis on these samples.**
- ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme
- ASS: EA033 (CRS Suite): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO₃) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m³ in-situ soil', multiply 'reported results' x 'wet bulk density of soil in t/m³'.
- EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH1_0.5-0.7	BH2_0.4-0.5	BH2_1.4-1.5	BH3_0.3-0.5	BH3_1.0
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit		ES1605611-001	ES1605611-002	ES1605611-003	ES1605611-004	ES1605611-005
				Result	Result	Result	Result	Result	Result
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit	----	----	----	----	----	----
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	----	----	----	----	----	----
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	----	----	----	----
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	----	----	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	----	----	----	----	----
EA033-C: Acid Neutralising Capacity									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	----	----	----	----	----	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	----	----	----	----	----	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	----	----	----	----	----	----
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-	----	----	----	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	----	----	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	----	----	----	----
Liming Rate	----	1	kg CaCO3/t	----	----	----	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	----	----	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	----	----	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	----	----	----	----	----
EA037: Ass Field Screening Analysis									
ø pH (F)	----	0.1	pH Unit	----	----	----	----	----	8.8
ø pH (Fox)	----	0.1	pH Unit	----	----	----	----	----	7.3
ø Reaction Rate	----	1	-	----	----	----	----	----	4
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%	4.2	6.4	19.2	8.1	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	----	----
Asbestos Type	1332-21-4	-	--	-	-	-	-	----	----
Sample weight (dry)	----	0.01	g	23.1	19.6	26.4	21.0	----	----
APPROVED IDENTIFIER:	----	-	--	G.MORGAN	G.MORGAN	G.MORGAN	G.MORGAN	----	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	10	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH1_0.5-0.7	BH2_0.4-0.5	BH2_1.4-1.5	BH3_0.3-0.5	BH3_1.0
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit		ES1605611-001	ES1605611-002	ES1605611-003	ES1605611-004	ES1605611-005
					Result	Result	Result	Result	Result
EG005T: Total Metals by ICP-AES - Continued									
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	1	----
Chromium	7440-47-3	2	mg/kg		<2	<2	<2	18	----
Copper	7440-50-8	5	mg/kg		9	7	<5	33	----
Lead	7439-92-1	5	mg/kg		18	8	<5	180	----
Nickel	7440-02-0	2	mg/kg		4	<2	<2	11	----
Zinc	7440-66-6	5	mg/kg		38	13	<5	670	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<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	----
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	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH1_0.5-0.7	BH2_0.4-0.5	BH2_1.4-1.5	BH3_0.3-0.5	BH3_1.0
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit		ES1605611-001	ES1605611-002	ES1605611-003	ES1605611-004	ES1605611-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
^ 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	72-54-8/72-55-9/5 0-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	----
EP068B: Organophosphorus Pesticides (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 Aromatic 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	1.4	----
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	4.8	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	4.8	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	1.9	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	1.9	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	2.6	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH1_0.5-0.7	BH2_0.4-0.5	BH2_1.4-1.5	BH3_0.3-0.5	BH3_1.0
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit		ES1605611-001	ES1605611-002	ES1605611-003	ES1605611-004	ES1605611-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	1.0	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	2.3	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	1.1	----
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	1.4	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	23.2	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	3.0	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	3.2	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	3.5	----
EP080/071: Total Petroleum Hydrocarbons									
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	150	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	150	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	300	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
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	----	50	mg/kg		<50	<50	<50	<50	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	260	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	110	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	370	----
^ >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	----
^ 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	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH1_0.5-0.7	BH2_0.4-0.5	BH2_1.4-1.5	BH3_0.3-0.5	BH3_1.0
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit		ES1605611-001	ES1605611-002	ES1605611-003	ES1605611-004	ES1605611-005
					Result	Result	Result	Result	Result
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		76.8	74.4	75.1	71.9	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		87.6	79.2	78.8	106	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		69.9	63.4	66.7	61.1	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		82.1	77.9	80.5	80.3	----
2-Chlorophenol-D4	93951-73-6	0.5	%		86.6	82.1	85.1	84.5	----
2,4,6-Tribromophenol	118-79-6	0.5	%		72.0	69.4	65.5	58.0	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		95.1	91.1	93.3	91.7	----
Anthracene-d10	1719-06-8	0.5	%		86.6	84.2	86.6	85.1	----
4-Terphenyl-d14	1718-51-0	0.5	%		87.4	84.3	87.2	85.3	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		102	89.2	83.9	85.9	----
Toluene-D8	2037-26-5	0.2	%		119	104	99.2	102	----
4-Bromofluorobenzene	460-00-4	0.2	%		116	105	94.4	99.3	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH3_1.9-2.0	BH3_2.9-3.0	BH3_3.9-4.0	BH4_0.4-0.5	BH4_0.9-1.0
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit		ES1605611-006	ES1605611-007	ES1605611-008	ES1605611-009	ES1605611-010
				Result	Result	Result	Result	Result	Result
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit	----	7.6	4.9	----	----	----
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	----	<2	13	----	----	----
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	<0.02	0.02	----	----	----
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	0.028	0.184	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	18	115	----	----	----
EA033-C: Acid Neutralising Capacity									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	----	0.24	----	----	----	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	----	48	----	----	----	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	----	0.08	----	----	----	----
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-	----	1.5	1.5	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	<0.02	0.20	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	<10	127	----	----	----
Liming Rate	----	1	kg CaCO3/t	----	<1	10	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	0.03	0.20	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	18	127	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	1	10	----	----	----
EA037: Ass Field Screening Analysis									
ø pH (F)	----	0.1	pH Unit	8.3	7.8	7.2	----	7.4	----
ø pH (Fox)	----	0.1	pH Unit	5.3	2.0	2.3	----	4.7	----
ø Reaction Rate	----	1	-	2	2	4	----	2	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%	----	----	----	8.6	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	No	----	----
Asbestos Type	1332-21-4	-	--	----	----	----	-	----	----
Sample weight (dry)	----	0.01	g	----	----	----	23.1	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	----	S.SPOONER	----	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg	----	----	----	<5	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID				
Client sampling date / time				BH3_1.9-2.0	BH3_2.9-3.0	BH3_3.9-4.0	BH4_0.4-0.5	BH4_0.9-1.0
Compound				ES1605611-006	ES1605611-007	ES1605611-008	ES1605611-009	ES1605611-010
CAS Number LOR Unit				Result	Result	Result	Result	Result
EG005T: Total Metals by ICP-AES - Continued								
Cadmium	7440-43-9	1	mg/kg	----	----	----	<1	----
Chromium	7440-47-3	2	mg/kg	----	----	----	4	----
Copper	7440-50-8	5	mg/kg	----	----	----	29	----
Lead	7439-92-1	5	mg/kg	----	----	----	86	----
Nickel	7440-02-0	2	mg/kg	----	----	----	5	----
Zinc	7440-66-6	5	mg/kg	----	----	----	94	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	<0.1	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	<0.1	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	----	----	<0.05	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	----	----	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg	----	----	----	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg	----	----	----	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg	----	----	----	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg	----	----	----	<0.05	----
Aldrin	309-00-2	0.05	mg/kg	----	----	----	<0.05	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	----	----	<0.05	----
^ Total Chlordane (sum)	----	0.05	mg/kg	----	----	----	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg	----	----	----	<0.05	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	----	----	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg	----	----	----	<0.05	----
Dieldrin	60-57-1	0.05	mg/kg	----	----	----	<0.05	----
4,4'-DDE	72-55-9	0.05	mg/kg	----	----	----	<0.05	----
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	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				BH3_1.9-2.0	BH3_2.9-3.0	BH3_3.9-4.0	BH4_0.4-0.5	BH4_0.9-1.0
Client sampling date / time				[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit	ES1605611-006	ES1605611-007	ES1605611-008	ES1605611-009	ES1605611-010
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	----	----	<0.05	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.05	mg/kg	----	----	----	<0.05	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	----	----	----	<0.05	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	----	----	----	<0.05	----
Monocrotophos	6923-22-4	0.2	mg/kg	----	----	----	<0.2	----
Dimethoate	60-51-5	0.05	mg/kg	----	----	----	<0.05	----
Diazinon	333-41-5	0.05	mg/kg	----	----	----	<0.05	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	----	----	----	<0.05	----
Parathion-methyl	298-00-0	0.2	mg/kg	----	----	----	<0.2	----
Malathion	121-75-5	0.05	mg/kg	----	----	----	<0.05	----
Fenthion	55-38-9	0.05	mg/kg	----	----	----	<0.05	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	----	----	----	<0.05	----
Parathion	56-38-2	0.2	mg/kg	----	----	----	<0.2	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	----	----	----	<0.05	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	----	----	----	<0.05	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	----	----	----	<0.05	----
Fenamiphos	22224-92-6	0.05	mg/kg	----	----	----	<0.05	----
Prothiofos	34643-46-4	0.05	mg/kg	----	----	----	<0.05	----
Ethion	563-12-2	0.05	mg/kg	----	----	----	<0.05	----
Carbophenothion	786-19-6	0.05	mg/kg	----	----	----	<0.05	----
Azinphos Methyl	86-50-0	0.05	mg/kg	----	----	----	<0.05	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	----	----	----	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	2.6	----
Anthracene	120-12-7	0.5	mg/kg	----	----	----	0.6	----
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	9.2	----
Pyrene	129-00-0	0.5	mg/kg	----	----	----	8.8	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	4.6	----
Chrysene	218-01-9	0.5	mg/kg	----	----	----	4.3	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	----	----	5.3	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID				
Client sampling date / time				BH3_1.9-2.0	BH3_2.9-3.0	BH3_3.9-4.0	BH4_0.4-0.5	BH4_0.9-1.0
Compound				ES1605611-006	ES1605611-007	ES1605611-008	ES1605611-009	ES1605611-010
CAS Number LOR Unit				Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	2.1	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	5.0	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	1.8	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	1.8	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	46.1	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	6.4	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	6.7	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	6.9	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	----	----	----	<10	----
C10 - C14 Fraction	----	50	mg/kg	----	----	----	<50	----
C15 - C28 Fraction	----	100	mg/kg	----	----	----	170	----
C29 - C36 Fraction	----	100	mg/kg	----	----	----	170	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	340	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	----	----	----	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	----	----	<10	----
>C10 - C16 Fraction	----	50	mg/kg	----	----	----	<50	----
>C16 - C34 Fraction	----	100	mg/kg	----	----	----	290	----
>C34 - C40 Fraction	----	100	mg/kg	----	----	----	110	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	----	----	400	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	----	----	<50	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	----	----	<0.2	----
Toluene	108-88-3	0.5	mg/kg	----	----	----	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg	----	----	----	<0.2	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	----	----	----	<0.5	----
Naphthalene	91-20-3	1	mg/kg	----	----	----	<1	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH3_1.9-2.0	BH3_2.9-3.0	BH3_3.9-4.0	BH4_0.4-0.5	BH4_0.9-1.0
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit		ES1605611-006	ES1605611-007	ES1605611-008	ES1605611-009	ES1605611-010
					Result	Result	Result	Result	Result
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		----	----	----	78.4	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		----	----	----	129	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		----	----	----	72.9	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	----	82.4	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	87.0	----
2,4,6-Tribromophenol	118-79-6	0.5	%		----	----	----	78.1	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	93.7	----
Anthracene-d10	1719-06-8	0.5	%		----	----	----	86.0	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	86.5	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	----	89.2	----
Toluene-D8	2037-26-5	0.2	%		----	----	----	105	----
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	----	101	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH4_1.9-2.0	BH4_2.9-3.0	BH5_0.4-0.6	BH5_1.4-1.5	BH6_0.4-0.5
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit		ES1605611-011	ES1605611-012	ES1605611-013	ES1605611-014	ES1605611-015
				Result	Result	Result	Result	Result	Result
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit	----	5.4	----	----	----	----
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	----	6	----	----	----	----
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	<0.02	----	----	----	----
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	0.065	----	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	40	----	----	----	----
EA033-C: Acid Neutralising Capacity									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	----	----	----	----	----	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	----	----	----	----	----	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	----	----	----	----	----	----
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-	----	1.5	----	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	0.07	----	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	47	----	----	----	----
Liming Rate	----	1	kg CaCO3/t	----	3	----	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	0.07	----	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	47	----	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	3	----	----	----	----
EA037: Ass Field Screening Analysis									
ø pH (F)	----	0.1	pH Unit	7.4	7.4	----	----	----	----
ø pH (Fox)	----	0.1	pH Unit	5.1	2.1	----	----	----	----
ø Reaction Rate	----	1	-	2	2	----	----	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%	----	----	8.4	18.4	3.2	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	No	No	No	----
Asbestos Type	1332-21-4	-	--	----	----	-	-	-	----
Sample weight (dry)	----	0.01	g	----	----	21.1	22.0	27.4	----
APPROVED IDENTIFIER:	----	-	--	----	----	S.SPOONER	S.SPOONER	S.SPOONER	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg	----	----	28	<5	<5	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH4_1.9-2.0	BH4_2.9-3.0	BH5_0.4-0.6	BH5_1.4-1.5	BH6_0.4-0.5
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit		ES1605611-011	ES1605611-012	ES1605611-013	ES1605611-014	ES1605611-015
					Result	Result	Result	Result	Result
EG005T: Total Metals by ICP-AES - Continued									
Cadmium	7440-43-9	1	mg/kg		----	----	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		----	----	6	2	3
Copper	7440-50-8	5	mg/kg		----	----	48	<5	<5
Lead	7439-92-1	5	mg/kg		----	----	164	<5	9
Nickel	7440-02-0	2	mg/kg		----	----	9	<2	<2
Zinc	7440-66-6	5	mg/kg		----	----	213	22	21
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		----	----	0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	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	<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
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



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH4_1.9-2.0	BH4_2.9-3.0	BH5_0.4-0.6	BH5_1.4-1.5	BH6_0.4-0.5
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit		ES1605611-011	ES1605611-012	ES1605611-013	ES1605611-014	ES1605611-015
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
^ 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	72-54-8/72-55-9/5 0-2	0.05	mg/kg		----	----	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (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 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		----	----	12.0	<0.5	17.0
Anthracene	120-12-7	0.5	mg/kg		----	----	1.8	<0.5	2.3
Fluoranthene	206-44-0	0.5	mg/kg		----	----	26.6	0.6	15.0
Pyrene	129-00-0	0.5	mg/kg		----	----	24.9	0.6	12.8
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	----	9.0	<0.5	4.2
Chrysene	218-01-9	0.5	mg/kg		----	----	8.6	<0.5	3.7
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	----	10.1	<0.5	4.1



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH4_1.9-2.0	BH4_2.9-3.0	BH5_0.4-0.6	BH5_1.4-1.5	BH6_0.4-0.5
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit		ES1605611-011	ES1605611-012	ES1605611-013	ES1605611-014	ES1605611-015
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	----	----	3.5	<0.5	1.6
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	9.4	<0.5	3.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	4.0	<0.5	1.6
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	----	----	0.8	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	----	----	4.5	<0.5	1.8
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	----	----	115	1.2	67.6
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	----	----	13.0	<0.5	4.7
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	----	----	13.0	0.6	5.0
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	----	----	13.0	1.2	5.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg	----	----	----	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg	----	----	----	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	----	----	----	250	<100	110
C29 - C36 Fraction	----	100	mg/kg	----	----	----	180	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	----	----	430	<50	110
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
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	----	50	mg/kg	----	----	----	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	----	----	----	380	<100	150
>C34 - C40 Fraction	----	100	mg/kg	----	----	----	120	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	----	----	500	<50	150
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	----	----	<50	<50	<50
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



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH4_1.9-2.0	BH4_2.9-3.0	BH5_0.4-0.6	BH5_1.4-1.5	BH6_0.4-0.5
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]
Compound	CAS Number	LOR	Unit		ES1605611-011	ES1605611-012	ES1605611-013	ES1605611-014	ES1605611-015
					Result	Result	Result	Result	Result
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		----	----	74.5	70.4	77.6
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		----	----	126	77.1	117
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		----	----	65.8	65.1	63.1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	78.2	79.3	82.0
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	82.5	83.5	85.9
2,4,6-Tribromophenol	118-79-6	0.5	%		----	----	75.0	65.7	66.7
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	89.5	90.4	94.5
Anthracene-d10	1719-06-8	0.5	%		----	----	80.7	84.7	83.6
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	83.2	85.0	85.0
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		----	----	88.7	86.5	92.0
Toluene-D8	2037-26-5	0.2	%		----	----	114	94.2	109
4-Bromofluorobenzene	460-00-4	0.2	%		----	----	106	97.2	106



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH6_1.4-1.5	BH11_0.5-0.7	BH4_3.9-4.0	----	----
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	----	----
Compound	CAS Number	LOR	Unit		ES1605611-016	ES1605611-017	ES1605611-018	-----	-----
				Result	Result	Result	Result	Result	Result
EA033-A: Actual Acidity									
pH KCl (23A)	----	0.1	pH Unit	----	----	5.0	----	----	----
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	----	----	19	----	----	----
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	----	----	0.03	----	----	----
EA033-B: Potential Acidity									
Chromium Reducible Sulfur (22B)	----	0.005	% S	----	----	0.287	----	----	----
acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	----	----	179	----	----	----
EA033-C: Acid Neutralising Capacity									
Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	----	----	----	----	----	----
acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	----	----	----	----	----	----
sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	----	----	----	----	----	----
EA033-E: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-	----	----	1.5	----	----	----
Net Acidity (sulfur units)	----	0.02	% S	----	----	0.32	----	----	----
Net Acidity (acidity units)	----	10	mole H+ / t	----	----	198	----	----	----
Liming Rate	----	1	kg CaCO3/t	----	----	15	----	----	----
Net Acidity excluding ANC (sulfur units)	----	0.02	% S	----	----	0.32	----	----	----
Net Acidity excluding ANC (acidity units)	----	10	mole H+ / t	----	----	198	----	----	----
Liming Rate excluding ANC	----	1	kg CaCO3/t	----	----	15	----	----	----
EA037: Ass Field Screening Analysis									
ø pH (F)	----	0.1	pH Unit	----	----	6.7	----	----	----
ø pH (Fox)	----	0.1	pH Unit	----	----	1.8	----	----	----
ø Reaction Rate	----	1	-	----	----	3	----	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%	7.3	3.6	----	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	----	----	----	----
Asbestos Type	1332-21-4	-	--	-	-	----	----	----	----
Sample weight (dry)	----	0.01	g	30.5	24.3	----	----	----	----
APPROVED IDENTIFIER:	----	-	--	G.MORGAN	G.MORGAN	----	----	----	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg	<5	<5	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH6_1.4-1.5	BH11_0.5-0.7	BH4_3.9-4.0	----	----
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	----	----
Compound	CAS Number	LOR	Unit		ES1605611-016	ES1605611-017	ES1605611-018	-----	-----
					Result	Result	Result	Result	Result
EG005T: Total Metals by ICP-AES - Continued									
Cadmium	7440-43-9	1	mg/kg		<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg		4	2	----	----	----
Copper	7440-50-8	5	mg/kg		<5	11	----	----	----
Lead	7439-92-1	5	mg/kg		<5	27	----	----	----
Nickel	7440-02-0	2	mg/kg		<2	5	----	----	----
Zinc	7440-66-6	5	mg/kg		<5	60	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<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	----	----	----
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		<0.05	<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		<0.05	<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		<0.2	<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	----	----	----



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Client sample ID

				BH6_1.4-1.5	BH11_0.5-0.7	BH4_3.9-4.0	----	----
Client sampling date / time				[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	----	----
Compound	CAS Number	LOR	Unit	ES1605611-016	ES1605611-017	ES1605611-018	-----	-----
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/5 0-2	0.05	mg/kg	<0.05	<0.05	----	----	----
EP068B: Organophosphorus Pesticides (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	----	----	----
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	----	----	----
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	----	----	----
Benzo(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+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH6_1.4-1.5	BH11_0.5-0.7	BH4_3.9-4.0	----	----
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	----	----
Compound	CAS Number	LOR	Unit		ES1605611-016	ES1605611-017	ES1605611-018	-----	-----
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
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 Hydrocarbons									
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 Hydrocarbons - NEPM 2013 Fractions									
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	----	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 (F2)	----	50	mg/kg		<50	<50	----	----	----
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	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	BH6_1.4-1.5	BH11_0.5-0.7	BH4_3.9-4.0	----	----
Client sampling date / time					[14-Mar-2016]	[14-Mar-2016]	[14-Mar-2016]	----	----
Compound	CAS Number	LOR	Unit		ES1605611-016	ES1605611-017	ES1605611-018	-----	-----
					Result	Result	Result	Result	Result
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		84.1	81.2	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		84.8	84.0	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		69.8	71.4	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		80.9	81.3	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		85.4	85.4	----	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%		61.9	73.8	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		93.1	93.7	----	----	----
Anthracene-d10	1719-06-8	0.5	%		86.8	86.4	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		88.3	87.9	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		86.0	95.8	----	----	----
Toluene-D8	2037-26-5	0.2	%		98.9	104	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		101	101	----	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	BH1_0.5-0.7 - [14-Mar-2016]	Mid grey sandy soil.
EA200: Description	BH2_0.4-0.5 - [14-Mar-2016]	Mid grey sandy soil.
EA200: Description	BH2_1.4-1.5 - [14-Mar-2016]	Mid brown sandy soil.
EA200: Description	BH3_0.3-0.5 - [14-Mar-2016]	Mid grey - brown clay soil with grey rocks.
EA200: Description	BH4_0.4-0.5 - [14-Mar-2016]	Mid grey sandy soil.
EA200: Description	BH5_0.4-0.6 - [14-Mar-2016]	Mid grey sandy soil.
EA200: Description	BH5_1.4-1.5 - [14-Mar-2016]	White sandy soil.
EA200: Description	BH6_0.4-0.5 - [14-Mar-2016]	Pale grey sandy soil.
EA200: Description	BH6_1.4-1.5 - [14-Mar-2016]	Mid brown sandy soil.
EA200: Description	BH11_0.5-0.7 - [14-Mar-2016]	Mid grey sandy soil with grey rocks.



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
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	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

QUALITY CONTROL REPORT

Work Order	: ES1605103	Page	: 1 of 12
Client	: REGIONAL GEOTECHNICAL SOLUTION	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE MORTON	Contact	:
Address	: 44 BENT STREET WINGHAM NSW, AUSTRALIA 2429	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: steve.m@regionalgeotech.com.au	E-mail	:
Telephone	: +61 02 6553 5641	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: RGS1219	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 07-Mar-2016
C-O-C number	: ----	Date Analysis Commenced	: 08-Mar-2016
Sampler	: ----	Issue Date	: 11-Mar-2016
Site	: ----	No. of samples received	: 8
Quote number	: ----	No. of samples analysed	: 8

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Quality Control Report contains the following information:

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



NATA Accredited
Laboratory 825

Accredited for
compliance with
ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW



General Comments

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

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

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

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 387272)									
ES1605081-007	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	19.2	19.3	0.00	0% - 50%
ES1605088-004	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	9.5	9.2	3.46	No Limit
EA055: Moisture Content (QC Lot: 387273)									
ES1605106-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	23.7	24.5	3.45	0% - 20%
ES1605114-009	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	10.0	8.9	11.4	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 387199)									
ES1605084-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	5	6	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	17	20	19.1	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	9	8	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	62	73	17.3	0% - 50%
ES1605114-003	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	8	6	33.9	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	7	5	43.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	6	5	21.2	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	19	21	8.75	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	28	28	0.00	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 389846)									
ES1605004-011	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	28	28	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	15	15	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	7	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	57	84	38.3	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	20	29	38.8	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	164	196	18.0	0% - 20%
ES1605150-007	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	27	27	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	12	11	9.88	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	13	11	22.2	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	22	16	34.2	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	42	36	14.2	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 387200)									
ES1605084-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1605114-003	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.9	0.9	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 389847)									
ES1605004-011	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.2	0.5	63.0	No Limit
ES1605150-007	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 387388)									
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 387387)									
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 387387)									
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 387387) - continued									
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit		
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 387386)									
ES1605138-003	Anonymous	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.7	0.7	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	0.8	0.8	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	0.7	0.7	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	0.6	0.6	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	0.6	0.6	0.00	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	0.9	0.8	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	1.4	1.4	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	5.4	4.8	11.8	0% - 50%
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	0.5	0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(q,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 387386) - continued									
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	0.5	0.00	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	2.2	2.3	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	0.6	0.8	26.4	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	1.9	2.0	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	5.2	6.1	15.9	0% - 50%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 387385)									
ES1605138-003	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 388365)									
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1605224-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 387385)									
ES1605138-003	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	110	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 388365)									
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1605224-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 388365)									
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

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 Work Order : ES1605103
 Client : REGIONAL GEOTECHNICAL SOLUTION
 Project : RGS1219



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: 388365) - continued									
ES1605224-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit



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

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High
EG005T: Total Metals by ICP-AES (QCLot: 387199)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	108	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	103	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	102	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	105	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	105	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	106	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	106	80	122
EG005T: Total Metals by ICP-AES (QCLot: 389846)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	101	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	98.2	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	79.1	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	86.9	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	81.0	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	102	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	89.4	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 387200)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	81.4	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 389847)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	77.4	70	105
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 387388)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	93.0	62	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 387387)								
EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	91.0	69	121
EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	89.7	67	115
EP068: 4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	104	66	120
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.8	69	115
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	96.9	69	113
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	93.0	66	116
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	99.0	67	119
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	90.8	69	115
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	91.5	64	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	81.5	65	117
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	90.6	66	116
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	110	62	124



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP068A: Organochlorine Pesticides (OC) (QCLot: 387387) - continued								
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.5	67	123
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	101	56	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	104	64	122
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	97.9	68	116
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.1	67	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	90.0	62	118
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	98.7	65	117
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	85.4	54	130
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.9	63	117
EP068B: Organophosphorus Pesticides (OP) (QCLot: 387387)								
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	75.2	41	123
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	97.4	66	118
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	107	65	127
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	84.9	69	121
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	93.4	76	118
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	95.9	72	120
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	95.0	62	128
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	92.6	70	120
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	102	59	119
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	90.1	67	119
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.8	68	120
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	78.6	68	124
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	86.2	69	117
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	81.4	68	122
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	106	54	126
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	81.8	64	122
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	92.2	68	120
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	89.3	70	116
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	88.3	62	112
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 387386)								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	96.5	73	127
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	87.9	72	124
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	100	77	127
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	83.8	69	123
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	86.5	70	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	84.7	68	116
	205-82-3							
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	81.1	63	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	95.9	74	126



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 387386) - continued								
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	99.7	75	127
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	78.0	62	118
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	96.2	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	93.3	72	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	78.4	61	121
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	97.0	77	125
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	101	75	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	98.6	74	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 387385)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	118	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	115	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	117	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 388365)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	85.6	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 387385)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	109	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	116	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	97.5	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 388365)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	83.3	68	128
EP080: BTEXN (QCLot: 388365)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	90.9	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	89.0	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	91.3	66	118
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	90.7	63	119
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	86.9	68	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	88.9	67	121

Matrix Spike (MS) Report

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

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High
EG005T: Total Metals by ICP-AES (QCLot: 387199)							
ES1605084-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	105	70	130



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 387199) - continued							
ES1605084-001	Anonymous	EG005T: Cadmium	7440-43-9	50 mg/kg	109	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	111	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	108	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	108	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	107	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	112	70	130
EG005T: Total Metals by ICP-AES (QCLot: 389846)							
ES1605004-012	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	81.6	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	80.8	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	77.2	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	99.3	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	81.0	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	71.2	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	101	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 387200)							
ES1605084-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	98.1	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 389847)							
ES1605004-012	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	98.7	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 387388)							
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	109	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 387387)							
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP068: 4,4`-DDT	50-29-3	2 mg/kg	88.1	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	81.1	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	89.5	70	130
		EP068: Endrin	72-20-8	2 mg/kg	98.5	70	130
		EP068: gamma-BHC	58-89-9	0.5 mg/kg	101	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	92.9	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 387387)							
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	108	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	92.8	70	130
		EP068: Diazinon	333-41-5	0.5 mg/kg	110	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	89.6	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	109	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 387386)							
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	98.5	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	114	70	130

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 Work Order : ES1605103
 Client : REGIONAL GEOTECHNICAL SOLUTION
 Project : RGS1219



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 387385)							
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP071: C10 - C14 Fraction	----	523 mg/kg	94.6	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	104	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	124	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 388365)							
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP080: C6 - C9 Fraction	----	32.5 mg/kg	76.8	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 387385)							
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP071: >C10 - C16 Fraction	----	860 mg/kg	92.6	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	110	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	120	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 388365)							
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	73.7	70	130
EP080: BTEXN (QCLot: 388365)							
ES1605103-001	BH1 0.0-0.1 BH1 0.0-0.2	EP080: Benzene	71-43-2	2.5 mg/kg	73.9	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	80.1	70	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	79.6	70	130
			106-42-3				
		EP080: Naphthalene	91-20-3	2.5 mg/kg	84.0	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	81.4	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	76.4	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1605103	Page	: 1 of 5
Client	: REGIONAL GEOTECHNICAL SOLUTION	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE MORTON	Telephone	: +61-2-8784 8555
Project	: RGS1219	Date Samples Received	: 07-Mar-2016
Site	: ----	Issue Date	: 11-Mar-2016
Sampler	: ----	No. of samples received	: 8
Order number	: ----	No. of samples analysed	: 8

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content								
Soil Glass Jar - Unpreserved (EA055-103) BH1 0.0-0.1 - BH1 0.0-0.2, BH3 0.0-0.1 - BH3 0.0-0.2, BH5 0.0-0.1 - BH5 0.0-0.2, BH7 0.0-0.1 - BH7 0.0-0.2, BH2 0.0-0.1 - BH2 0.0-0.2, BH4 0.0-0.1 - BH4 0.0-0.2, BH6 0.0-0.1 - BH6 0.0-0.2, BH17 0.0-0.1 - BH17 0.0-0.2		07-Mar-2016	----	----	----	08-Mar-2016	21-Mar-2016	✓
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Snap Lock Bag: Separate bag received (EA200) BH1 0.0-0.1 - BH1 0.0-0.2, BH3 0.0-0.1 - BH3 0.0-0.2, BH5 0.0-0.1 - BH5 0.0-0.2, BH7 0.0-0.1 - BH7 0.0-0.2, BH2 0.0-0.1 - BH2 0.0-0.2, BH4 0.0-0.1 - BH4 0.0-0.2, BH6 0.0-0.1 - BH6 0.0-0.2, BH17 0.0-0.1 - BH17 0.0-0.2		07-Mar-2016	----	----	----	09-Mar-2016	03-Sep-2016	✓
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T) BH1 0.0-0.1 - BH1 0.0-0.2, BH3 0.0-0.1 - BH3 0.0-0.2, BH5 0.0-0.1 - BH5 0.0-0.2, BH7 0.0-0.1 - BH7 0.0-0.2, BH2 0.0-0.1 - BH2 0.0-0.2, BH4 0.0-0.1 - BH4 0.0-0.2, BH6 0.0-0.1 - BH6 0.0-0.2,		07-Mar-2016	08-Mar-2016	03-Sep-2016	✓	09-Mar-2016	03-Sep-2016	✓
Soil Glass Jar - Unpreserved (EG005T) BH17 0.0-0.1 - BH17 0.0-0.2		07-Mar-2016	10-Mar-2016	03-Sep-2016	✓	11-Mar-2016	03-Sep-2016	✓
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T) BH1 0.0-0.1 - BH1 0.0-0.2, BH3 0.0-0.1 - BH3 0.0-0.2, BH5 0.0-0.1 - BH5 0.0-0.2, BH7 0.0-0.1 - BH7 0.0-0.2, BH2 0.0-0.1 - BH2 0.0-0.2, BH4 0.0-0.1 - BH4 0.0-0.2, BH6 0.0-0.1 - BH6 0.0-0.2,		07-Mar-2016	08-Mar-2016	04-Apr-2016	✓	09-Mar-2016	04-Apr-2016	✓
Soil Glass Jar - Unpreserved (EG035T) BH17 0.0-0.1 - BH17 0.0-0.2		07-Mar-2016	10-Mar-2016	04-Apr-2016	✓	11-Mar-2016	04-Apr-2016	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP066: Polychlorinated Biphenyls (PCB)								
Soil Glass Jar - Unpreserved (EP066) BH1 0.0-0.1 - BH1 0.0-0.2, BH3 0.0-0.1 - BH3 0.0-0.2, BH5 0.0-0.1 - BH5 0.0-0.2, BH7 0.0-0.1 - BH7 0.0-0.2, BH2 0.0-0.1 - BH2 0.0-0.2, BH4 0.0-0.1 - BH4 0.0-0.2, BH6 0.0-0.1 - BH6 0.0-0.2, BH17 0.0-0.1 - BH17 0.0-0.2	07-Mar-2016	10-Mar-2016	21-Mar-2016	✔	10-Mar-2016	19-Apr-2016	✔	
EP068A: Organochlorine Pesticides (OC)								
Soil Glass Jar - Unpreserved (EP068) BH1 0.0-0.1 - BH1 0.0-0.2, BH3 0.0-0.1 - BH3 0.0-0.2, BH5 0.0-0.1 - BH5 0.0-0.2, BH7 0.0-0.1 - BH7 0.0-0.2, BH2 0.0-0.1 - BH2 0.0-0.2, BH4 0.0-0.1 - BH4 0.0-0.2, BH6 0.0-0.1 - BH6 0.0-0.2, BH17 0.0-0.1 - BH17 0.0-0.2	07-Mar-2016	10-Mar-2016	21-Mar-2016	✔	10-Mar-2016	19-Apr-2016	✔	
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP071) BH1 0.0-0.1 - BH1 0.0-0.2, BH3 0.0-0.1 - BH3 0.0-0.2, BH5 0.0-0.1 - BH5 0.0-0.2, BH7 0.0-0.1 - BH7 0.0-0.2, BH2 0.0-0.1 - BH2 0.0-0.2, BH4 0.0-0.1 - BH4 0.0-0.2, BH6 0.0-0.1 - BH6 0.0-0.2, BH17 0.0-0.1 - BH17 0.0-0.2	07-Mar-2016	10-Mar-2016	21-Mar-2016	✔	10-Mar-2016	19-Apr-2016	✔	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM)) BH1 0.0-0.1 - BH1 0.0-0.2, BH3 0.0-0.1 - BH3 0.0-0.2, BH5 0.0-0.1 - BH5 0.0-0.2, BH7 0.0-0.1 - BH7 0.0-0.2, BH2 0.0-0.1 - BH2 0.0-0.2, BH4 0.0-0.1 - BH4 0.0-0.2, BH6 0.0-0.1 - BH6 0.0-0.2, BH17 0.0-0.1 - BH17 0.0-0.2	07-Mar-2016	10-Mar-2016	21-Mar-2016	✔	10-Mar-2016	19-Apr-2016	✔	
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080) BH1 0.0-0.1 - BH1 0.0-0.2, BH3 0.0-0.1 - BH3 0.0-0.2, BH5 0.0-0.1 - BH5 0.0-0.2, BH7 0.0-0.1 - BH7 0.0-0.2, BH2 0.0-0.1 - BH2 0.0-0.2, BH4 0.0-0.1 - BH4 0.0-0.2, BH6 0.0-0.1 - BH6 0.0-0.2, BH17 0.0-0.1 - BH17 0.0-0.2	07-Mar-2016	09-Mar-2016	21-Mar-2016	✔	10-Mar-2016	21-Mar-2016	✔	



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	4	39	10.26	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(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 SnCl ₂ 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)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

QUALITY CONTROL REPORT

Work Order	: ES1605611	Page	: 1 of 12
Client	: REGIONAL GEOTECHNICAL SOLUTION	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE MORTON	Contact	:
Address	: 44 BENT STREET	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
	WINGHAM NSW, AUSTRALIA 2429		
Telephone	: +61 02 6553 5641	Telephone	: +61-2-8784 8555
Project	: RGS01219.1 COMMERCIAL DEVELOPMENT	Date Samples Received	: 14-Mar-2016
Order number	: ----	Date Analysis Commenced	: 16-Mar-2016
C-O-C number	: ----	Issue Date	: 23-Mar-2016
Sampler	: ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 18		
No. of samples analysed	: 18		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Quality Control Report contains the following information:

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Satishkumar Trivedi	Acid Sulfate Soils Supervisor	Brisbane Acid Sulphate Soils, Stafford, QLD
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW

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 (%)
EA033-A: Actual Acidity (QC Lot: 401208)									
EB1607123-001	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.00	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.00	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	9.2	9.3	1.08	0% - 20%
ES1605879-003	Anonymous	EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.00	No Limit
		EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.00	No Limit
		EA033: pH KCl (23A)	----	0.1	pH Unit	8.6	8.6	0.00	0% - 20%
EA033-B: Potential Acidity (QC Lot: 401208)									
EB1607123-001	Anonymous	EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	0.132	0.138	4.24	0% - 20%
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	82	86	4.24	No Limit
ES1605879-003	Anonymous	EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	<0.005	0.00	No Limit
		EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	<10	0.00	No Limit
EA033-C: Acid Neutralising Capacity (QC Lot: 401208)									
EB1607123-001	Anonymous	EA033: Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	1.88	1.88	0.00	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	0.60	0.60	0.00	0% - 20%
		EA033: acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	376	375	0.287	0% - 20%
ES1605879-003	Anonymous	EA033: Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	0.67	0.59	13.7	0% - 20%
		EA033: sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	0.22	0.19	13.7	0% - 20%
		EA033: acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	135	118	13.7	0% - 50%
EA037: Ass Field Screening Analysis (QC Lot: 402766)									

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 Work Order : ES1605611
 Client : REGIONAL GEOTECHNICAL SOLUTION
 Project : RGS01219.1 COMMERCIAL DEVELOPMENT



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 (%)
EA037: Ass Field Screening Analysis (QC Lot: 402766) - continued									
EB1607481-001	Anonymous	EA037: pH (F)	----	0.1	pH Unit	8.6	8.6	0.00	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	6.6	6.4	2.30	0% - 20%
ES1605611-010	BH4_0.9-1.0	EA037: pH (F)	----	0.1	pH Unit	7.4	7.4	0.00	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	4.7	4.6	0.00	0% - 20%
EA055: Moisture Content (QC Lot: 396056)									
ES1605611-003	BH2_1.4-1.5	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	19.2	19.1	0.00	0% - 50%
ES1605706-004	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	11.9	13.7	13.6	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 400062)									
ES1605611-001	BH1_0.5-0.7	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	4	4	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	9	8	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	18	20	5.95	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	38	40	4.19	No Limit
ES1605869-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	12	10	16.9	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	98	84	15.8	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 400063)									
ES1605611-001	BH1_0.5-0.7	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1605869-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.1	0.2	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 396662)									
ES1605611-014	BH5_1.4-1.5	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1605611-001	BH1_0.5-0.7	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 396661)									
ES1605611-014	BH5_1.4-1.5	EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068A: Organochlorine Pesticides (OC) (QC Lot: 396661) - continued									
ES1605611-014	BH5_1.4-1.5	EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1605611-001	BH1_0.5-0.7	EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 396661)									
ES1605611-014	BH5_1.4-1.5	EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 396661) - continued									
ES1605611-014	BH5_1.4-1.5	EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1605611-001	BH1_0.5-0.7	EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 396664)							
ES1605611-001	BH1_0.5-0.7	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



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 (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 396664) - continued									
ES1605611-001	BH1_0.5-0.7	EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
	EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 396663)									
ES1605611-001	BH1_0.5-0.7	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 399579)									
ES1605611-001	BH1_0.5-0.7	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1605752-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 396663)									
ES1605611-001	BH1_0.5-0.7	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 399579)									
ES1605611-001	BH1_0.5-0.7	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1605752-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 399579)									
ES1605611-001	BH1_0.5-0.7	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
		EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1605752-001	Anonymous	EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 399579) - continued									
ES1605752-001	Anonymous	EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit



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

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EA033-A: Actual Acidity (QCLot: 401208)								
EA033: pH KCl (23A)	----	----	pH Unit	----	4.8 pH Unit	97.9	70	130
EA033: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----
EA033: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	15 mole H+ / t	98.5	70	130
EA033-B: Potential Acidity (QCLot: 401208)								
EA033: acidity - Chromium Reducible Sulfur (a-22B)	----	10	mole H+ / t	<10	----	----	----	----
EA033: Chromium Reducible Sulfur (22B)	----	0.005	% S	<0.005	0.295 % S	96.4	70	130
EA033-C: Acid Neutralising Capacity (QCLot: 401208)								
EA033: Acid Neutralising Capacity (19A2)	----	0.01	% CaCO3	<0.01	10 % CaCO3	105	70	130
EA033: acidity - Acid Neutralising Capacity (a-19A2)	----	10	mole H+ / t	<10	----	----	----	----
EA033: sulfidic - Acid Neutralising Capacity (s-19A2)	----	0.01	% pyrite S	<0.01	----	----	----	----
EG005T: Total Metals by ICP-AES (QCLot: 400062)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	96.7	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	93.8	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	99.3	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	100	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	93.1	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	98.7	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	104	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 400063)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	80.9	70	105
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 396662)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	86.0	62	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 396661)								
EP068: 4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.7	69	121
EP068: 4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	80.3	67	115
EP068: 4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	108	66	120
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	81.5	69	115
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	96.8	69	113
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	85.1	66	116
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	91.2	67	119
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	85.7	69	115
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	83.0	64	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	82.5	65	117



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit		Result	Concentration	LCS	Low
EP068A: Organochlorine Pesticides (OC) (QCLot: 396661) - continued								
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	81.9	66	116
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	94.0	62	124
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.8	67	123
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	80.2	56	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	88.6	64	122
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.8	68	116
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	95.8	67	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	83.2	62	118
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	97.4	65	117
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	95.2	54	130
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	84.9	63	117
EP068B: Organophosphorus Pesticides (OP) (QCLot: 396661)								
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	72.1	41	123
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	85.7	66	118
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	91.7	65	127
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	83.4	69	121
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	87.2	76	118
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	90.1	72	120
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	87.8	62	128
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	87.1	70	120
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	108	59	119
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	84.5	67	119
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	82.6	68	120
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	80.3	68	124
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	89.0	69	117
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	81.6	68	122
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	83.4	54	126
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	98.8	64	122
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	93.9	68	120
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	88.8	70	116
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	88.2	62	112
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 396664)								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	120	73	127
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	113	72	124
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	117	77	127
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	107	69	123
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	114	70	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	89.3	68	116
	205-82-3							



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075(SIM): Polynuclear Aromatic Hydrocarbons (QCLot: 396664) - continued								
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	84.9	63	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	105	74	126
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	112	75	127
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	90.2	62	118
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	113	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	120	72	126
EP075(SIM): Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	87.7	61	121
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	118	77	125
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	113	75	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	117	74	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 396663)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	104	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	110	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	95.8	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 399579)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	113	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 396663)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	101	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	112	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	96.9	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 399579)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	118	68	128
EP080: BTEXN (QCLot: 399579)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	89.0	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	94.0	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	91.7	66	118
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	83.1	63	119
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	91.4	68	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	95.0	67	121

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number			Low	High



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 400062)							
ES1605611-001	BH1_0.5-0.7	EG005T: Arsenic	7440-38-2	50 mg/kg	97.9	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	97.6	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	98.4	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	92.0	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	99.1	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	99.9	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	108	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 400063)							
ES1605611-001	BH1_0.5-0.7	EG035T: Mercury	7439-97-6	5 mg/kg	91.5	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 396662)							
ES1605611-001	BH1_0.5-0.7	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	101	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 396661)							
ES1605611-001	BH1_0.5-0.7	EP068: 4,4'-DDT	50-29-3	2 mg/kg	82.4	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	91.4	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	82.6	70	130
		EP068: Endrin	72-20-8	2 mg/kg	90.0	70	130
		EP068: gamma-BHC	58-89-9	0.5 mg/kg	97.4	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	93.4	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 396661)							
ES1605611-001	BH1_0.5-0.7	EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	92.6	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	91.7	70	130
		EP068: Diazinon	333-41-5	0.5 mg/kg	107	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	87.4	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	94.5	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 396664)							
ES1605611-001	BH1_0.5-0.7	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	99.9	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	106	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 396663)							
ES1605611-001	BH1_0.5-0.7	EP071: C10 - C14 Fraction	----	523 mg/kg	94.9	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	105	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	120	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 399579)							
ES1605611-001	BH1_0.5-0.7	EP080: C6 - C9 Fraction	----	32.5 mg/kg	116	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 396663)							
ES1605611-001	BH1_0.5-0.7	EP071: >C10 - C16 Fraction	----	860 mg/kg	100.0	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	114	53	131

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 Work Order : ES1605611
 Client : REGIONAL GEOTECHNICAL SOLUTION
 Project : RGS01219.1 COMMERCIAL DEVELOPMENT



Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 396663) - continued							
ES1605611-001	BH1_0.5-0.7	EP071: >C34 - C40 Fraction	----	1058 mg/kg	115	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 399579)							
ES1605611-001	BH1_0.5-0.7	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	118	70	130
EP080: BTEXN (QCLot: 399579)							
ES1605611-001	BH1_0.5-0.7	EP080: Benzene	71-43-2	2.5 mg/kg	87.9	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	90.4	70	130
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	92.5	70	130
			106-42-3				
		EP080: Naphthalene	91-20-3	2.5 mg/kg	76.2	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	91.7	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	93.4	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1605611	Page	: 1 of 7
Client	: REGIONAL GEOTECHNICAL SOLUTION	Laboratory	: Environmental Division Sydney
Contact	: MR STEVE MORTON	Telephone	: +61-2-8784 8555
Project	: RGS01219.1 COMMERCIAL DEVELOPMENT	Date Samples Received	: 14-Mar-2016
Site	: ----	Issue Date	: 23-Mar-2016
Sampler	: ----	No. of samples received	: 18
Order number	: ----	No. of samples analysed	: 18

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

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



Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA037: Ass Field Screening Analysis							
Snap Lock Bag							
BH3_1.0,	BH3_1.9-2.0,	23-Mar-2016	15-Mar-2016	8	23-Mar-2016	15-Mar-2016	8
BH3_2.9-3.0,	BH3_3.9-4.0,						
BH4_0.9-1.0,	BH4_1.9-2.0,						
BH4_2.9-3.0,	BH4_3.9-4.0						

Analysis Holding Time Compliance

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

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

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

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

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA033-B: Potential Acidity								
80* dried soil (EA033)								
BH3_2.9-3.0,	BH3_3.9-4.0,	14-Mar-2016	22-Mar-2016	14-Mar-2017	✔	22-Mar-2016	20-Jun-2016	✔
BH4_2.9-3.0,	BH4_3.9-4.0							
EA037: Ass Field Screening Analysis								
Snap Lock Bag (EA037)								
BH3_1.0,	BH3_1.9-2.0,	14-Mar-2016	23-Mar-2016	15-Mar-2016	✖	23-Mar-2016	15-Mar-2016	✖
BH3_2.9-3.0,	BH3_3.9-4.0,							
BH4_0.9-1.0,	BH4_1.9-2.0,							
BH4_2.9-3.0,	BH4_3.9-4.0							
EA055: Moisture Content								
Soil Glass Jar - Unpreserved (EA055-103)								
BH1_0.5-0.7,	BH2_0.4-0.5,	14-Mar-2016	----	----	----	16-Mar-2016	28-Mar-2016	✔
BH2_1.4-1.5,	BH3_0.3-0.5,							
BH4_0.4-0.5,	BH5_0.4-0.6,							
BH5_1.4-1.5,	BH6_0.4-0.5,							
BH6_1.4-1.5,	BH11_0.5-0.7							



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Snap Lock Bag - Subsampled by ALS (EA200) BH1_0.5-0.7, BH2_1.4-1.5, BH4_0.4-0.5, BH5_1.4-1.5, BH6_1.4-1.5, BH2_0.4-0.5, BH3_0.3-0.5, BH5_0.4-0.6, BH6_0.4-0.5, BH11_0.5-0.7	14-Mar-2016	----	----	----	22-Mar-2016	10-Sep-2016	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) BH1_0.5-0.7, BH2_1.4-1.5, BH4_0.4-0.5, BH5_1.4-1.5, BH6_1.4-1.5, BH2_0.4-0.5, BH3_0.3-0.5, BH5_0.4-0.6, BH6_0.4-0.5, BH11_0.5-0.7	14-Mar-2016	19-Mar-2016	10-Sep-2016	✓	21-Mar-2016	10-Sep-2016	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) BH1_0.5-0.7, BH2_1.4-1.5, BH4_0.4-0.5, BH5_1.4-1.5, BH6_1.4-1.5, BH2_0.4-0.5, BH3_0.3-0.5, BH5_0.4-0.6, BH6_0.4-0.5, BH11_0.5-0.7	14-Mar-2016	19-Mar-2016	11-Apr-2016	✓	22-Mar-2016	11-Apr-2016	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066) BH1_0.5-0.7, BH2_1.4-1.5, BH4_0.4-0.5, BH5_1.4-1.5, BH6_1.4-1.5, BH2_0.4-0.5, BH3_0.3-0.5, BH5_0.4-0.6, BH6_0.4-0.5, BH11_0.5-0.7	14-Mar-2016	17-Mar-2016	28-Mar-2016	✓	18-Mar-2016	26-Apr-2016	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068) BH1_0.5-0.7, BH2_1.4-1.5, BH4_0.4-0.5, BH5_1.4-1.5, BH6_1.4-1.5, BH2_0.4-0.5, BH3_0.3-0.5, BH5_0.4-0.6, BH6_0.4-0.5, BH11_0.5-0.7	14-Mar-2016	17-Mar-2016	28-Mar-2016	✓	18-Mar-2016	26-Apr-2016	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071) BH1_0.5-0.7, BH2_1.4-1.5, BH4_0.4-0.5, BH5_1.4-1.5, BH6_1.4-1.5, BH2_0.4-0.5, BH3_0.3-0.5, BH5_0.4-0.6, BH6_0.4-0.5, BH11_0.5-0.7	14-Mar-2016	17-Mar-2016	28-Mar-2016	✓	18-Mar-2016	26-Apr-2016	✓

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM))		14-Mar-2016	17-Mar-2016	28-Mar-2016	✓	17-Mar-2016	26-Apr-2016	✓
BH1_0.5-0.7,	BH2_0.4-0.5,							
BH2_1.4-1.5,	BH3_0.3-0.5,							
BH4_0.4-0.5,	BH5_0.4-0.6,							
BH5_1.4-1.5,	BH6_0.4-0.5,							
BH6_1.4-1.5,	BH11_0.5-0.7							
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP080)		14-Mar-2016	18-Mar-2016	28-Mar-2016	✓	19-Mar-2016	28-Mar-2016	✓
BH1_0.5-0.7,	BH2_0.4-0.5,							
BH2_1.4-1.5,	BH3_0.3-0.5,							
BH4_0.4-0.5,	BH5_0.4-0.6,							
BH5_1.4-1.5,	BH6_0.4-0.5,							
BH6_1.4-1.5,	BH11_0.5-0.7							



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chromium Suite for Acid Sulphate Soils	EA033	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055-103	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	10	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	16	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Chromium Suite for Acid Sulphate Soils	EA033	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chromium Suite for Acid Sulphate Soils	EA033	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Chromium Suite for Acid Sulphate Soils	EA033	SOIL	In house: Referenced to Ahern et al 2004. This method covers the determination of Chromium Reducible Sulfur (SCR); pHKCl; titratable actual acidity (TAA); acid neutralising capacity by back titration (ANC); and net acid soluble sulfur (SNAS) which incorporates peroxide sulfur. It applies to soils and sediments (including sands) derived from coastal regions. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
ASS Field Screening Analysis	* EA037	SOIL	In house: Referenced to Acid Sulfate Soils Laboratory Methods Guidelines, version 2.1 June 2004. As received samples are tested for pH field and pH fox and assessed for a reaction rating.
Moisture Content	EA055-103	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(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 SnCl ₂ 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)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
Preparation Methods	Method	Matrix	Method Descriptions
Drying only	EN020D	SOIL	In house



Preparation Methods	Method	Matrix	Method Descriptions
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.