

Australia Pacific LNG Project Supplemental information to the EIS Sediment Characterisation Report - Pipeline

Disclaimer

This report has been prepared on behalf of and for the exclusive use of Australia Pacific LNG Pty Limited, and is subject to and issued in accordance with the agreement between Australia Pacific LNG Pty Limited and WorleyParsons Services Pty Ltd. WorleyParsons Services Pty Ltd accepts no liability or responsibility whatsoever for it in respect of any use of or reliance upon this report by any third party.

Copying this report without the permission of Australia Pacific LNG Pty Limited or WorleyParsons is not permitted.

Abbreviations

Abbreviation	Description
AAA	Advanced Analytical Australia
Ag	Silver
Al	Aluminium
ALS	Australian Laboratory Services
APLNG	Australia Pacific LNG Limited
As	Arsenic
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
Cd	Cadmium
Co	Cobalt
Cr	Chromium
CSG	Coal Seam Gas
Cu	Copper
DEWHA	Department of the Environment, Water, Heritage and the Arts
EIL	Environmental Investigation Levels
Fe	Iron
GPC	Gladstone Ports Corporation
Hg	Mercury
HIL-A	Health Investigation Levels for residential land use
LNG	Liquefied Natural Gas
LOR	Limits of Reporting
Mn	Manganese
NAGD	National Assessment Guidelines for Dredging
NATA	National Association of Testing Authorities
Ni	Nickel
OCP	Organochlorine Pesticide
OPP	Organophosphorus Pesticide
PAH	Polycyclic Aromatic Hydrocarbon (Polynuclear Aromatic Hydrocarbon)
Pb	Lead
PCB	Polychlorinated Biphenyl
PSD	Particle Size Distribution
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RPD	Relative Percent Difference
RSD	Relative Standard Deviation

Abbreviation	Description
SAP	Sampling and Analysis Plan
Sb	Antimony
Se	Selenium
TBT	Tributyltin
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbon
UCL	Upper Confidence Limit
V	Vanadium
Zn	Zinc

Executive Summary

Australia Pacific LNG Limited (APLNG) is seeking to accelerate the development and production of its coal seam gas (CSG) reserves in Queensland through the development of a CSG to liquefied natural gas (LNG) project. The proposed CSG to LNG Project, which is the largest under consideration in Australia, will encompass the further development of APLNG's CSG fields, the construction of a gas transmission pipeline(s), together with the construction of an LNG plant and associated port infrastructure to export LNG to international markets.

APLNG is proposing to develop the LNG plant on the western side of Curtis Island. This will require the construction of an LNG pipeline across The Narrows in the northern part of Port Curtis. The Narrows crossing has three distinct sections: the creeks (1,500m); the mudflats (1,300m); and The Narrows channel (2,150m). The preferred alignment for the APLNG pipeline is in the most southern location within the government defined common-user corridor.

Two main proposals are under consideration by APLNG:

- A stand alone option in which APLNG would construct its pipeline in isolation from other proponents
- A bundled option in which all proponent's pipelines will be constructed in one joint construction exercise

For the crossing of The Narrows channel, APLNG's preferred construction method is horizontal directional drilling. If this is not feasible, then the alternative method proposed is open cut trenching using conventional dredging methods. This would require the trenching of approximately 262,000m³. The trench invert would be approximately 5m wide at the base. Trench depth would range from 3-7m, with surface widths ranging from 25-45m (average 35m).

For the bundled pipeline option, the only feasible approach is open cut trenching using conventional dredging methods, due to the size and complexity of the four pipe bundle. The in-situ volume of dredged material to be removed to create the trench is calculated to be 465,000 m³. The anticipated trench invert is 25m at the base. Trench depth will range from 3-7m, with surface widths varying from approximately 45-65m (average 55m).

It is expected that dredged material would be placed within the proposed Western Basin Reclamation Area north of Fisherman's Landing.

Sediment sampling and analysis undertaken generally reflected that which was detailed in the draft sediment sampling and analysis plan (SAP) for the Western Basin Dredging and Disposal Project submitted by the Gladstone Ports Corporation (GPC) in July 2009 and approved by the Department of the Environment, Water, Heritage and the Arts (DEWHA) in September 2009. The main difference between the approved SAP and this study is that the SAP was based on a pilot-level sample collection program, testing for a wide range of contaminant substances.

This study complies with the minimum number of samples required as listed in Table 6 of the *National Assessment Guidelines for Dredging* (NAGD) (Commonwealth of Australia 2009) for the given volume of 'potentially contaminated' material (for a capital dredging project, the NAGD takes this to be represented by the top 1m of sediment over the dredge footprint) rather than for a pilot study that samples 20% of locations numbers required in Table 6. Based on a maximum trench width of 65m (average 55m) over the trench length, the calculated volume of potentially contaminated material in

the top 1m of sediment is 156,000m³. Based on that volume, Table 6 of the NAGD requires a minimum of 20 sampling locations.

Under the NAGD, sampling locations are randomly allocated over the dredge area using a grid with at least five times the number of required sampling locations. For The Narrows crossing, it was decided to sample at the same points as for acid sulphate soils analysis, which were linear along the crossing alignment. It was considered that such an arrangement should still provide a suitable design for assessment of chemical contaminant status for the sediments to be dredged.

Where possible, sample material for laboratory analyses was taken from the following horizon depths: 0-0.5m; 0.5-1.0m; 1.0-2.0m; 2.0-3.0m; 3.0-4.0m. Refusal of the coring apparatus on stiff substrate typically limited the number of horizons submitted for laboratory analysis. Samples were analysed for the following contaminants:

- Particle Size Distribution (PSD)
- Moisture Content
- Total Organic Carbon (TOC)
- Metals (Al, Fe, Sb, As, Cd, Cr, Cu, Co, Pb, Mn, Ni, Se, Ag, V, Zn, Hg)
- Organotins (Tributyltin - TBT)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Nutrients
- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Total Petroleum Hydrocarbons (TPH)
- Organophosphorus Pesticides (OPP)
- Organochlorine Pesticides (OCP)
- Polychlorinated Biphenyls (PCB)

Samples were collected at each location using a piston corer of 60mm diameter and a vibracore of 40mm diameter. The corers were boat deployed, or diver assisted as necessitated by water depth.

The piston corer was used to collect a sediment core to 1m of depth, or until refusal was met. At each location between one and five cores were taken to obtain the necessary sample volume for chemical analysis. The vibracore was used to collect a sediment sample to the required predetermined dredge depth at that location, or to refusal. At each location between one and three vibracores were taken to obtain the necessary sample volume for chemical analysis.

At numerous sites that contained only a thin veneer of silts over very stiff substrate, the piston corer was used to collect the silty layer while stiffer sediments were collected using vibracore. The use of the piston corer to collect surface sediments enabled better quality environmental cores to be collected of fine material, since vibracore can significantly disturb this material.

Sediment samples were returned to shore twice a day for logging, processing and containment. Samples were split into relevant horizons and homogenised in a large stainless steel bowl using powderless nitrile gloved hands. Samples were then placed in sample containers with zero headspace and stored in chilled eskies before being consigned under chain-of-custody documentation to the analytical laboratories, Australian Laboratory Services (ALS) and Advanced Analytical Australia (AAA). Following receipt at the laboratories, samples were stored under refrigerated conditions prior to analysis.

Sediment contaminant concentrations were assessed against the NAGD (Commonwealth of Australia 2009) screening levels and Environmental Investigation Levels (EIL) and Health Investigation Levels for residential land use (HIL-A) as detailed in the *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* (DEH 1998).

Chemical analyses of sediments within The Narrows pipeline crossing identifies that contaminant substances, if present, are generally below NAGD Screening Levels. The only exception to this is the presence of arsenic at four locations. Arsenic was identified in the surface sediments (0.0-0.5m) above the NAGD Screening Levels across the deeper channel area and in sediments 1.0-2.0m below the surface on the Curtis Island edge of the channel. Arsenic has previously been identified as occurring naturally within sediments in the Port of Gladstone and Port Curtis (GHD 2009; Storey et al. 2007) and in particular has previously been identified within this section of The Narrows (URS 2009). A study by URS (2009) characterised sediments over two similar linear routes across The Narrows and identified elevated levels of arsenic. It is noted however, that the results of the URS (2009) study identified elevated arsenic concentrations only in sediments below 2m and not within the surface sediments as has been identified within this current study.

Storey et al. (2007) state that, in general, high metal concentrations within Port Curtis are associated with areas of lower water movement and higher silt/clay content. This statement contradicts the results of this study, as locations which recorded high arsenic concentrations were located across the deeper, faster running area of the channel and in comparison with the remainder of the locations had lower percentages of silt and clay fractions. However, The Narrows is considered a relatively pristine area with no anthropogenic sources of contamination and, as has been previously noted, arsenic is a naturally occurring element in the local geology (Storey et al. 2007). As such, the presence of arsenic in the upper sediment layers is not considered likely to be anthropogenically derived, but a function of natural variation within the sediments.

With regards to other contaminants, URS (2009) also identified elevated concentrations of copper, nickel and mercury in comparison with the NAGD criteria. The current study has not identified elevated concentrations of any of these contaminants.

In comparison with the DEH (1998) guidelines arsenic concentrations, as discussed above, exceeded the EILs. In addition, manganese exceeded the EILs at four locations over a number of sediment horizons. These exceedances occurred in four consecutive locations from the outside edge of the channel, moving closer to Curtis Island. URS (2009) also identified elevated concentrations of manganese within this area, however as for arsenic, elevated concentrations were detected at greater depths than those reported in this current study. Manganese, as with arsenic, is considered a naturally occurring element within the local geology and is often recorded at elevated levels (Storey et al. 2007).

For organic contaminant substances within The Narrows pipeline crossing survey, results are summarised below:

- Total Petroleum Hydrocarbon (TPH) fractions C6-C9 and C10-C14 were not detected in any sample
- TPH fractions C15-C28 and C29-C36 were detected in two locations from all sediment horizons
- The majority of PAH species were detected in a least one sample, four species were not detected in any sample. Seven locations did not record any PAH species above the limits of reporting (LOR)
- Tributyltin, BTEX, Organochlorine Pesticides, Organophosphorus Pesticides and Polychlorinated Biphenyls were not detected in any sample

The 95% upper confidence limit (UCL) of the mean for all contaminants tested across The Narrows pipeline route were below respective NAGD Screening Levels and EIL and HIL-A. Therefore, based on the analyses undertaken, it is considered that the capital material to be dredged from the pipeline crossing is suitable for unconfined placement at sea, according to the NAGD contaminant assessment framework. The material is also suitable for placement on land according to the DEH (1998) guidelines.

Contents

1.	Introduction	1
1.1	Background	1
1.2	Sediment Sampling and Analysis	4
1.3	Project Objectives	4
2.	Methods.....	5
2.1	Sampling Locations and Horizons	5
2.2	Sample Collection	8
2.3	Sample Handling and Processing.....	8
2.3.1	Physical and Chemical Testing	9
2.4	Procedures for Sample Handling, Preservations, Storage and QA/QC	13
2.4.1	Quality Control – Field and Laboratory Analysis.....	13
2.5	Data Analysis	14
2.5.1	Chemical Analysis	14
3.	Results	15
3.1	Physical Characteristics	15
3.2	Chemical Results	16
3.2.1	Assessment of Results against the NAGD	17
3.2.2	Assessment of Results against DEH Guidelines	18
4.	Chemical Data Validation.....	21
4.1	Laboratory Accuracy and Precision	21
4.1.1	Laboratory Blanks	21
4.1.2	Laboratory Duplicates	21
4.1.3	Surrogate Spikes.....	22
4.1.4	Matrix Spikes.....	22
4.1.5	Field Split Triplicate, Replicate Triplicate and Inter-Batch Duplicate Analysis....	22
4.1.6	Trip Blanks	24
4.2	Holding Times	24
5.	Discussion and Conclusions	26
6.	References	28

Table of Figures

Figure 1-1 Location of pipeline crossing across The Narrows	3
Figure 2-1 Sampling locations along The Narrows pipeline crossing	7
Figure 3-1 Graphical summary of particle size distribution by depth across The Narrows pipeline route.	15
Figure 3-2 Graphical summary of particle size distribution by location across The Narrows pipeline route.....	16
Figure 3-3 Sample locations and corresponding guideline exceedances.....	20

Table of Tables

Table 2-1 Sample locations, depth of cores and number of horizons sampled	5
Table 2-2 Contaminant analysis undertaken at each sampling location.....	10
Table 2-3 Laboratory LOR for analyses undertaken	12
Table 3-1 Summary statistics for particle size distribution of sediments across all sample locations and depth horizons for The Narrows pipeline route.	16
Table 3-2 Contaminant results for sediments within The Narrows pipeline crossing dredge area	19
Table 4-1 Results for field split triplicate, replicate triplicate and inter-batch precision testing.	25

Appendices

Appendix 1	Core Logs and Photos
Appendix 2	Particle Size Analysis Reports (ALS)
Appendix 3	Primary Laboratory Reports (ALS)
Appendix 4	Secondary Laboratory Reports (AAA)

1. Introduction

1.1 Background

Australia Pacific LNG Limited (APLNG) is seeking to accelerate the development and production of its coal seam gas (CSG) reserves in Queensland through the development of a CSG to liquefied natural gas (LNG) project. The proposed CSG to LNG Project, which is the largest under consideration in Australia, will encompass the further development of APLNG's CSG fields, the construction of a gas transmission pipeline(s), together with the construction of a LNG plant and associated port infrastructure to export LNG to international markets.

APLNG is proposing to develop the LNG plant on the western side of Curtis Island. This will require the construction of an LNG pipeline in The Narrows in the northern part of Port Curtis. The Narrows crossing has three distinct sections: the creeks (1,500m); the mudflats (1,300m); and The Narrows channel (2,150m).

There are at present four LNG plants proposed for Curtis Island, Gladstone, each requiring a gas transmission link across The Narrows. The proponents intending to cross The Narrows are:

- Australia Pacific LNG – Origin/ConocoPhillips
- Gladstone LNG – Santos/PETRONAS
- Queensland Curtis LNG – British Gas Group
- Shell Australia LNG – Shell

Two main proposals are under consideration by APLNG:

- A stand alone option in which APLNG would construct its pipeline in isolation from other proponents
- A bundled option in which all proponents pipelines will be constructed in one joint construction exercise

The preferred alignment for the APLNG pipeline for either the stand alone or bundled option is the same, being in the most southern location within the government defined common-user corridor.

The actual method of construction for either option and for each section will be a function of geotechnical and construction constraints.

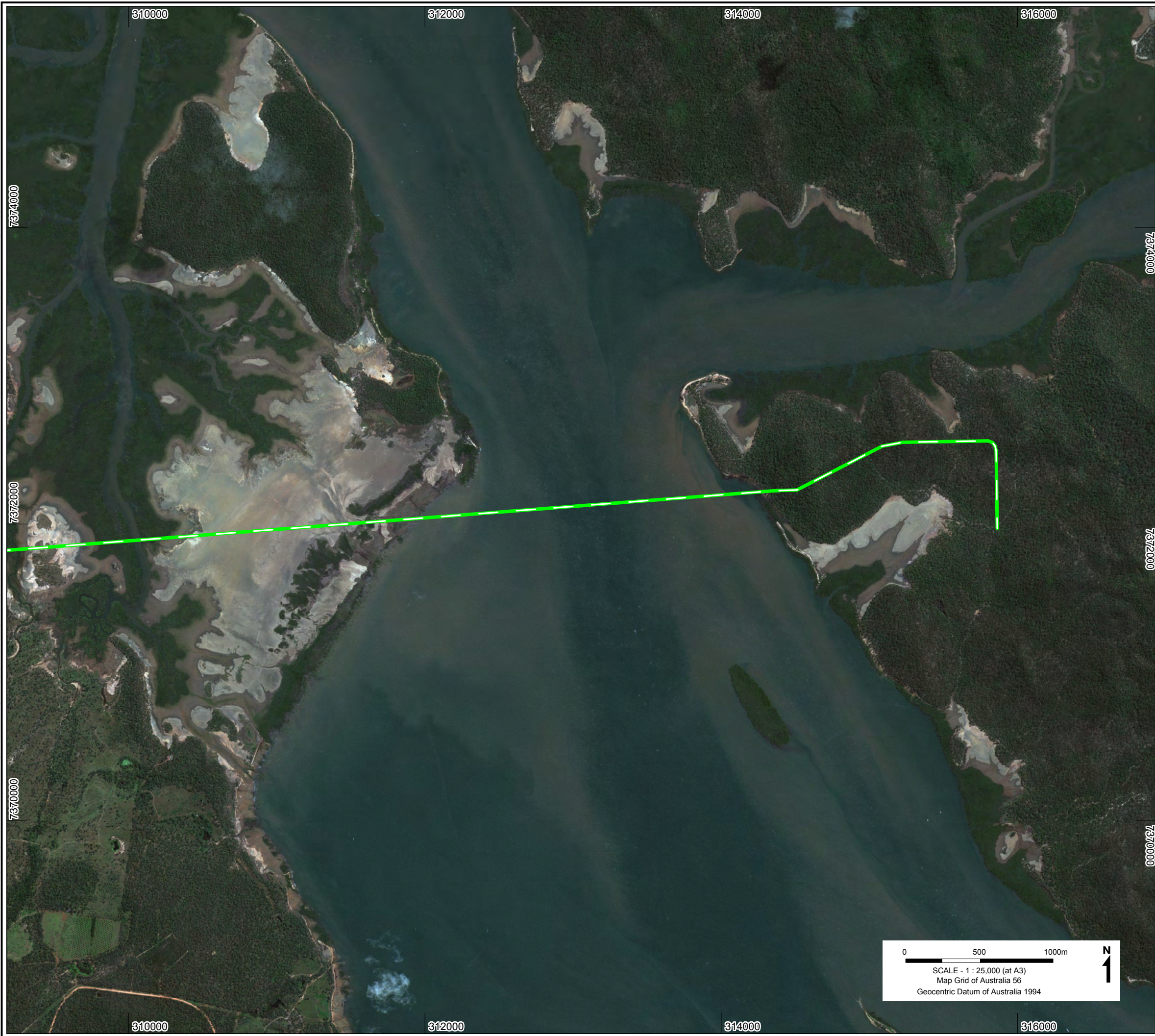
For the crossing of The Narrows channel, APLNG's preferred construction method is horizontal directional drilling. If this is not feasible, then the alternative method proposed is open cut trenching using conventional dredging methods. This would require the trenching of approximately 262,000m³. The trench invert would be approximately 5m wide at the base. Trench depth would range from 3-7m, with surface widths ranging from 25-45m (average 35m).

For the bundled pipeline option, the only feasible approach is open cut trenching using conventional dredging methods, due to the size and complexity of the four pipe bundle. The in-situ volume of dredged material to be removed to create the trench is calculated to be 465,000 m³. The anticipated trench invert is 25m at the base. Trench depth will range from 3-7m, with surface widths varying from approximately 45-65m (average 55m).

It is expected that dredged material would be placed within the proposed Western Basin Reclamation Area north of Fisherman's Landing.

Both trench options would require approximately 2m of rock armouring on top of the pipe or pipe bundle to provide mechanical protection, with rock finishing flush with the seabed.

Waterpersons Services Pty Ltd bears the responsibility for the information and should not be held responsible for any errors or omissions. The information is provided for your reference only and is not intended to be used as a basis for any decision. The information is provided for your reference only and is not intended to be used as a basis for any decision. The information is provided for your reference only and is not intended to be used as a basis for any decision.



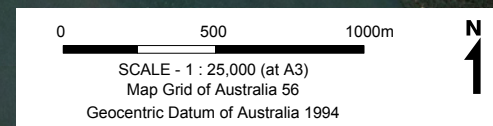
LEGEND

Gas pipeline Route 3H

Source Information
Indicative Gas Pipeline
Supplied by Origin Energy 27/03/2010
Satellite imagery
Captured by GeoEye-1 on 24 March 2009



Figure 1.1
Location of pipeline
crossing across The Narrows



1.2 Sediment Sampling and Analysis

The sediment sampling and analysis undertaken largely reflects that proposed by the Gladstone Ports Corporation (GPC) in the sediment sampling and analysis plan (SAP) for the Western Basin Dredging and Disposal Project (GHD 2009) which was submitted to the Department of the Environment, Water, Heritage and the Arts (DEWHA) in July 2009 and approved in September 2009. That SAP was based on a pilot-level sampling collection program, testing for a wide range of contaminant substances.

One significant departure from the GPC SAP in the present study is that The Narrows crossing sediment characterisation study complies with the minimum number of samples required in Table 6 of the *National Assessment Guidelines for Dredging* (NAGD) (Commonwealth of Australia 2009) for the given volume of 'potentially contaminated' material (for a capital dredging project, the NAGD takes this to be represented by the top 1m of sediment over the dredge footprint) rather than for a pilot study that samples 20% of locations numbers required in Table 6.

Sampling and analysis for acid sulphate soils was undertaken as part of the same campaign, but is reported separately.

1.3 Project Objectives

WorleyParsons was commissioned by APLNG to characterise sediments within the pipeline trench dredge area across the Narrows. The analysis conducted applies to both the single and bundled trench options since both alignments are common and the extent of sampling reflects the larger of the dredging requirements. The objectives of the study were to:

- Undertake a sediment sampling and analysis program consistent with the Western Basin Dredging and Disposal Project draft SAP study methods (GHD 2009) but undertaking sampling at the full number of sites required for the calculated quantity of potentially contaminated sediments
- Test and analyse sediments for a range of physical and chemical properties
- Provide a comparison of contaminant concentrations against the NAGD Screening Levels and the DEH (1998) environment and health investigation levels
- Determine the suitability of sediments for placement on land or unconfined sea disposal

2. Methods

2.1 Sampling Locations and Horizons

The number of locations sampled within the dredging area was determined with regard to the volume of 'potentially contaminated' sediments (i.e. sediments that could contain contaminants above background) within the dredge footprint. For capital dredging projects, this is based typically on the volume of material in the top 1m of sediment over the dredge area. Based on a maximum crossing trench width of 65m (average 55m) over the trench length of 2,150m and to a 1m sediment depth of potentially contaminated material, the calculated volume of potentially contaminated material is $139,750\text{m}^3$, upon which the minimum sample location numbers have been identified. Based on that volume, Table 6 of the NAGD requires a minimum of 19 sampling locations. The sampling program has exceeded this, collecting sediments at 20 locations.

Under the NAGD, sampling locations are randomly allocated over the dredge area using a grid with at least five times the number of required sampling locations. For The Narrows crossing, it was decided to sample at the same points as for acid sulphate soils analysis, which were linear along the crossing alignment. It was considered that such an arrangement should still provide a suitable design for assessment of chemical contaminant status for the sediments to be dredged. A map showing the sampling locations for physical and chemical testing of sediments is provided in Figure 2-1. Table 2-1 provides a list of the GPS coordinates and sampling depth for each core.

Where possible, sample material for laboratory analyses was taken from the following horizon depths: 0-0.5m; 0.5- 1.0m; 1.0-2.0m; 2.0-3.0m; 3.0-4.0m. Refusal of the coring apparatus on stiff substrate typically limited the number of horizons submitted for laboratory analyses.

Table 2-1 Sample locations, depth of cores and number of horizons sampled

Sample Site	Latitude (S) [WGS84]	Longitude (E) [WGS84]	Vibracore Sediment Depth (m)	No. Horizons Analysed for Contaminants
W1	23°45.103'	151°09.356'	1.1	2
W2	23°45.099'	151°09.415'	2.4	4
W3	23°45.095'	151°09.474'	1.8	3
W4	23°45.092'	151°09.533'	1.2	2
W5	23°45.088'	151°09.591'	2.24	4
W6	23°45.084'	151°09.650'	2.6	4
W7	23°45.080'	151°09.709'	1.8	3
W8	23°45.077'	151°09.767'	1.2	2
W9	23°45.073'	151°09.826'	0.5	1

Sample Site	Latitude (S) [WGS84]	Longitude (E) [WGS84]	Vibracore Sediment Depth (m)	No. Horizons Analysed for Contaminants
W10	23°45.069'	151°09.885'	0.2	1
W11	23°45.066'	151°09.944'	0.05	1
W12	23°45.062'	151°10.002'	0.08	1
W13	23°45.058'	151°10.061'	0.1	1
W14	23°45.055'	151°10.120'	0.45	1
W15	23°45.051'	151°10.178'	2.2	4
W16	23°45.047'	151°10.237'	2.2	4
W17	23°45.044'	151°10.296'	0.75	2
W18	23°45.040'	151°10.355'	0.6	2
W19	23°45.036'	151°10.413'	1.6	3
W20	23°45.033	151°10.472'	1.1	2

Datum: WGS84

WorleyParsons Services Pty Ltd bears the responsibility for the information presented in this document (the information is not to be used for any purpose other than that for which it is provided) and is not to be used for any purpose other than that for which it is provided. The information is provided for your reference only and is not to be used for any purpose other than that for which it is provided. The information is provided for your reference only and is not to be used for any purpose other than that for which it is provided.



LEGEND

- Sediment sample locations
- Gas pipeline Route 3H

Source Information

Indicative Gas Pipeline
Supplied by Origin Energy 27/03/2010
Satellite imagery
Captured by GeoEye-1 on 24 March 2009
Sediment sampling locations
Supplied by WorleyParsons 31/05/2010



Figure 2.1
Sampling locations along
The Narrows pipeline crossing

2.2 Sample Collection

Samples were collected at each location using a piston corer of 60mm diameter and a vibracore of 40mm diameter. The corers were boat deployed, or diver assisted as necessitated by water depth.

The piston corer was constructed of stainless steel, and had an internal barrel length of 1.0m. When deployed from the boat, the corer was lowered over the side of the vessel to the seabed using extension rods. The corer was used to collect a sediment core to 1m of depth, or until refusal was met. Once a sediment core had been collected, the piston corer was retrieved to the surface and extruded manually into a plastic core sock for geotechnical logging and subsequent sample processing and containment. At each location, between one and five cores were taken to obtain the necessary sample volume for chemical analysis.

The vibracore was constructed of stainless steel with an internal barrel length of 6.0m. The head of the vibracore was attached to a pulley system, mounted to an A-frame on the bow of the vessel. This allowed the vibracore to be lowered and raised via a winch. When deployed from the boat, the corer was lowered over the side of the vessel to the seabed via this system and guided to an upright position to ensure a vertical core profile. A sediment sample was collected to the required predetermined dredge depth at that location, or to refusal. Once a sample had been collected the vibracore was retrieved to the surface and the sample extruded under mild back-pressure into a plastic core tube for subsequent logging and sample processing. At each location, between one and three vibracores were taken to obtain the necessary sample volume for chemical and acid sulphate soils analysis.

At numerous sites that contained only a thin veneer of silts over very stiff substrate, the piston corer was used to collect the silty layer while stiffer sediments were collected using vibracore. The use of the piston corer to collect surface sediments enabled better quality environmental cores to be collected of fine material, since vibracore can significantly disturb this material.

For locations where sampling was completed with diver assistance, a shot line was deployed from the bow of the vessel to the seabed. Once on the seabed, the piston corer was attached and lowered to the seabed. A diver was then deployed to operate the corer and obtain a sediment sample to a depth of 1m. Once a sediment core had been collected the piston corer was retrieved to the surface and extruded, as per boat deployment. Once piston coring had been completed the diver assisted in the positioning of the vibracore into the sediments, ensuring a vertical core profile. A sediment sample was collected to the required predetermined dredge depth, or to refusal. Once a sediment core had been collected the vibracore was retrieved to the surface and extruded, as per boat deployment.

2.3 Sample Handling and Processing

Sediment samples were returned to shore twice a day for logging, processing and containment. Samples were split into relevant horizons and homogenised in a large stainless steel bowl using powderless nitrile gloved hands. Decontamination between samples included washing of all sampling equipment with ambient sea water and a laboratory grade detergent (Decon 90), and successive rinsing with deionised water. Samples were then placed in sample containers with zero headspace and stored in chilled eskies before being consigned under chain-of-custody documentation to the analytical laboratories, Australian Laboratory Services (ALS) and Advanced Analytical Australia (AAA). Following receipt at the laboratories, samples were stored under refrigerated conditions prior to

analysis. The jars for chemical analyses were solvent washed, acid rinsed glass jars with Teflon lined lids and were provided by the analytical laboratories.

At each site a site description sheet was completed. The following information was collected:

- Name of client
- Sampling date
- General location number and sample identifiers assigned
- Name of the sample collector
- Type of sampler used
- Weather conditions at the time of sampling
- Sea state at the time of sampling
- General comments (e.g. wind speed, level of shipping traffic etc)
- GPS location
- Time of sampling
- Water depth at each sampling location (based on boat mounted depth sounder)
- Photograph of each sediment sample

A sediment log of each core was recorded on a field data sheet, providing a description of the composition of each sample, including the following information:

- Colour
- Field texture
- Observed sand grain size
- Plasticity
- Moisture content of sample (e.g. wet, moist, dry)
- Consistency
- % stones
- Presence of shell/shell grit
- Odour (e.g. marine, sulphurous)

2.3.1 Physical and Chemical Testing

Primary sediment analyses were conducted by Australian Laboratory Services (ALS). Inter-laboratory quality control testing was undertaken by Advanced Analytical Australia (AAA). Both Laboratories are NATA (National Association of Testing Authorities) accredited for the analyses performed.

Table 2-2 provides a summary of the analyses performed, which includes the following:

Basic Suite:

- Particle Size Distribution (PSD)
- Moisture content
- Total Organic Carbon (TOC)
- Metals (Al, Sb, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, V, Zn)
- Organotins (TBT)
- Polycyclic Aromatic Hydrocarbons (PAH)

Detailed Suite:

- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Total Petroleum Hydrocarbons (TPH)
- Organophosphorus Pesticides (OPP)
- Organochlorine Pesticides (OCP)
- Polychlorinated Biphenyls (PCB)

All horizons from each location were analysed for the basic suite of analysis. In addition, 20% of the sample locations were also analysed for the detailed suite of analysis.

Table 2-2 Contaminant analysis undertaken at each sampling location

Sample Location	Horizon	Basic						Detailed					
		Moisture Content	PSD	TOC	Metals	TBT	PAH	TPH	OPP	OCP	PCB	BTEX	Nutrients
W1	0.0-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	0.5-1.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
W2	0.0-0.5	✓	✓	✓	✓	✓	✓						
	0.5-1.0	✓	✓	✓	✓	✓	✓						
	1.0-2.0	✓	✓	✓	✓	✓	✓						
	2.0-3.0	✓	✓	✓	✓	✓	✓						
W3	0.0-0.5	✓	✓	✓	✓	✓	✓						
	0.5-1.0	✓	✓	✓	✓	✓	✓						
	1.0-2.0	✓	✓	✓	✓	✓	✓						
W4	0.0-0.5	✓	✓	✓	✓	✓	✓						
	0.5-1.0	✓	✓	✓	✓	✓	✓						
W5	0.0-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	0.5-1.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1.0-2.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2.0-3.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
W6	0.0-0.5	✓	✓	✓	✓	✓	✓						
	0.5-1.0	✓	✓	✓	✓	✓	✓						
	1.0-2.0	✓	✓	✓	✓	✓	✓						
	2.0-3.0	✓	✓	✓	✓	✓	✓						

Sample Location	Horizon	Basic						Detailed					
		Moisture Content	PSD	TOC	Metals	TBT	PAH	TPH	OPP	OCP	PCB	BTEX	Nutrients
W7	0.0-0.5	✓	✓	✓	✓	✓	✓						
	0.5-1.0	✓	✓	✓	✓	✓	✓						
	1.0-2.0	✓	✓	✓	✓	✓	✓						
W8	0.0-0.5	✓	✓	✓	✓	✓	✓						
	0.5-1.0	✓	✓	✓	✓	✓	✓						
W9	0.0-0.5	✓	✓	✓	✓	✓	✓						
W10	0.0-0.5	✓	✓	✓	✓	✓	✓						
W11	0.0-0.5	✓	✓	✓	✓	✓	✓						
W12	0.0-0.5	✓	✓	✓	✓	✓	✓						
W13	0.0-0.5	✓	✓	✓	✓	✓	✓						
W14	0.0-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
W15	0.0-0.5	✓	✓	✓	✓	✓	✓						
	0.5-1.0	✓	✓	✓	✓	✓	✓						
	1.0-2.0	✓	✓	✓	✓	✓	✓						
	2.0-3.0	✓	✓	✓	✓	✓	✓						
W16	0.0-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	0.5-1.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	1.0-2.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2.0-3.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
W17	0.0-0.5	✓	✓	✓	✓	✓	✓						
	0.5-1.0	✓	✓	✓	✓	✓	✓						
W18	0.0-0.5	✓	✓	✓	✓	✓	✓						
	0.5-1.0	✓	✓	✓	✓	✓	✓						
W19	0.0-0.5	✓	✓	✓	✓	✓	✓						
	0.5-1.0	✓	✓	✓	✓	✓	✓						
	1.0-2.0	✓	✓	✓	✓	✓	✓						
W20	0.0-0.5	✓	✓	✓	✓	✓	✓						
	0.5-1.0	✓	✓	✓	✓	✓	✓						

Material submitted for testing included additional samples for quality control (QC) purposes in accordance with NAGD requirements (refer to Section 4 for details). These QC samples assessed:

- Sediment homogeneity – a ‘replicate triplicate’ sample (i.e. Three separate samples taken within 1m³)
- Laboratory variation – a ‘split triplicate’ sample – two samples sent to the ‘primary laboratory’ and a third sent to a secondary (‘check’) laboratory
- Analytical variation – a sample ‘split duplicate’ analysed in one batch was submitted in a later batch
- Volatile transfer between samples – a ‘trip blank’ consisting of inert chromatographic sand was shipped in the sealed eskies with samples

Laboratory limits of reporting (LORs) are identified as the lowest chemical analysis level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. The LORs reported in Table 2-3 were applicable to the analyses undertaken for both the top 1m and sediment below 1m. Apart from moisture content, the LORs meet the NAGD practical quantitation limit (PQL) requirements.

Table 2-3 Laboratory LOR for analyses undertaken

Analyte	NAGD PQL		Laboratory LOR for Analysis
Moisture Content	0.1%		1%
Total Organic Carbon	0.1%		0.02%
Metals	Al	200mg/kg	50mg/kg
	Fe	100mg/kg	50mg/kg
	Mn	10mg/kg	10mg/kg
	V	2mg/kg	2mg/kg
	As, Cr, Cu, Pb, Ni, Zn	1mg/kg	1mg/kg
	Sb, Co	0.5mg/kg	0.5mg/kg
	Cd, Se, Ag	0.1mg/kg	0.1mg/kg
	Hg	0.01mg/kg	0.01mg/kg
TBT	1 µgSn/kg		0.5 µgSn/kg
BTEX	0.2mg/kg		0.2mg/kg
TPH	100mg/kg		3mg/kg
OPP	10-100µg/kg (varies according to toxicity)		10µg/kg
OCP	1µg/kg		0.5µg/kg (HCB and chlordanes 0.25µg/kg)
PCB	5µg/kg		5µg/kg
PAH	5µg/kg		4µg/kg (Naphthalene, 2-Methylnaphthalene, Coronene 5µg/kg)

2.4 Procedures for Sample Handling, Preservations, Storage and QA/QC

Prior to use, the vessel to be used for the coring operations and all equipment was inspected and washed down. Any evident sources of potential contamination such as exposed metal, galvanized or oily surfaces were thoroughly cleaned.

Core samples collected from the vibracore were recovered in a clear plastic sleeve. The vibracore method for collecting soil cores prevents cross contamination and vertical mixing of samples. Onshore, the cores were sub-sampled into appropriate sample containers supplied by the analytical laboratories. Samples were transported to the laboratory in eskies with crushed ice so that they remained cold and were delivered to the laboratory within 10 hours of collection.

Soil samples are retained at the laboratory for three months after reporting.

2.4.1 Quality Control – Field and Laboratory Analysis

The laboratories used for sediment sample analysis, ALS (primary) and AAA (secondary) are NATA accredited for the methods used and are experienced in the analysis of marine sediments.

Quality control (QC) procedures for contaminant assessment were used from sampling through to completion of laboratory analysis, including:

- Chain of custody (COC) documentation
- Field and intra-laboratory QC protocols
- Inter-laboratory analyses

Field QC samples included three inter-batch duplicate, two field replicate triplicate, and one field split triplicate, which were taken from the following sites:

- Inter-batch duplicate (i.e. one sample split into two and submitted to the laboratory in two different batches):
 - W 03
 - W 06
 - W 16
- Field replicate triplicate (i.e. three separate samples taken at the one site):
 - W 05
 - W 18
- Field split triplicate (i.e. one sample split into three and tested at two laboratories):
 - W 16
- Three field trip-blank samples

Laboratory QC procedures were conducted in accordance with the requirements of Appendix F of the NAGD. These requirements included analysis of laboratory blanks, certified reference materials, replicates and spiked samples.

Validation of the laboratory analyses was undertaken in accordance with Appendix A of the NAGD to confirm that the data quality was suitable for undertaking an assessment to characterise material proposed for dredging and disposal. Laboratory data validation included assessment of results for laboratory blanks, standards, surrogate and matrix spikes and duplicate samples. Field data validation included calculation of relative standard deviation (RSD) for field split triplicates and replicate triplicate samples, and comparison against laboratory and NAGD criteria.

2.5 Data Analysis

2.5.1 Chemical Analysis

Contaminant levels for sediments are compared against the following guidelines:

- Screening Level concentrations listed in Appendix A Table 2 of the NAGD (Commonwealth of Australia, 2009) to assess whether the material is suitable for unconfined placement at sea or if further testing is required (e.g. elutriate, bioavailability and/or direct toxicity assessment)
- Environmental Investigation Level (EIL) and Health Investigation Level for residential land use (HIL-A) listed in the *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* (DEH, 1998) to assess the suitability for placement of dredged material on land, using the most stringent of the health investigation categories (residential use)

The comparison against guideline levels involves the comparison of mean contaminant concentrations at the upper 95% confidence level (95% UCL) of the mean. For the purposes of calculation of normalised values and of 95% UCLs, values below detection limits were set to one-half of the LOR in accordance with NAGD recommendations. Results for organic parameters are normalised to 1% TOC where the recorded value is within the range of 0.2 – 10%. If TOC values are outside this range, then the highest or lowest of the 0.2 – 10% range is adopted as appropriate. Organic contaminants below LOR were not normalised to 1% TOC in 95% UCL calculations, but left at half the LOR.

The methods used to calculate the 95% UCLs were based on those required in Appendix A of the NAGD (P58, Comparison of Data to Screening Levels). Normality of datasets was determined using Shapiro-Wilks test and quantile-quantile plots in ProUCL Version 4 (4.00.02) developed by the US EPA. Datasets were determined as being normal, log-normal or neither in their distributions. Normal datasets were analysed using the 1-tailed student's 't' UCL. Log-normal datasets were analysed using non-parametric jackknife analysis as recommended in the NAGD. Similarly, datasets that were neither normal nor log-normally distributed were analysed using non-parametric jackknife analysis.

Outcomes regarding the tests are presented in Section 3.2. Under the NAGD, if the 95% UCL values for all substances are below relevant Screening Levels, it is considered unlikely that sediment contaminants will have adverse effects on organisms living in or on that sediment or on water quality during disposal. The sediment is therefore considered non-toxic and there are no chemical obstacles to unconfined placement at sea. The 95% UCLs of the mean are also compared against EIL and HIL-A guidelines as a conservative measure when assessing the suitability of the material for disposal on land.

3. Results

3.1 Physical Characteristics

Samples were collected from each sampling location and sample horizon and analysed for particle size distribution (PSD). Core logs from each bore hole are presented in Appendix 1 and laboratory reports for PSD analysis are included in Appendix 2.

Figure 3-1 and Figure 3-2 provide a graphical summary of PSD across The Narrows pipeline route. Figure 3-1 shows that, in general, surface sediments (i.e. <0.5m) are dominated by sand and gravel, with an increase in silt and clay content with depth. Figure 3-2 identifies that sediments closest to Curtis Island (sites W15 – W20) have a higher sand content than those adjacent to Friend Point and within the channel area. It also shows that, in general, clay content at each location increases with depth, while sand and gravel content decrease.

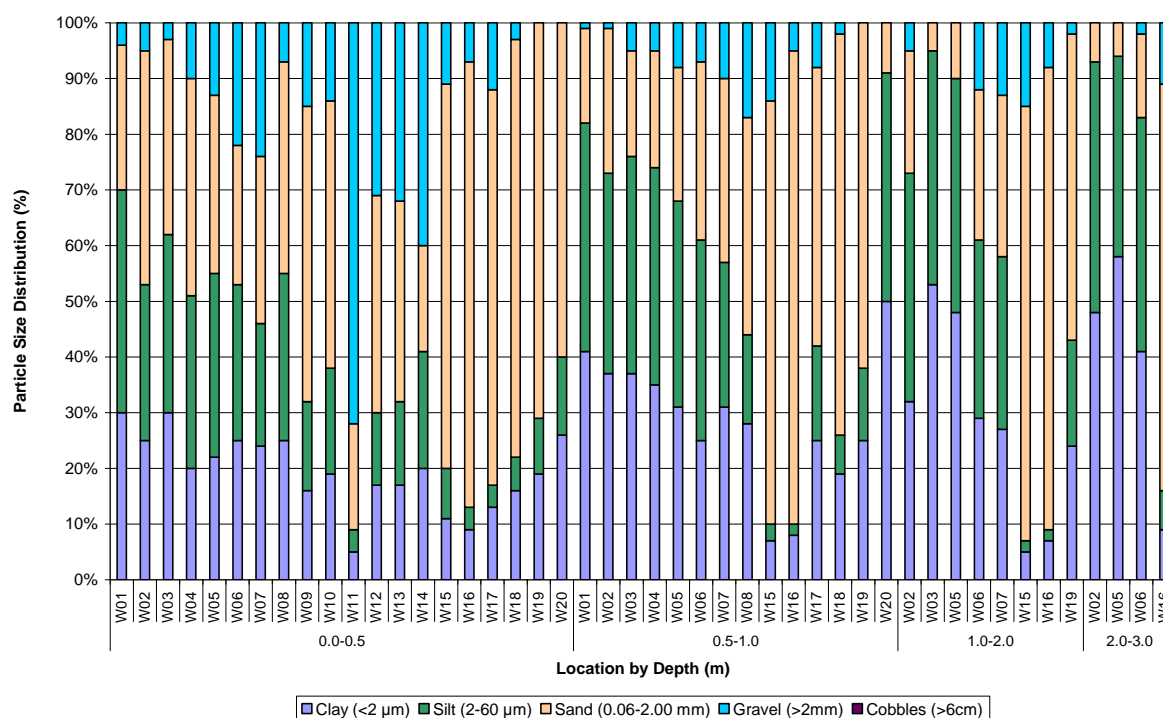


Figure 3-1 Graphical summary of particle size distribution by depth across The Narrows pipeline route.

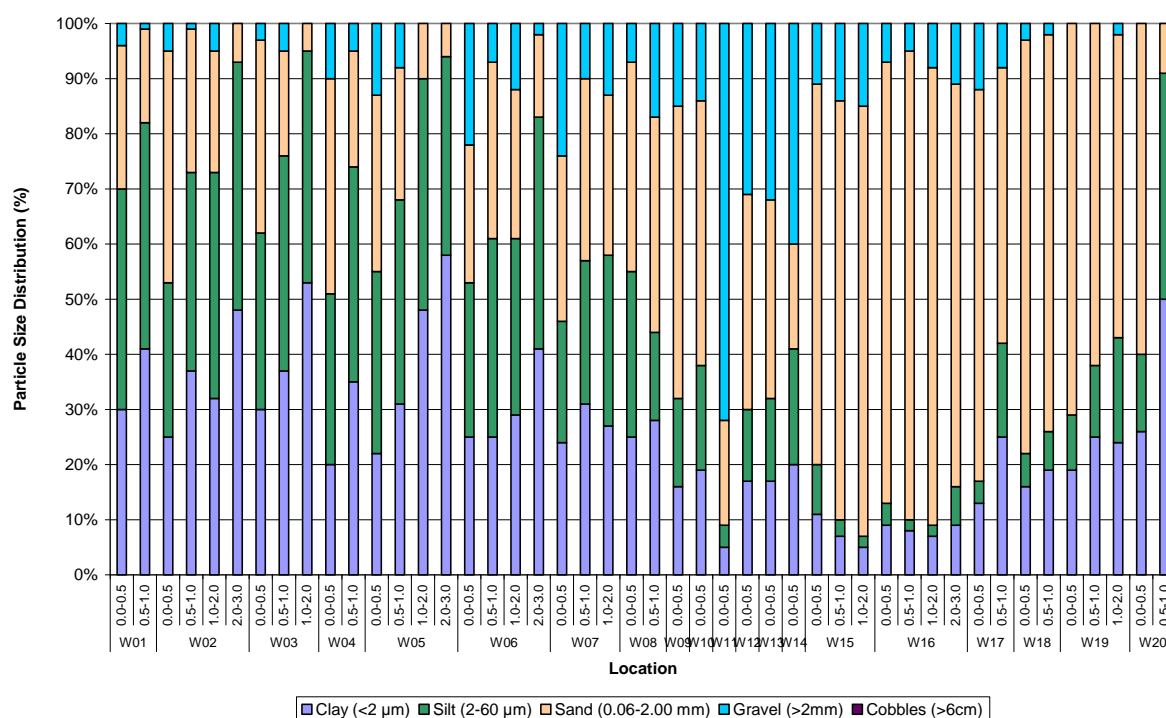


Figure 3-2 Graphical summary of particle size distribution by location across The Narrows pipeline route.

Table 3-1 provides the summary statistics for PSD across the pipeline route. The results show that sediments across the pipeline route are dominated by sand (41%), with relatively even portions of silt (23%) and clay (25%).

Table 3-1 Summary statistics for particle size distribution of sediments across all sample locations and depth horizons for The Narrows pipeline route.

	Percent Clay (<2µm)	Percent Silt (2-60µm)	Percent Sand (0.06-2.00mm)	Percent Gravel (>2mm)	Percent Cobbles (>6cm)
Number of Samples	46	46	46	46	46
Mean	25.4	23.3	40.9	10.3	0.0
Standard Deviation	13.1	14.2	23.9	13.0	0.0
Minimum	5	2	5	0	0
Maximum	58	45	85	72	0

3.2 Chemical Results

Laboratory results obtained during the study are summarised in Table 3-2. Primary analytical reports are provided in Appendix 3. Results are compared against the Screening Levels listed in Table 2, Appendix A of the NAGD (Commonwealth of Australia 2009) and against DEH (1998) EIL and HIL-A concentrations and are summarised below. Exceedances of these Screening Levels by individual sample locations are identified within Figure 3-3.

3.2.1 Assessment of Results against the NAGD

Metals

- Aluminium, iron, cobalt, manganese, selenium and vanadium were above LOR in all samples at all locations. There are no NAGD Screening Levels for these metals
- Antimony and cadmium were below LOR in all samples
- Arsenic was above LOR in all samples, across all locations. Four samples, each from different locations (W10, W11, W12, and W16), exceeded the NAGD Screening Level of 20mg/kg. Three of these exceedances (W10, W11 and W12) occurred in the surface 0.5m. The 95% UCL of the mean for arsenic was below the NAGD Screening Level
- Chromium, copper, lead, nickel and zinc were above LOR and below respective NAGD Screening Levels in all samples across all locations. All 95% UCLs of the means were below respective NAGD Screening Levels
- Silver was below LOR in all but four samples. These samples were from two locations (W5 and W6) and results were below the NAGD Screening Level. The 95% UCL of the mean was also below the NAGD Screening Level
- Mercury was above LOR in approximately half of all samples. All detections were below the NAGD Screening Level. The 95% UCL of the mean was also below the NAGD Screening Level

Organotins

- Tributyltin was below LOR in all samples, across all locations

Polycyclic Aromatic Hydrocarbons (PAHs)

- All PAH species, except acenaphthylene, acenaphthene, anthracene, and dibenz(a,h)anthracene, were above LOR in at least one sample. There are no NAGD Screening Levels for individual PAH species for comparison
- In samples where PAHs were detected, the Sum of PAHs was below the NAGD Screening Level

Nutrients

- Nitrite was below LOR in all samples, across all locations
- Nitrate was below LOR in all but one sample (W1: 0.5-1.0m)
- Total Kjeldahl Nitrogen (TKN) results were variable across locations ranging from <20 to 1,660mg/kg
- Ammonia was above LOR at one location only (W5: 0.5-1.0m, 1.0-2.0m and 2.0-3.0m)
- Total Phosphorus was relatively consistent across locations, ranging from 82 to 280mg/kg
- Reactive Phosphorus was relatively consistent across locations, ranging from 0.2 to 2.3mg/kg

BTEX

- All BTEX species were below LOR across all locations

Total Petroleum Hydrocarbons (TPHs)

- C6-C9 and C10-C14 fractions were below LOR in all samples, across all locations
- C15-C28 and C29-C36 fractions were above LOR in all samples from locations W5 and W15. All other sites analysed were below LOR
- The NAGD Screening Level for the Sum of TPHs was not exceeded in any sample. The 95% UCL of the mean was also below the NAGD Screening Level

Organophosphorus Pesticides

- All organophosphorus pesticides were below LOR in all samples, across all locations

Organochlorine Pesticides

- All organochlorine pesticides were below LOR in all samples, across all locations

Polychlorinated Biphenyls (PCBs)

- All polychlorinated biphenyls were below LOR in all samples, across all locations

3.2.2 Assessment of Results against DEH Guidelines

The following parameters reported concentrations exceeding EIL guidelines detailed in DEH (1998):

- Manganese exceeded EIL guidelines in seven samples from four locations (W15: 0.5-1.0m; W16: 0.5-1.0m, 1.0-2.0m; W17: 0-0.5m, 0.5-1.0m; and W18: 0-0.5m, 0.5-1.0m)
- Arsenic exceeded EIL guidelines in four samples, each from different locations (W10, W11, W12, and W16), exceeded the EIL guideline level of 20mg/kg. Three of these exceedances (W10, W11 and W12) occurred in the surface 0.5m

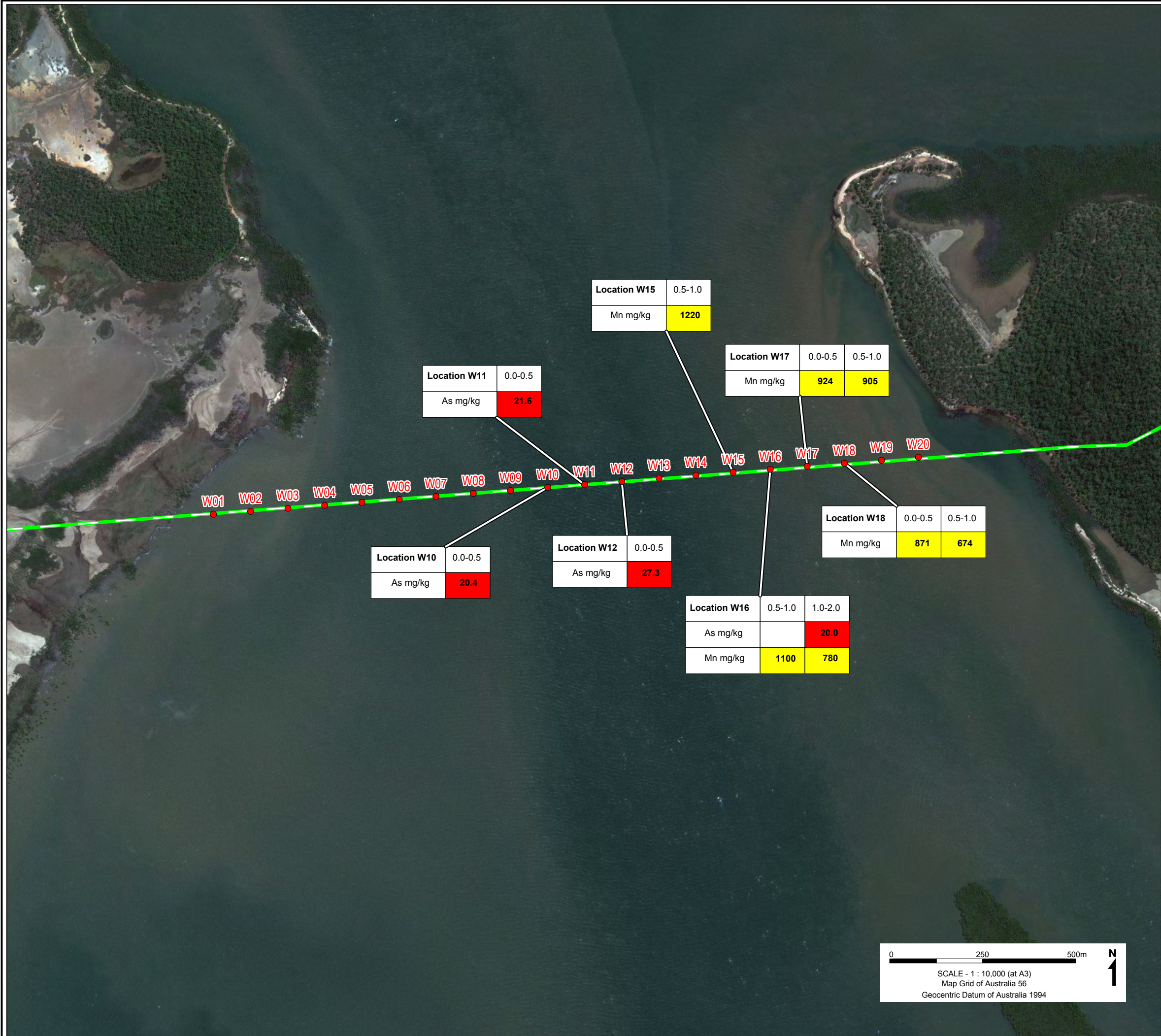
There were no exceedances of HIL-A guidelines.

Table 3-2: Contaminant results for sediments within The Narrows pipeline crossing dredge area

[illegible]

Location	Units	LOR	NAGD PQL	DEH (1998) EIL	DEH (1998) HIL-A	NAGD Screening Level	W1	W1	W2	W2	W2	W2	W3	W3	W3	W4	W4	W5	W5	W5	W5	W6	W6	W6	W6	W7	W7	W7	W8	W8	W9	W10	W11	W12	W13	W14	W15	W15	W15	W15	W16	W16	W16	W17	W17	W18	W18	W19	W19	W20	W20	Mean/ Geomean	Standard Devialtion	95% UCL	Normal (N) Log-normal (L) Neither (X)			
Horizon							0-0.5	0.5-1	0-0.5	0.5-1	1-2.0	2.0-3.0	0-0.5	0.5-1	1.0-2.0	0-0.5	0.5-1.0	0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	0-0.5	0.5-1.0	1.0-2.0	0.0-0.5	0.5-1.0	1.0-2.0	0.0-0.5	0.5-1.0	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0.5-1.0	1.0-2.0	2.0-3.0	0-0.5	0.5-1.0	0-0.5	0.5-1	1-1.6	0-0.5	0.5-1.0										
Date							1/05/10	1/05/10	1/05/10	1/05/10	1/05/10	1/05/10	1/05/10	1/05/10	1/05/10	1/05/10	1/05/10	1/05/10	7/05/10	7/05/10	7/05/10	7/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10	6/05/10				
Organophosphorus Pesticides																																																										
Bromophos-ethyl	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10									<10	-	<10	-			
Carbophenothion	µg/kg	10	10				<10	<10										<10	<10	<10	<10															<10					<10	<10	<10	<10								<10	-	<10	-			
Chlorfenvinphos (E)	µg/kg	10	10				<10.0	<10.0										<10.0	<10.0	<10.0	<10.0														<10.0					<10.0	<10.0	<10.0	<10.0								<10	-	<10	-				
Chlorfenvinphos (Z)	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Chlorpyrifos	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Chlorpyrifos-methyl	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Demeton-S-methyl	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Diazinon	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Dichlorvos	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Dimethoate	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Ethion	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Fenamiphos	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Fenthion	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Malathion	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Azinphos Methyl	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Monocrotophos	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Parathion	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Parathion-methyl	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Phinphos-ethyl	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Prothiols	µg/kg	10	10				<10	<10										<10	<10	<10	<10														<10					<10	<10	<10	<10							<10	-	<10	-					
Organochlorine Pesticides																																																										
Aldrin	µg/kg	0.5	1				<0.50	<0.50										<0.50	<0.50	<0.50	<0.50														<0.50					<0.50	<0.50	<0.50	<0.50								<0.50	-	<0.50	-				
alpha-BHC	µg/kg	0.5	1				<0.50	<0.50										<0.50	<0.50	<0.50	<0.50														<0.50					<0.50	<0.50	<0.50	<0.50								<0.50	-	<0.50	-				
beta-BHC	µg/kg	0.5	1				<0.50	<0.50										<0.50	<0.50	<0.50	<0.50														<0.50					<0.50	<0.50	<0.50	<0.50								<0.50	-	<0.50	-				
delta-BHC	µg/kg	0.5					<0.50	<0.50										<0.50	<0.50	<0.50	<0.50														<0.50					<0.50	<0.50	<0.50	<0.50								<0.50	-	<0.50	-				
4,4'-DDD	µg/kg	0.5	1			2	<0.50	<0.50										<0.50	<0.50	<0.50	<0.50														<0.50					<0.50	<0.50	<0.50	<0.50								<0.50	-	<0.50	-				
4,4'-DDE	µg/kg	0.5	1			2.2	<0.50	<0.50										<0.50	<0.50	<0.50	<0.50														<0.50					<0.50	<0.50	<0.50	<0.50								<0.50	-	<0.50	-				
4,4'-DDT	µg/kg	0.5	1				<0.50	<0.50										<0.50	<0.50	<0.50	<0.50														<0.50					<0.50	<0.50	<0.50	<0.50								<0.50	-	<0.50	-				
DDT (total)	µg/kg	0.5				1.6	<0.50	<0.50										<0.50	<0.50	<0.50	<0.50														<0.50					<0.50	<0.50	<0.50	<0.50			</												

WorleyParsons Services Pty Ltd bears the responsibility for the information reported in this document (the information is not to be used for any purpose other than that for which it is provided) and is not to be used for any purpose other than that for which it is provided. The information is provided for your reference only and is not to be used for any purpose other than that for which it is provided. The information is provided for your reference only and is not to be used for any purpose other than that for which it is provided. The information is provided for your reference only and is not to be used for any purpose other than that for which it is provided.



LEGEND

- Sediment sample locations
- Gas pipeline Route 3H

Contaminant Levels

- Value Exceeds both EIL and NAGD levels
- Value exceeds EIL

Source Information

Indicative Gas Pipeline
Supplied by Origin Energy 27/03/2010
Satellite imagery
Captured by GeoEye-1 on 24 March 2009
Sediment sampling locations
Supplied by WorleyParsons 31/05/2010
Laboratory Results
Supplied by ALS Laboratory Group from data collected by WorleyParsons May 2010

AUSTRALIA PACIFIC LNG PROJECT

Figure 3.3
Sample locations and corresponding guideline exceedences

4. Chemical Data Validation

This section examines the validity of the analytical data obtained in the study. It provides the scientific confidence in the actual results presented.

4.1 Laboratory Accuracy and Precision

The primary laboratory (ALS) and secondary laboratory (AAA) incorporated a range of quality assurance (QA) and QC (QA/QC) methods to ensure accuracy of data. These are detailed further below. Laboratory QA/QC reports are included in laboratory reports in Appendix 3 (ALS) and Appendix 4 (AAA).

4.1.1 Laboratory Blanks

Laboratory blanks are samples analysed by the laboratory during sample analysis to assist in identifying any cross contamination of samples during laboratory preparation, extraction or analysis. Analysis of laboratory blank samples should result in a concentration not exceeding the detection limit for a particular contaminant. An assessment of laboratory blank samples reported by ALS demonstrates concentrations below the detection limit for all parameters, so cross-contamination of samples does not appear to have occurred.

4.1.2 Laboratory Duplicates

The precision of analysis performed by the laboratory is determined by the calculation of the relative percent difference (RPD). The RPD is calculated based on a comparison of an intra-laboratory split of the sample sediment material (not aliquot splits) with results representing the percent difference between the two sample concentrations for a specific contaminant. The NAGD recommends that laboratory duplicate samples should be within an RPD of $\pm 35\%$. Review of laboratory QC results identifies that TKN, reactive phosphorus, TPH C15-C28 and silver were outside this criterion, while magnesium was outside this twice.

While NAGD states that the RPD should be within $\pm 35\%$, ALS prefers to use a sliding scale to account for greater analytical uncertainty for contaminant concentrations nearer to the detection limit. The laboratory RPDs have been assessed using the following protocol:

- Results <10 times LOR: no limits
- Results between 10 and 20 times LOR: 0% - 50%
- Results >20 times LOR: 0% - 20%

Three metals, manganese, aluminium and iron, were recorded outside of the above criteria for laboratory duplicates. Aluminium and iron were each recorded on a single occasion and manganese was recorded twice.

4.1.3 Surrogate Spikes

Surrogate spikes are compounds similar in composition to the target analyte but are not likely to be present within the environment. Samples are spiked with the surrogate material and a calculation of the percent recovery of the spiked amount against the returned concentration is performed. The percent recovery result provides an indication of the ability of the laboratory to extract a specified contaminant type from the sample matrix. Typically surrogate spikes are performed only on organic compounds. NAGD states that recovery limits of 75% - 125% are generally acceptable.

For the analysis, a number of organophosphorus (OPP) and organochlorine (OCP) pesticides were outside the accepted NAGD recovery limits.

The NAGD criteria range is likely based on surrogate recoveries from 'clean' matrix free samples. In real samples, the range of recoveries can be much greater and often lower due to matrix interference. As such, ALS has developed recovery limits for different contaminants. Refer to Appendix 3 for the relevant dynamic recovery limits applied by the laboratory. Based on these limits, there are no surrogate spikes that fall outside of the adopted criteria.

Matrix interference occurs when samples contain certain properties such as high moisture content, high salinity and/or contain substances such as plant sterols, waxes, lipids or other organic matter that can inhibit the full extrusion of a contaminant during laboratory surrogate extraction.

4.1.4 Matrix Spikes

Matrix spikes are undertaken by the laboratory to identify the amount of interference from the sediment matrix on contaminant recovery. Samples collected from the field are split from the base sample and spiked with a known contaminant concentration. The percent recovery of the contaminant is then calculated.

The accuracy of the data is determined through analysis of spiked samples. NAGD recommends that:

"Recovery Rates (for matrix spiked samples) should be within the limits specified for the analysis method (typically 75-125%)".

Matrix spike recoveries show that a number of PAH, OCP, OPP, and TPH species were outside of the NAGD criteria and ALS specified limits in the majority of batches. ALS reported that this was due to matrix interference and confirmed results through re-analysis. Mercury, TBT and total phosphorus were also outside these criteria, each from one batch only.

Consequently, reported contaminant concentrations by the laboratory are potentially lower than actual contaminant concentrations found within sediment samples. Given that these analytical groups were typically not detected or were well below Screening Levels, these matrix spike recovery exceedances are not of significant concern.

4.1.5 Field Split Triplicate, Replicate Triplicate and Inter-Batch Duplicate Analysis

Table 4-1 provides a summary of RPDs and Relative Standard Deviations (RSDs) of field split triplicate, field replicate triplicate and inter-batch duplicate analyses. Results for the various analyses are discussed below.

Field Split Triplicate Sample Analyses

Field split triplicates are samples that are split from the original sample with two of the samples submitted to the primary laboratory and the third sample submitted to the secondary laboratory for analysis. This assesses variation associated with sub-sample handling and repeatability of laboratory analysis. Contaminant concentrations are compared between the split samples through calculation of the RSD. A field split triplicate was collected from one location (W16) over three depth horizons (0.0-0.5m, 0.5-1.0m and 1.0-2.0m).

The NAGD states that RSDs for field split samples should be within $\pm 50\%$. Assessment of field split triplicate samples identified all contaminants were within the 50% criterion (Table 4-1). Based on RSD data analysis for field split triplicate samples, sub-sample handling was undertaken effectively to a standard that ensured sample contaminant concentrations were representative of sampled sediments.

Field Replicate Triplicate Analyses

Field replicate triplicate samples (i.e. three separate samples collected in the field at a given sampling location) were collected from two locations (W5 and W18) to test for sediment homogeneity. Triplicate samples were completed for each depth horizon analysed at each location. Contaminant results were compared through calculation of the RSD. According to NAGD:

“Field replicates (that is, two separate samples taken at the same location) should agree within an RPD (or for three samples at the one location, the relative standard deviation, RSD) of $\pm 50\%$, although they may not always do so where the sediments are very inhomogeneous or greatly differing in grain size”.

All contaminants, except for lead and Sum of TPH, were compliant with the 50% criterion. Lead and the Sum of TPH marginally exceeded the 50% RSD in one sample each, 50.48% and 51.67% respectively. Despite these exceedances it can still be concluded that sample contaminant concentrations are relatively homogenous across the dredge area.

Inter-batch Duplicate Sample Analyses

Inter-batch duplicates are samples that are split from the original sample and each sample is then submitted to the laboratory in a different sample batch for analysis. This is to identify any analysis variation between sample batches. Contaminant concentrations are compared between the two split samples through calculation of the RPD. The RPD value provides an indication of the accuracy of laboratory analysis between samples/batches. The NAGD states that RPDs for duplicate split samples should be within $\pm 50\%$. Inter-batch duplicate samples were taken from three locations (W3, W6 and W16) over three depths horizons (0.0-0.5m, 0.5-1.0m and 1.0-2.0m).

Three contaminants, arsenic (57.65%), mercury (66.67%) and Sum of PAHs (102.22%), fell outside of the NAGD criteria for one sample each.

Given that each of these contaminants exceeded the NAGD criteria in only one of nine samples submitted and based on RPD data analysis for remainder of the contaminants, laboratory analysis between batches appears to be consistent.

4.1.6 Trip Blanks

Field trip blank samples provide an indication of cross-contamination from volatile substances during field sampling. Three trip blank samples were collected in the field and sent to the primary laboratory for BTEX analysis. BTEX concentrations were below detection limits, so no cross-contamination is likely to have occurred during in-field sample processing.

4.2 Holding Times

Samples were kept chilled whilst in the field, during storage and during delivery, and stored under refrigeration at the laboratories. All sample analyses were undertaken within required holding times by the primary laboratory (ALS) and the secondary laboratory (AAA).

Table 4-1: Results for field split triplicate, replicate triplicate and inter-batch precision testing

			Moisture Content																						
			Total Organic Carbon		Aluminium	Iron	Arsenic	Chromium	Copper	Cobalt	Lead	Manganese	Nickel	Selenium	Vanadium	Zinc	Mercury	Chrysene	Benzo(g,h,i)perylene	Sum of PAHs	C15 - C28 Fraction	C29 - C36 Fraction	C10 - C36 Fraction (sum)		
Location	Horizon	Date	%	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	mg/kg	mg/kg	mg/kg		
Units																									
Inter-batch Duplicate																									
W3	0-0.5	1/05/2010	42.2	0.98	16000	28800	13.4	23.9	17.3	15.4	7.4	209	11	0.6	48.6	44.3	<0.01	<4	<4	5					
IB2	0-0.5	1/05/2010	44.9	1.18	16100	30600	16.6	24.7	19.3	17	7.9	236	11.6	0.7	50	47.3	<0.01	<4	<4	<4					
RPD			6.20%	18.52%	0.62%	6.06%	21.33%	3.29%	10.93%	9.88%	6.54%	12.13%	5.31%	15.38%	2.84%	6.55%	ND	ND	ND	ND	---	---	---		
W3	0.5-1	1/05/2010	46.3	1.12	20300	30700	12	27.7	25.1	15.3	8.7	200	12.6	0.9	60.6	44.5	0.01	<4	<4	5					
IB2	0.5-1.0	1/05/2010	46.5	1.15	22100	28600	10.8	27.9	28.4	13.9	9.1	185	12.8	0.8	63.9	47.5	<0.01	<4	<4	<4					
RPD			0.43%	2.64%	8.49%	7.08%	10.53%	0.72%	12.34%	9.59%	4.49%	7.79%	1.57%	11.76%	5.30%	6.52%	ND	ND	ND	ND	---	---	---		
W3	1.0-2.0	1/05/2010	53.2	3.19	25300	33800	8.66	25.7	42.9	16	10.4	225	14.9	1.1	77.5	41.8	<0.01	7	5	34					
IB2	1-2.0	1/05/2010	49.1	3.46	22000	31900	9.06	23.7	37.9	17.2	9.2	204	14.1	1	83.7	40.3	<0.01	6	5	11					
RPD			8.02%	8.12%	13.95%	5.78%	4.51%	8.10%	12.38%	7.23%	12.24%	9.79%	5.52%	9.52%	7.69%	3.65%	ND	15.38%	0.00%	102.22%	---	---	---		
W6	0-0.5	6/05/2010	38.1	1.05	11400	21200	14.6	21.5	16.1	11.5	7.7	233	10.5	0.5	45.2	30.8	0.02	<4	<4	<4					
IB5	0-0.5	7/05/2010	39.3	1.11	10700	19500	14	19.2	14.1	11	6.7	318	9.4	0.6	36.4	28.1	0.02	<4	<4	<4					
RPD			3.10%	5.56%	6.33%	8.35%	4.20%	11.30%	13.25%	4.44%	13.89%	30.85%	11.06%	18.18%	21.57%	9.17%	0.00%	ND	ND	ND	---	---	---		
W6	0.5-1.0	6/05/2010	24.1	1.14	8960	18700	12	16.9	13.8	9.5	6.5	212	8	0.5	33.2	24.2	0.01	<4	<4	<4					
IB5	0.5-1.0	7/05/2010	30.2	1.07	12500	21000	14.8	21.9	17.3	14.7	8.1	200	11.3	0.6	50.9	33.3	0.02	<4	<4	<4					
RPD			22.47%	6.33%	32.99%	11.59%	20.90%	25.77%	22.51%	42.98%	21.92%	5.83%	34.20%	18.18%	42.09%	31.65%	66.67%	ND	ND	ND	---	---	---		
W6	1.0-2.0	6/05/2010	36.4	1.49	12000	25100	16.8	23.6	19.5	13	8.5	305	10.6	0.6	51.6	33	0.02	<4	<4	15					
IB5	1.0-2.0	7/05/2010	36.4	1.16	12700	24300	15.4	23.3	17.8	12.2	8.2	287	10.6	0.5	58.1	33.2	0.02	<4	<4	<4					
RPD			0.00%	24.91%	5.67%	3.24%	8.70%	1.28%	9.12%	6.35%	3.59%	6.08%	0.00%	18.18%	11.85%	0.60%	0.00%	ND	ND	ND	---	---	---		
W16	0-0.5	4/05/2010	24.6	0.36	3800	12200	16	9.4	6	8.5	2.6	460	5.6	0.4	31.5	12.1	<0.01	<4	<4	<4	<3	<5	<3		
IB3	0-0.5	4/05/2010	26.6	0.35	4110	11000	8.84	7.8	4.5	7.3	2.9	496	4.8	0.3	25.7	14.1	<0.01	5	8	62	6	<5	6		
RPD			7.81%	2.82%	7.84%	10.34%	57.65%	18.60%	28.57%	15.19%	10.91%	7.53%	15.38%	28.57%	20.28%	15.27%	ND	ND	ND	ND	ND	ND	ND		
W16	0.5-1.0	4/05/2010	24.6	0.18	2320	12300	14.4	6.2	3.3	7.6	2.1	1100	4.4	0.3	36.2	8.2	<0.01	<4	<4	<4	<3	<5	<3		
IB3	0.5-1.0	4/05/2010	23	0.19	2440	10400	12.5	5.3	3.2	9.1	2.3	1040	5	0.2	26.6	8.8	<0.01	<4	<4	<4	3	<5	3		
RPD			6.72%	5.41%	5.04%	16.74%	14.13%	15.65%	3.08%	17.96%	9.09%	5.61%	12.77%	40.00%	30.57%	7.06%	ND	ND	ND	ND	ND	ND	ND		
W16	1.0-2.0	4/05/2010	22.7	0.23	2160	11500	20	7.4	3.5	6.9	2.1	780	3.8	0.2	27.6	7.6	<0.01	<4	<4	<4	<3	<5	<3		
IB3	1.0-1.2	4/05/2010	21.5	0.25	2190	11000	14.1	6	3.1	7.2	2.1	692	3.8	0.3	27.7	7.4	<0.01	<4	<4	<4	<3	<5	<3		
RPD			5.43%	8.33%	1.38%	4.44%	34.60%	20.90%	12.12%	4.26%	0.00%	11.96%	0.00%	40.00%	0.36%	2.67%	ND	ND	ND	ND	ND	ND	ND		

			Moisture Content		Total Organic Carbon											Chrysene			Benzo(g,h,i)perylene			Sum of PAHs			C15 - C28 Fraction			C29 - C36 Fraction			C10 - C36 Fraction (sum)				
Location	Horizon	Date	%	%	Aluminium	Iron	Arsenic	Chromium	Copper	Cobalt	Lead	Manganese	Nickel	Selenium	Vanadium	Zinc	Mercury	µg/kg	µg/kg	µg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Field Replicate Triplicate																																			
W5	0-0.5	7/05/2010	40.7	1.05	11500	22900	16.2	22.1	16.8	14.8	7.7	254	10.7	0.7	42.8	36.6	0.02	<4	<4	<4	5	6	11												
T16	0-0.5	7/05/2010	35.4	0.9	10800	21900	14.4	20.2	13.6	15.7	6.5	285	9.9	0.6	34.7	36.3	0.02	<4	<4	<4	<3	6	6												
T17	0-0.5	7/05/2010	40.1	0.89	9830	21700	15	19.1	12.6	15.7	5.9	242	9.4	0.5	35.9	35.9	0.02	<4	<4	<4	8	10	18												
RSD			7.49%	9.47%	7.83%	2.90%	6.03%	7.42%	15.31%	3.37%	13.68%	8.52%	6.56%	16.67%	11.56%	0.97%	0.00%	ND	ND	ND	32.64%	31.49%	51.67%												
W5	0.5-1.0	7/05/2010	42	1.16	14100	25600	16.7	24.6	20.1	13.8	8.9	220	11.5	0.7	48.2	37.6	0.02	<4	<4	<4	5	6	11												
T16	0.5-1.0	7/05/2010	38.6	1.1	14100	31800	18.1	29.9	21.4	13.5	11	298	11.6	0.6	75.7	37.1	0.02	<4	<4	<4	6	8	14												
T17	0.5-1.0	7/05/2010	39.4	0.97	13800	22400	14.4	24.8	19.8	12.9	8.8	229	11.2	0.6	43.8	36.4	0.02	<4	<4	<4	7	12	19												
RSD			4.44%	9.02%	1.24%	17.97%	11.39%	11.36%	4.16%	3.42%	12.99%	17.14%	1.82%	9.12%	30.93%	1.63%	0.00%	ND	ND	ND	16.67%	35.25%	27.56%												
W5	1.0-2.0	7/05/2010	44.5	1.39	17000	23700	8.94	23.9	30.1	12.2	9.7	238	11.8	0.6	53	40.1	0.02	<4	<4	<4	6	11	17												
T16	1.0-2.0	7/05/2010	43.9	0.81	16500	25300	10.9	25.5	27.5	14.7	9.2	237	12.5	0.6	55	40	0.02	<4	<4	<4	<3	9	9												
T17	1.0-2.0	7/05/2010	41.3	1.19	17800	26800	10.4	27.5	27.7	14.2	9.6	368	13.3	0.6	59.5	42.8	0.02	<4	<4	<4	5	13	18												
RSD			3.93%	26.07%	3.83%	6.14%	10.10%	7.04%	5.09%	9.66%	2.79%	26.81%	5.99%	0.00%	5.96%	3.88%	0.00%	ND	ND	ND	12.86%	18.18%	33.63%												
W18	0-0.5	7/05/2010	27.8	0.55	4830	12400	13.9	10.1	6.1	10.1	3.6	871	6.8	0.3	32.3	15.4	<0.01	<4	<4	<4															
T20	0-0.5	7/05/2010	28.6	0.34	5360	11700	12.7	10.2	6.5	9.8	3.5	581	7.1	0.3	30.4	17.2	<0.01	<4	<4	8															
T21	0-0.5	7/05/2010	28.7	0.32	5360	13500	16.1	10.4	6.7	10.3	3.7	969	7.5	0.4	34.2	16.5	<0.01	<4	<4	<4															
RSD			1.74%	31.59%	5.90%	7.24%	12.11%	1.49%	4.75%	2.50%	2.78%	25.00%	4.92%	17.32%	5.88%	5.54%	ND	ND	ND	ND	---	---	---												
W18	0.5-1.0	7/05/2010	27.5	0.26	5550	12300	16.2	10.7	6.8	9.7	3.8	674	7.1	0.4	30.1	16.4	<0.01	<4	<4	<4															
T20	0.5-1.0	7/05/2010	26.4	0.23	5000	22400	20	14.3	7.1	9.6	8.6	719	6.8	0.6	69.4	17.4	<0.01	<4	<4	<4															
T21	0.5-1.0	7/05/2010	27.7	0.24	5550	13200	11.5	10.5	7.6	8.8	3.9	541	6.9	0.3	35.9	15.9	<0.01	<4	<4	<4															
RSD			2.57%	6.28%	5.92%	35.01%	26.78%	18.07%	5.64%	5.27%	50.48%	14.36%	2.20%	35.25%	47.00%	4.61%	ND	ND	ND	ND	---	---	---												
Field Split Triplicate																																			
W16	0-0.5	4/05/2010	24.6	0.36	3800	12200	16	9.4	6	8.5	2.6	460	5.6	0.4	31.5	12.1	<0.01	<4	<4	<4	<3	<5	<3												
T18	0-0.5	4/05/2010	24.9	0.41	3360	10400	9.51	6.8	4.3	7	2.4	618	4.4	0.2	25.5	12.2	<0.01	<4	<4	<4	<3	<5	<3												
T19	0-0.5	4/05/2010	24.1	0.36		11000	10	7.9	5.3		2.1	430	4.8		27	12	<0.01	<5	<5	<100	<50	<50	<3												
RSD			1.65%	7.66%	8.69%	8.18%	30.53%	16.25%	16.43%	13.69%	10.63%	20.09%	12.39%	47.14%	11.15%	0.83%	ND	ND	ND	ND	ND	ND	ND												
W16	0.5-1.0	4/05/2010	24.6	0.18	2320	12300	14.4	6.2	3.3	7.6	2.1	1100	4.4	0.3	36.2	8.2	<0.01	<4	<4	<4	<3	<5	<3												
T18	0.5-1.0	4/05/2010	22.7	0.18	2300	11100	13.5	5	3.2	8.2	2	1260	4.2	0.3	27.6	8.8	<0.01	<4	<4	<4	<3	<5	<3												
T19	0.5-1.0	4/05/2010	19.8			13000	15	6.7	4.1		1.7	1400	4.5		32	8.9	<0.01	<5	<5	<100	<50	<50	<3												
RSD			10.81%	0.00%	0.61%	7.92%	5.28%	14.64%	13.96%	5.37%	10.77%	11.98%	3.50%	0.00%	13.47%	4.39%	ND	ND	ND	ND	ND	ND	ND												
W16	1.0-2.0	4/05/2010	22.7	0.23	2160	11500	20	7.4	3.5	6.9	2.1	780	3.8	0.2	27.6	7.6	<0.01	<4	<4	<4	<3	<5	<3												
T18	1.0-2.0	4/05/2010	27.9	0.23	2010	9900	13.9	5.2	3	7.2	1.7	1150	3.4	0.3	25.1	7.2	<0.01	<4	<4	<4	<3	<5	<3												
T19	1.0-2.0	4/05/2010	18.5			11000	13	6.1	3.6		1.8	740	3.4		27	6.7	<0.01	<5	<5	<100															
RSD			20.44%	0.00%	5.09%	7.58%	24.36%	17.74%	9.55%	3.01%	11.15%	25.40%	6.54%	28.28%	4.91%	6.29%	ND	ND	ND	ND	ND	ND	ND												

Note: Cells shaded yellow represent RPD or RSD percentages outside of the NAGD criteria (only substances with concentrations above detection limits for each sample have been reported)

5. Discussion and Conclusions

Chemical analyses of sediments within The Narrows pipeline crossing identifies that contaminant substances, if present, are generally below NAGD Screening Levels. The only exception to this is the presence of arsenic at four locations. Arsenic was identified in the surface sediments (0.0-0.5m) above the NAGD Screening Levels across the deeper channel area and in sediments 1.0-2.0m below the surface on the Curtis Island edge of the channel. Arsenic has previously been identified as occurring naturally within sediments in the Port of Gladstone and Port Curtis (GHD 2009; Storey et al. 2007) and in particular has previously been identified within this section of The Narrows (URS 2009). A study by URS (2009) characterised sediments over two similar linear routes across The Narrows and identified elevated levels of arsenic. It is noted however, that the results of the URS (2009) study identified elevated arsenic concentrations only in sediments below 2m and not within the surface sediments as has been identified within this current study.

Storey et al. (2007) state that, in general, high metal concentrations within Port Curtis are associated with areas of lower water movement and higher silt/clay content. This statement contradicts the results of this study, as locations which recorded high arsenic concentrations were located across the deeper, faster running area of the channel and in comparison with the remainder of the locations had lower percentages of silt and clay fractions. However, The Narrows is considered a relatively pristine area with no anthropogenic sources of contamination and, as has been previously noted, arsenic is a naturally occurring element in the local geology (Storey et al. 2007). As such, the presence of arsenic in the upper sediment layers is not considered likely to be anthropogenically derived, but a function of natural variation within the sediments.

With regards to other contaminants, URS (2009) identified elevated concentrations of copper, nickel and mercury in comparison with the NAGD criteria. The current study has not identified elevated concentrations, in comparison with the NAGD criteria, of any of these contaminants.

In comparison with the DEH (1998) guidelines arsenic concentrations, as discussed above, exceeded the EILs. In addition, manganese exceeded the EILs at four locations over a number of sediment horizons. These exceedances occurred in four consecutive locations from the outside edge of the channel, moving closer to Curtis Island. URS (2009) also identified elevated concentrations of manganese within this area, however as for arsenic, elevated concentrations were detected at greater depths than those reported in this current study. Manganese, as with arsenic, is considered a naturally occurring element within the local geology and is often recorded at elevated levels (Storey et al. 2007).

For organic contaminant substances within The Narrows pipeline crossing survey, results are summarised below:


- Total Petroleum Hydrocarbon fractions C6-C9 and C10-C14 were not detected in any sample
- TPH fractions C15-C28 and C29-C36 were detected in two locations from all sediment horizons
- The majority of PAH species were detected in a least one sample, four species were not detected in any sample. Seven locations did not record any PAH species above LOR
- Tributyltin, BTEX, Organochlorine Pesticides, Organophosphorus Pesticides and Polychlorinated Biphenyls were not detected in any sample

The 95% UCL of the mean for all contaminants tested across The Narrows pipeline route were below respective NAGD Screening Levels and EIL and HIL-A. Therefore, based on the analyses undertaken, it is considered that the capital material to be dredged from the pipeline crossing is suitable for unconfined placement at sea, according to the NAGD contaminant assessment framework. The material is also suitable for placement on land according to the DEH (1998) guidelines.

6. References

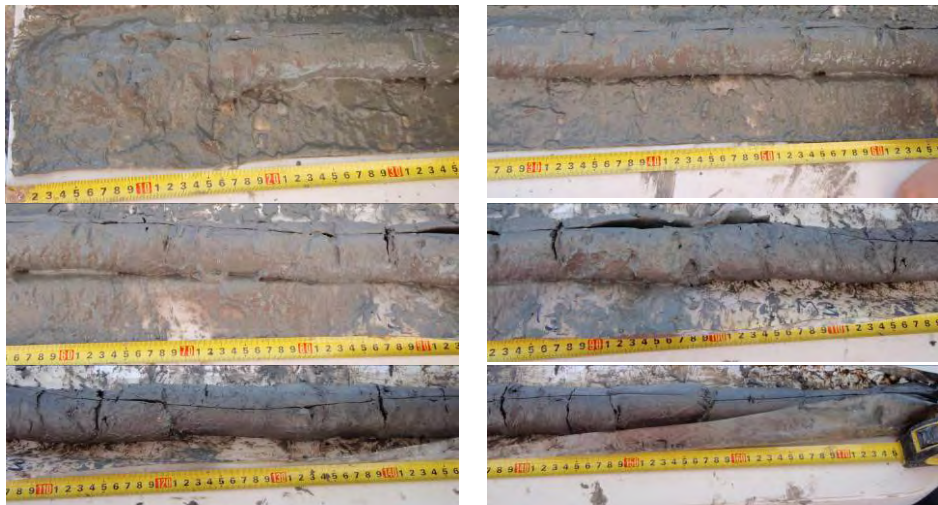
- Commonwealth of Australia (2009) *National Assessment Guidelines for Dredging*. Commonwealth of Australia, Canberra, March 2009.
- DEH (1998) *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland*. Department of Environment and Heritage, Queensland Government. May 1998.
- GHD (2009) *Report for Western Basin Dredging and Disposal Project – Sediment Sampling and Analysis Plan (Draft)*. Prepared by GHD for the Gladstone Ports Corporation, July 2009.
- Storey, A., Andersen, L., Lynas, J. and Melville, F. (2007). *Port Curtis Ecosystem Health Report Card. Port Curtis Integrated Monitoring Program (PCIMP)*, Centre for Environmental Management, Central Queensland University.
- URS (2009) *Marine Sediment Investigation, Environmental Investigations of Proposed Capital Dredging at China Bay and Pipeline Crossing at the Narrows, Gladstone*. Prepared by URS for Santos Ltd. January 2009.

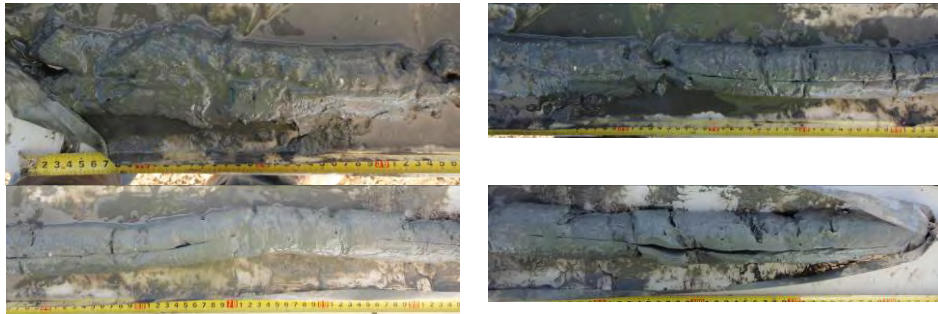
Appendix 1 Core Logs and Photos



General Location of Sampling		The Narrows							
Site Number		W1							
Date/Sample Time		1 May 2010/ 10:05am							
Water Depth at Site		1.1m							
Type of Core Sampler		Vibracore + Piston Core							
Depth Retained		1.1m							
Weather Conditions		Wind 18kn, choppy							
General Information		Refusal at 1.4m							
PSD (%)									
Gravel (2.5)	Sand (21.5)	Silt (40.5)	Clay (35.5)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/ Biota	Odour
0-0.15	Gley 1 3\ Very Dark Grey	Silty clay	High	Very Weak	Trace, Fine	High	Nil	1% shell 5% organics	Sulphurous
0.15 – 0.6	Gley 1 4\ Dark Grey	Silty clay	Moderate	Weak	Nil	High	Nil	5% shell <2cm	Sulphurous
0.6 – 1.1	Gley 1 4\ Dark Grey	Silty clay	Low	Firm	Nil	High	Nil	Nil shell 5% organics	Sulphurous

General Location of Sampling			The Narrows							
Site Number			W2							
Date/Sample Time			1 May 2010/ 9:45am							
Water Depth at Site			1.1m							
Type of Core Sampler			Vibracore + Piston Core							
Depth Retained			2.4m							
Weather Conditions			Wind 18kn, choppy							
General Information			Refusal at 2.8m							
PSD (%)										
Gravel (2.75)		Sand (24.25)		Silt (37.5)		Clay (35.5)				
Strata Change (m)		Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/ Biota	Odour
0 – 0.2		Gley 1 3\ Very dark grey	Silty clay	High	Very Weak	Trace, fine	High	Nil	5% shell <5mm 5% organic	Sulphurous
0.2 – 1.1		Gley 1 4\ Dark grey	Silty clay	Moderate	Weak	Nil	High	Nil	5% <10mm 10% organics	Sulphurous

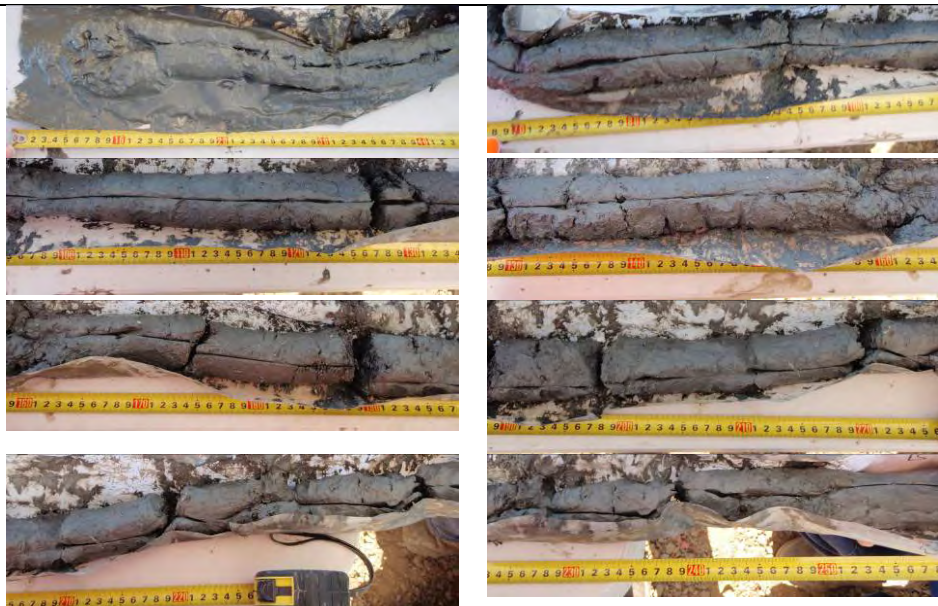
1.1 – 2.4	Gley 1 4\ Dark grey	Silty clay	Low	Firm	Nil	High	Nil	Nil shell 10% organic <20mm	Sulphurous
-----------	------------------------	------------	-----	------	-----	------	-----	--------------------------------	------------

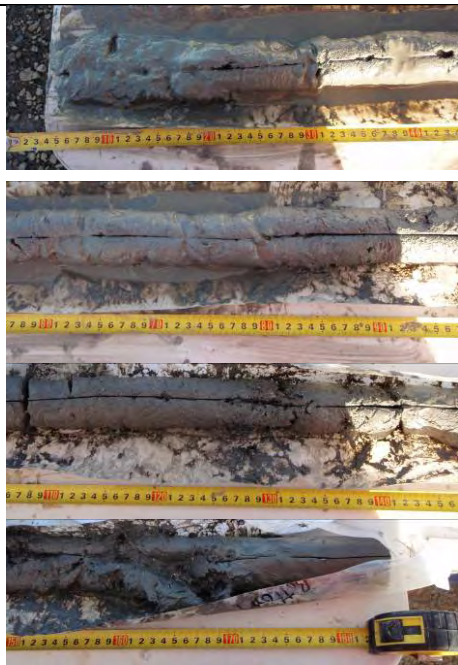

General Location of Sampling		The Narrows							
Site Number		W3							
Date/Sample Time		1 May 2010/ 9:10am							
Water Depth at Site		1.1m							
Type of Core Sampler		Vibracore + Piston Core							
Depth Retained		1.8m							
Weather Conditions		Wind SE 18kn, Choppy							
General Information		Refusal at 2.7m							
PSD (%)									
Gravel (2.66)	Sand (19.67)	Silt (37.67)	Clay (40)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/Biota	Odour
0 – 0.2	Gley 1 3\ Very dark grey	Silty clay	High	Very Weak	Trace sand	Low	Nil	Shell 50% Organic 50% <10mm	Marine
0.2 – 1.0	Gley 1 4\ Dark grey	Silty clay	Moderate	Weak	Nil	High	Nil	1% shell <1mm 20% organic <1mm	Marine
1.0 – 1.8	Gley 1 2.5\ Black	Silty clay	Low	Firm	Nil	High	Nil	Nil shell 80% organic <10mm	Marine

General Location of Sampling		The Narrows							
Site Number		W4							
Date/Sample Time		1 May 2010/ 8:50am							
Water Depth at Site		1.0m							
Type of Core Sampler		Vibracore + Piston Core							
Depth Retained		1.2m							
Weather Conditions		Wind 15kn, choppy							
General Information		Refusal at 1.7m							
PSD (%)									
Gravel (7.5)	Sand (30)	Silt (35)	Clay (27.5)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/ Biota	Odour
0.0-0.4	Gley 1 3\ Very dark grey	Silty Clay	High	Very weak	Trace fine	Low	Nil	Abundant shells – fine to coarse Abundant organics – coarse	Sulphurous
0.4-1.0	Gley 1 4\ Dark grey	Silty clay	Moderate	Weak	Nil	High	Nil	Few fine shells Common organics – fine	Sulphurous
1.0-1.2	Gley 1 5\ Grey	Silty Clay	Moderate	Firm	Nil	High	Nil	Few fine shells Common very fine organics	Sulphurous


General Location of Sampling		The Narrows							
Site Number		W5							
Date/Sample Time		7 May 2010/ 12:00pm							
Water Depth at Site		0.5m							
Type of Core Sampler		Vibracore + Piston Core							
Depth Retained		2.24m							
Weather Conditions		Wind SE 20kn, Choppy							
General Information		Refusal at 2.6m							
PSD (%)									
Gravel (5.25)	Sand (18)	Silt (37)	Clay (39.75)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/Biota	Odour
0 – 0.25	Gley 1 3\ Very dark grey	Silty clay	Moderate	Very Weak	Fine	Low	Nil	20% <40mm	Nil
0.25 – 1.8	Gley 1 3\ Very dark grey	Silty clay	Moderate	Weak	Nil	High	Nil	5% shell <3mm Trace organics	Nil


1.8 – 2.24	Gley 1 2.5\ Black	Clay	Low	Firm	Nil	High	Nil	Trace shell <1mm Trace organics	Nil
------------	----------------------	------	-----	------	-----	------	-----	------------------------------------	-----

General Location of Sampling		The Narrows							
Site Number		W6							
Date/Sample Time		6 May 2010/ 1:40pm							
Water Depth at Site		1.7m							
Type of Core Sampler		Vibracore + Piston Core							
Depth Retained		2.6m							
Weather Conditions		Fine. 10kn SE wind							
General Information		Full length piston, vibracore refusal at 2.7m on stiff clays							
PSD (%)									
Gravel (10.75)	Sand (24.75)	Silt (34.5)	Clay (30)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/ Biota	Odour
0 – 0.3	Gley 1 3\ Very dark grey	Clay silt	High	Very Weak	Fine sand	Low	Nil	50% shell Organic <20mm	Nil
0.3 – 1.9	Gley 1 3\ Very dark grey	Silty clay	Moderate	Weak	Trace fine	Moderate	Few <10mm	40% shell <2mm 10% organics	Faint marine
1.9 – 2.5	Gley 1 4\ Dark grey	Silty clay	Low	Firm	Nil	High	Nil	1% shell <10mm	Nil
2.5 – 2.6	Gley 1 4\ Dark grey	Clay	Dry	Very Firm	Nil	High	Nil	Nil	Nil

General Location of Sampling			The Narrows						
Site Number			W7						
Date/Sample Time			6 May 2010/ 1:15pm						
Water Depth at Site			2.3m						
Type of Core Sampler			Vibracore + Piston Core						
Depth Retained			1.8m						
Weather Conditions			Fine 10kn SE, calm seas						
General Information			Refusal on rocks at 2.2m for vibracore. Refusal of piston around 1.0m on stiff clays.						
PSD (%)									
Gravel (15.67)	Sand (30.67)	Silt (26.33)	Clay (27.33)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/ Biota	Odour
0 – 0.2	Gley 1 3\ Very dark grey	Clay silt	High	Very Weak	Fine	Low	Nil	50% shell <10mm Trace organics	Nil
0.2 – 0.8	Gley 1 3\ Very dark grey	Silty clay	Moderate	Weak	Trace fine	High	<10mm	5% shell <20mm	Nil
0.8 – 1.4	Gley 1 4\ Dark grey	Silty clay	Moderate	Firm	Nil	High	Few <5mm	20% shell 5% organics <5mm	Nil


1.4 – 1.65	Gley 1 4\ Dark grey	Silty clay		Weak	Trace fine	Moderate	Few <5mm	50% shell 20% organics <20mm	Nil
1.65 – 1.8	Gley 1 3\ Very dark grey	Clay	Dry	Firm	Nil	High	Nil	Nil	Nil


General Location of Sampling		The Narrows							
Site Number		W8							
Date/Sample Time		6 May 2010/ 1:00pm							
Water Depth at Site		3.3m							
Type of Core Sampler		Vibracore + Piston Core							
Depth Retained		1.2m							
Weather Conditions		10kn SE wind. Fine. Slight chop							
General Information		Piston refusal at 0.9m. Vibracore refusal at 1.6m on firm clays							
PSD (%)									
Gravel (12)	Sand (38.5)	Silt (23)	Clay (26.5)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/ Biota	Odour
0 – 0.05	Gley 1 4\ Dark grey	Clay silty shells	High	Loose	Medium	Nil	Nil	90% shell Trace organic	Nil
0.05 – 0.25	Gley 1 4\ Dark grey	Clay silty	High	Weak	Medium	Low	Nil	50% shell <10mm Trace organics	Nil
0.25 – 1	Gley 1 4\ Dark grey	Silty clay	Moderate	Weak	Medium	Moderate	Nil	20% shell	Nil
1 – 1.2	Gley 1 5\ Grey	Clay	Dry	Very Firm	Nil	High	Nil	Nil	Nil


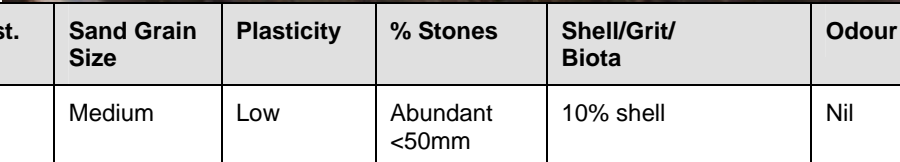
General Location of Sampling									
Site Number									
Date/Sample Time									
Water Depth at Site									
Type of Core Sampler									
Depth Retained									
Weather Conditions									
General Information									
PSD (%)									
Gravel (15)	Sand (53)	Silt (16)	Clay (16)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/Biota	Odour
0 – 0.3	Gley 1 3\ Very dark grey	Clay silt	High	Very Weak	Fine – medium	Low	10% <50mm	60%shell <20mm	Nil
0.3 – 0.5	Gley 1 4\1 Dark greenish grey	Sandy silty clay	Moderate	Very Firm	Fine – medium	Moderate	1% <5mm some large stones <50mm	<5mm shell 30%	Nil


General Location of Sampling		The Narrows	
Site Number		W10	
Date/Sample Time		4 May 2010/ 10:36am	
Water Depth at Site		11.6m	
Type of Core Sampler		Vibracore + Piston Core	
Depth Retained		0.2m	
Weather Conditions		Calm. 10kn SE Slightly overcast.	
General Information		Refusal at 0.2m on shell material.	
PSD (%)			
Gravel (14)	Sand (48)	Silt (19)	Clay (19)


Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/ Biota	Odour
0 – 0.2	Gley 1 4\ Dark grey	Clay silty sand	High	Weak	Fine – medium	Nil	<5mm abundant	<20mm abundant shell 10% organics	Nil





General Location of Sampling		The Narrows							
Site Number		W11							
Date/Sample Time		5 May 2010/ 9:15am							
Water Depth at Site		13.2m							
Type of Core Sampler		Piston Core							
Depth Retained		0.05m							
Weather Conditions		Fine. 10kn SE							
General Information		Shell and gravel surface of 5cm. Refusal of Piston at 5cm on very hard clay/rock							
PSD (%)									
Gravel (72)	Sand (19)	Silt (4)	Clay (5)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/ Biota	Odour
0 – 0.05	Gley 1 4\ Dark grey	Silty gravely clay	High	Weak	Medium	Low	Abundant <50mm	10% shell	Nil


General Location of Sampling		The Narrows								
Site Number		W12								
Date/Sample Time		5 May 2010/ 9:45am								
Water Depth at Site		13.4m								
Type of Core Sampler		Piston Core								
Depth Retained		0.08								
Weather Conditions		Fine. 5kn SE wind. Calm seas								
General Information		Piston refusal at 8cm on large gravel/rock.								
PSD (%)										
Gravel (31)	Sand (39)	Silt (13)	Clay (17)							
Strata Change (m)	Colour	Field Texture	Moist.		Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/Biota	Odour
0 – 0.08	Gley 1 4\ Dark grey	Silty gravely clay	High		Weak	Medium	Low	Abundant <50mm	10% shell	Nil

General Location of Sampling		The Narrows							
Site Number		W13							
Date/Sample Time		5 May 2010/ 10:20am							
Water Depth at Site		14.6m							
Type of Core Sampler		Piston Core							
Depth Retained		10cm							
Weather Conditions		Fine, Calm seas							
General Information		10cm refusal for piston on large rocks 3cm-20cm.							
PSD (%)									
Gravel (32)	Sand (36)	Silt (15)	Clay (17)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/ Biota	Odour
0 – 0.1	Gley 1 4\ Dark grey	Silty gravelly clay	High	Weak	Medium	Low	Abundant <50mm	10% shell	Nil

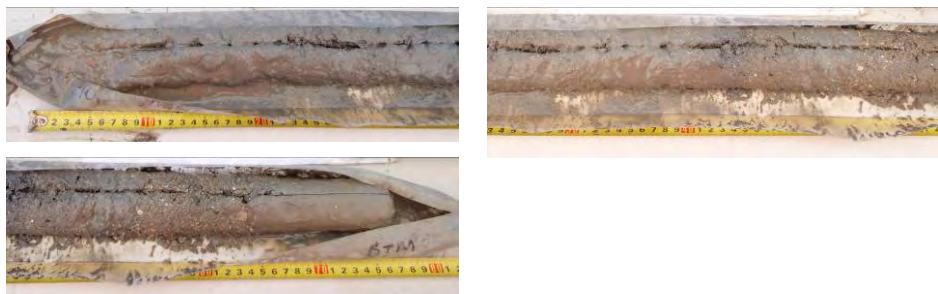
General Location of Sampling		The Narrows							
Site Number		W14							
Date/Sample Time		5 May 2010/ 10:45am							
Water Depth at Site		14.8m							
Type of Core Sampler		Vibracore + Piston core							
Depth Retained		0.45m							
Weather Conditions		Fine, 5kn SE wind, calm seas							
General Information		Piston refusal at 10cm. Vibracore at 40cm.							
PSD (%)									
Gravel (40)	Sand (19)	Silt (21)	Clay (20)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/ Biota	Odour
0 – 0.16	Gley 1 4\ Dark grey	Silty gravel clay	High	Loose	Trace fine	Nil	10% <50mm	80% shell 1% organic	Nil
0.16 – 0.45	Gley 1 4\ Dark grey	Silty clay	Moderate	Firm	Nil	High	10% <30mm	5% <1mm shell	Nil

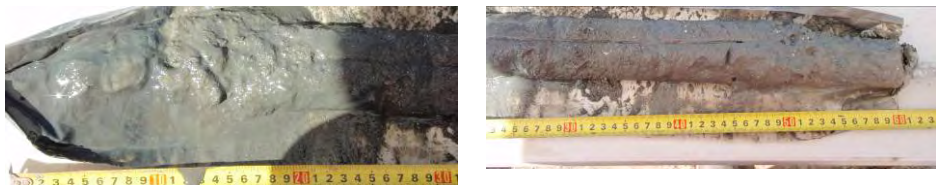
General Location of Sampling		The Narrows							
Site Number		W15							
Date/Sample Time		4 May 2010/ 1:10pm							
Water Depth at Site		9.8m							
Type of Core Sampler		Vibracore + Piston Core							
Depth Retained		2.2m							
Weather Conditions		Dead water. High tide. Slightly overcast							
General Information		Very shelly mud. Refusal on shell at 2m							
PSD (%)									
Gravel (13.33)	Sand (74.33)	Silt (4.67)	Clay (7.67)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/Biota	Odour
0 – 0.1	Gley 1 3\ Very dark grey	Clay sandy silt	High	Very Weak	Fine – medium	Low	1 – 10mm few	50% shell Trace organic	Nil

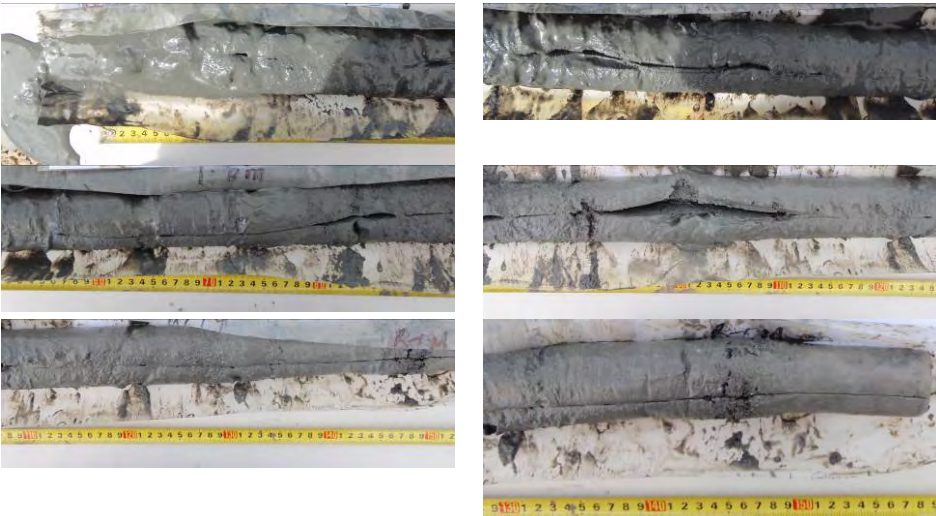
0.1 – 0.5	Gley 1 4\ Dark grey	Silty sandy clay	Moderate	Weak	Medium	High	Few <5mm	50% shell Trace organic	Nil
0.5 – 1.3	10yr 5\2 Greyish brown	Silty sand	Moderate	Loose	Medium	Nil	Trace	5% shell	Nil
1.3 – 1.7	Gley 1 4\ Dark grey	Silty sand	Moderate	Loose	Medium	Nil	<5mm few	50% shell 50% organic	Nil
1.7 – 2.3	Gley 1 4\ Dark grey	Silty clay sand	Moderate	Weak	Medium	Nil	<10mm few	20% shell 5% organic <20mm	Nil


General Location of Sampling		The Narrows							
Site Number		W16							
Date/Sample Time		4 May 2010/ 2:00pm							
Water Depth at Site		5.2m							
Type of Core Sampler		Vibracore + Piston Core							
Depth Retained		2.2m							
Weather Conditions		Slightly overcast. 5kn SE							
General Information		Vibracore refusal at 2.3m. No refusal on piston							
PSD (%)									
Gravel (7.75)	Sand (80.25)	Silt (3.75)	Clay (8.25)						
									
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/Biota	Odour
0 – 0.3	Gley 1 5\1 Greenish grey	Clay sandy silt	High	Very Weak	Medium	Low	Nil	80% shell <20mm 20% organic	Nil
0.3 – 1.2	Gley 1 4\1 Dark greenish grey	Silty clay sand	High	Loose	Medium	Nil	Nil	80% shell 20% organic <2mm	Nil

1.2 – 1.6	10yr 5\2 Greyish brown	Silty clay sand	High	Loose	Medium	Nil	Few gravel <2mm	80% shell	Nil
1.6 – 2.0	Gley 1 5\1 Greenish grey	Silty clay sand	High	Loose	Medium	Nil	Few gravel <2mm	50% shell <20mm	Nil
2.0 – 2.2	Gley 1 3\ Very dark grey	Silty sandy clay	High		Medium	Moderate	Many gravel <5mm	50% shell	Nil

General Location of Sampling		The Narrows							
Site Number		W17							
Date/Sample Time		7 May 2010/ 8:45am							
Water Depth at Site		4.8m							
Type of Core Sampler		Vibracore + Piston Core							
Depth Retained		0.75cm							
Weather Conditions		Wind 12km SW choppy							
General Information		Refusal at 1.1m							
PSD (%)									
Gravel (10)	Sand (60.5)	Silt (10.5)	Clay (19)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/Biota	Odour
0.0 – 0.23	Gley 1 5\ Grey	Sandy silty clay	High	Weak	Fine	Moderate	5% <2mm	10% <5mm Trace organic	Nil
0.23 – 0.65	Gley 1 5\ Grey	Silty sand	Moderate	Weak	Fine - medium	Low	5% <2mm	30% <5mm	Faint marine
0.65 – 0.75	Gley 1 5\ Grey with yellowish red mottle (5yr 4/6)	Clay	Low	Very firm	Trace fine	High	Nil	Trace <1mm	Nil

General Location of Sampling		The Narrows							
Site Number		W18							
Date/Sample Time		7 May 2010/ 9:20am							
Water Depth at Site		5.0m							
Type of Core Sampler		Vibracore + Piston Core							
Depth Retained		60cm							
Weather Conditions		Wind 15kn S choppy							
General Information		Refusal at 1.1m							
PSD (%)									
Gravel (2.5)	Sand (73.5)	Silt (6.5)	Clay (17.5)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/Biota	Odour
0.0 – 0.1	Gley 1 3\ Very dark grey	Silt	High	Very Weak	Trace Fine	Low	Nil	Trace <1mm No organics	Faint marine
0.1 – 0.3	Gley 1 4\ Dark grey	Sandy silt	High	Weak	Fine – medium	Low	Trace <2mm	5% <2mm No organics	Faint marine
0.3 – 0.5	Gley 1 4\ Dark grey	Silty sand	Moderate	Weak	Medium	Moderate	Trace <2mm	5% <2mm No organics	Nil
0.5 – 0.6	Gley 1 5\ Greenish grey	Clay	Low	Very Firm	Fine	High	Trace up to 5mm	Trace, <1mm No organics	Nil

General Location of Sampling		Curtis Is (The Narrows)							
Site Number		W19							
Date/Sample Time		3 May 2010/ 9:10am							
Water Depth at Site		1.9m							
Type of Core Sampler		Vibracore							
Depth Retained		1.6m							
Weather Conditions		Wind 20kn, Rough seas							
General Information		Refusal at 1.9m							
PSD (%)									
Gravel (0.67)	Sand (62.67)	Silt (14)	Clay (22.66)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/Biota	Odour
0.0 - 0.3	Gley 1 3\ Very dark grey	Clay silt	High	Very Weak	Fine	Low	Nil	20% shell <1mm 50% organics <1mm	Sulphur
0.3 – 1.5	Gley 1 4\ Dark grey	Silty sandy clay	Moderate	Weak	Fine	High	Nil	20% shell 50% organics<20mm	Sulphur
1.5 – 1.6	Gley 1 5\ Grey	Silty clay	Low	Very Firm	Nil	High	Trace gravel <5mm	Nil	Nil

General Location of Sampling		Curtis Island							
Site Number		W20							
Date/Sample Time		1 May 2010/ 12:25pm							
Water Depth at Site		2.2m							
Type of Core Sampler		Vibracore + Piston Core							
Depth Retained		1.1m							
Weather Conditions		Wind 20km SE, Rough seas							
General Information		Refusal at 1.2m							
PSD (%)									
Gravel (0)	Sand (34.5)	Silt (27.5)	Clay (38)						
Strata Change (m)	Colour	Field Texture	Moist.	Consist.	Sand Grain Size	Plasticity	% Stones	Shell/Grit/ Biota	Odour
0 – 0.3	Gley 1 3\ Very dark grey	Clay silt	High	Very Weak	Trace	Low	Nil	5% shell <20mm 50% organic	Sulphur
0.3 – 0.6	Gley 1 4\ Dark grey	Silty clay	High	Weak	Trace	High	Nil	10% shell <1mm 50% organic	Sulphur
0.6 – 1.1	Gley 1 4\ Dark grey	Silty clay	Moderate	Firm	Nil	High	Nil	Nil shell Bands of 50% organics	Sulphur

Appendix 2 Particle Size Analysis Reports (ALS)

Certificate of Analysis

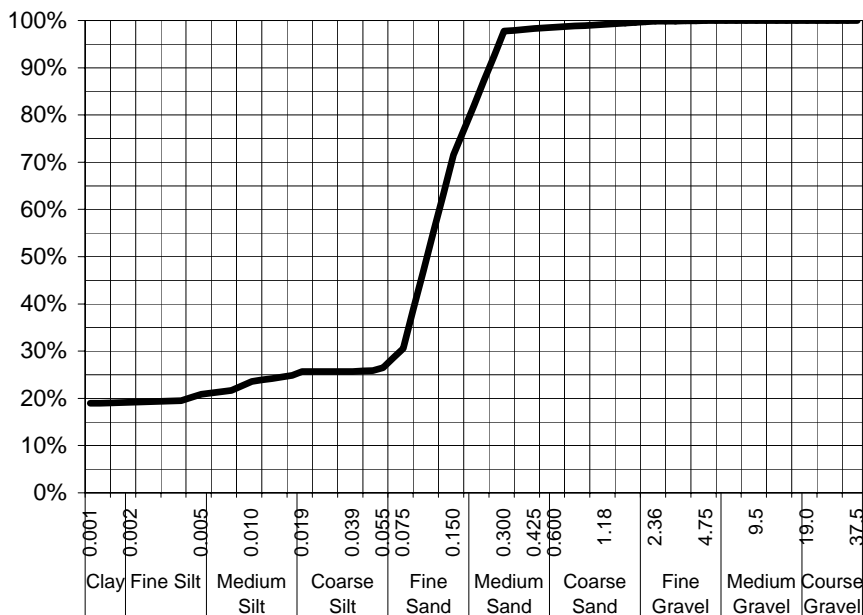
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
ph 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Vivian Seto **DATE REPORTED:** 18-May-2010
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 5-May-2010
ADDRESS: Level 3, 60 Albert Street **REPORT NO:** ES1008241-001 / PSD
PO Box 15081
PROJECT: NAGD - Asia Pacific LNG **SAMPLE ID:** W19 0 - 0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	99%
0.425	98%
0.300	98%
0.150	72%
0.075	31%
Particle Size (microns)	
55	27%
39	26%
19	26%
10	24%
5	21%
4	19%
1	19%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Fine sand, clay & silt

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 7-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Supervisor
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

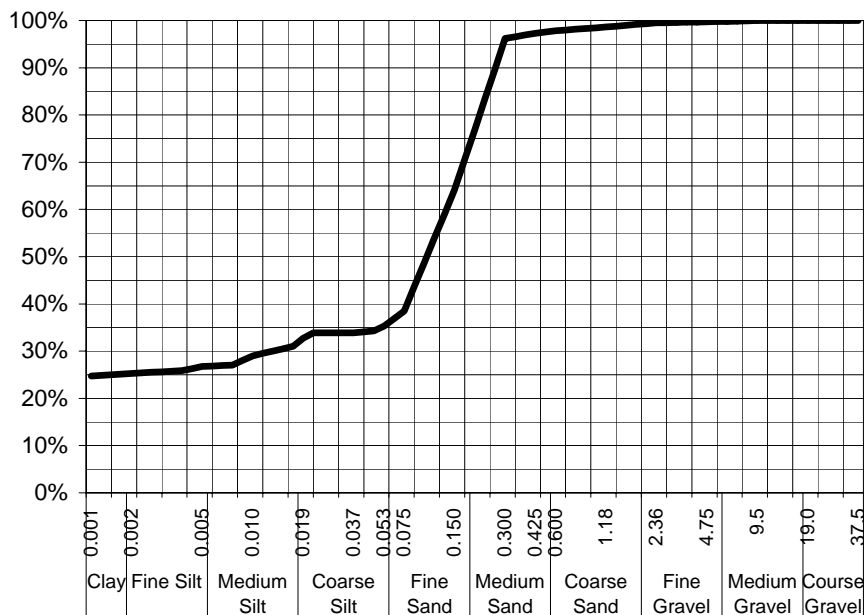
ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto **DATE REPORTED:** 18-May-2010
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 5-May-2010
ADDRESS: Level 3, 60 Albert Street **REPORT NO:** ES1008241-002 / PSD
PO Box 15081
PROJECT: NAGD - Asia Pacific LNG **SAMPLE ID:** W19 0.5 - 1

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	98%
0.425	97%
0.300	96%
0.150	64%
0.075	38%
Particle Size (microns)	
53	35%
37	34%
19	33%
10	29%
5	27%
4	26%
1	25%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Fine sand, clay & silt

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 7-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Supervisor
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

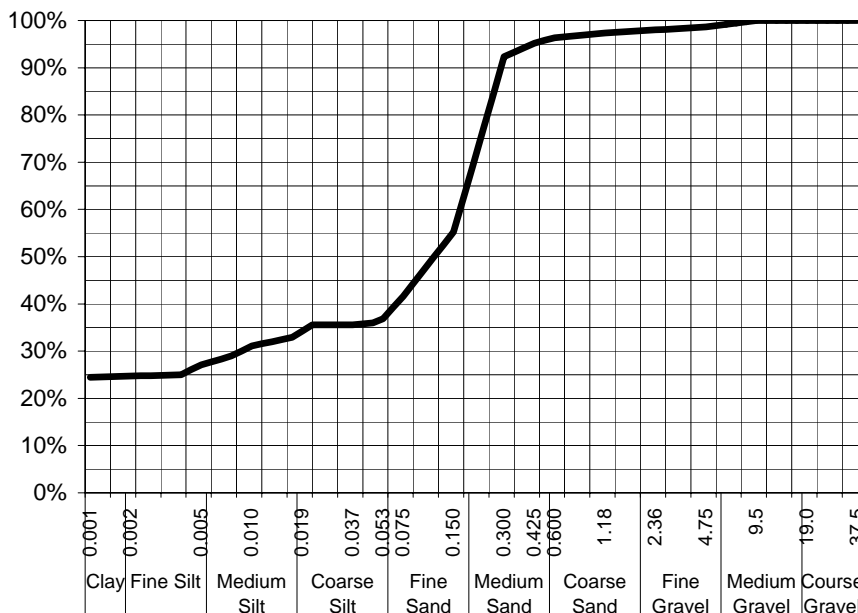
ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto **DATE REPORTED:** 18-May-2010
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 5-May-2010
ADDRESS: Level 3, 60 Albert Street **REPORT NO:** ES1008241-003 / PSD
PROJECT: NAGD - Asia Pacific LNG **SAMPLE ID:** W19 1 - 1.6

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	99%
2.36	98%
1.18	97%
0.600	96%
0.425	95%
0.300	92%
0.150	55%
0.075	42%
Particle Size (microns)	
53	37%
37	36%
19	34%
10	31%
5	27%
4	25%
1	24%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Fine sand, clay & silt

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 7-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Supervisor
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 5-May-2010

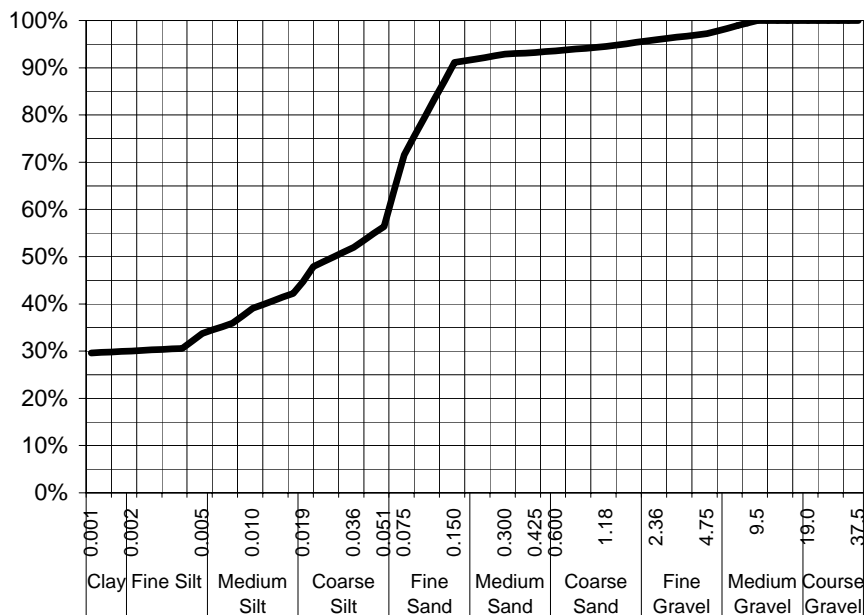
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008246-001 / PSD

PROJECT: NAGD - Asia Pacific LNG

SAMPLE ID: W1 0-0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	97%
2.36	96%
1.18	95%
0.600	94%
0.425	93%
0.300	93%
0.150	91%
0.075	72%
Particle Size (microns)	
51	56%
36	52%
19	45%
10	39%
5	34%
4	31%
1	30%

Samples analysed as received.

Sample Comments:

Analysed: 14-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Silt, clay & sand

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

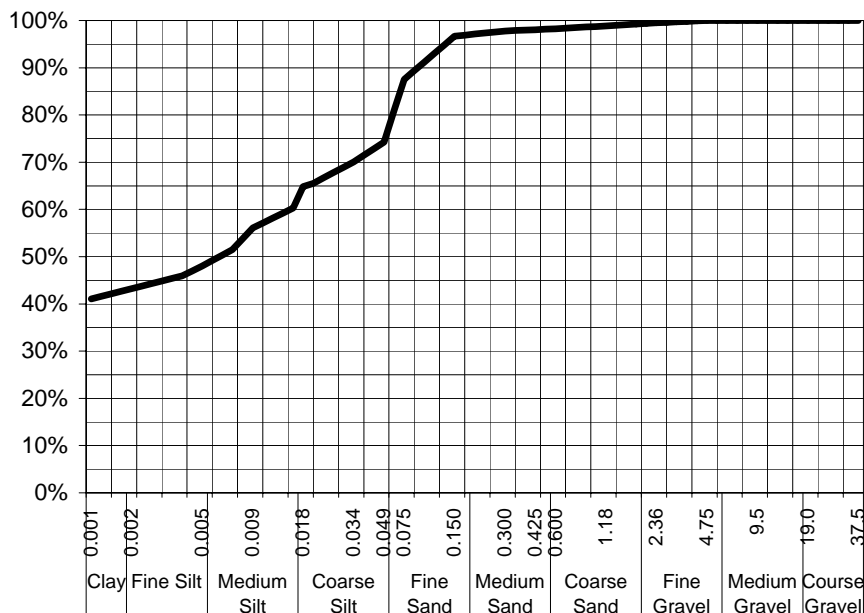
ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto **DATE REPORTED:** 20-May-2010
COMPANY: Worley Parsons - Infrastructure MWE **DATE RECEIVED:** 5-May-2010
ADDRESS: Level 3, 60 Albert Street **REPORT NO:** ES1008246-002 / PSD
PO Box 15081 City East
BRISBANE Qld, 4000
PROJECT: NAGD - Asia Pacific LNG **SAMPLE ID:** W1 0.5-1

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	99%
1.18	99%
0.600	98%
0.425	98%
0.300	98%
0.150	97%
0.075	88%
Particle Size (microns)	
49	74%
34	70%
18	65%
9	56%
5	48%
3	46%
1	41%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silt, clay & sand

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 14-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 5-May-2010

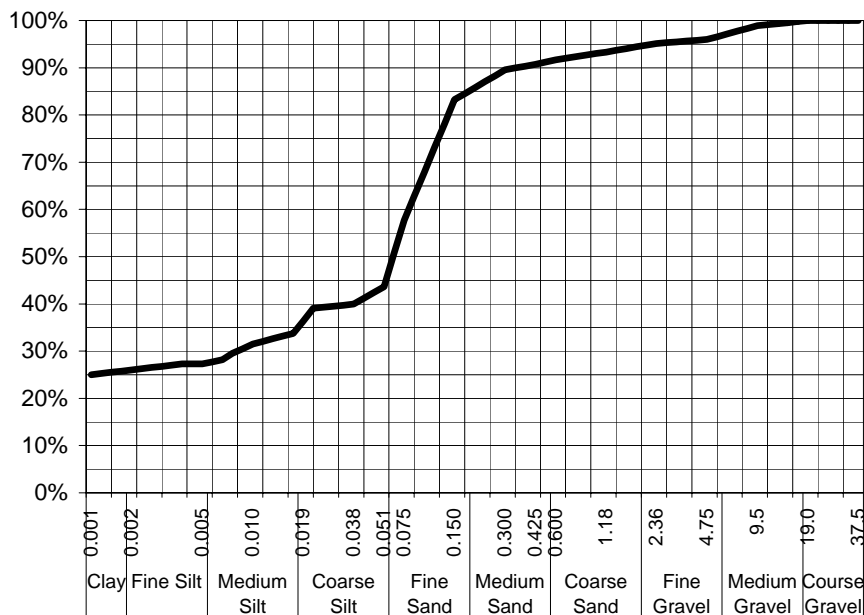
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008246-004 / PSD

PROJECT: NAGD - Asia Pacific LNG

SAMPLE ID: W2 0-0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	99%
4.75	96%
2.36	95%
1.18	93%
0.600	92%
0.425	91%
0.300	90%
0.150	83%
0.075	58%
Particle Size (microns)	
51	44%
38	40%
19	36%
10	31%
5	27%
4	27%
1	25%

Samples analysed as received.

Sample Comments:

Analysed: 14-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand, silt & clay

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 21-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 5-May-2010

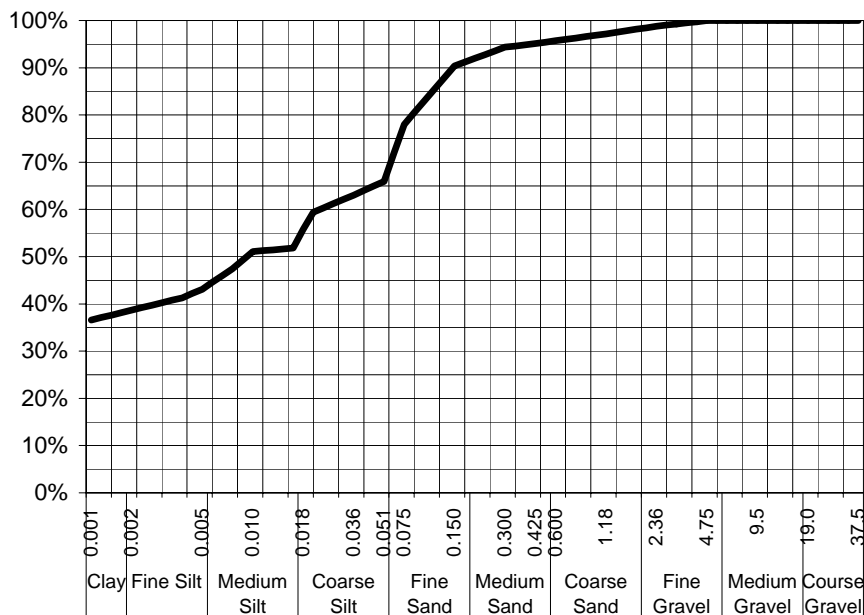
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008246-005 / PSD

PROJECT: NAGD - Asia Pacific LNG

SAMPLE ID: W2 0.5-1.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	99%
1.18	97%
0.600	96%
0.425	95%
0.300	94%
0.150	90%
0.075	78%
Particle Size (microns)	
51	66%
36	63%
18	56%
10	51%
5	43%
3	41%
1	37%

Samples analysed as received.

Sample Comments:

Analysed: 14-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Silt, clay & sand

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 5-May-2010

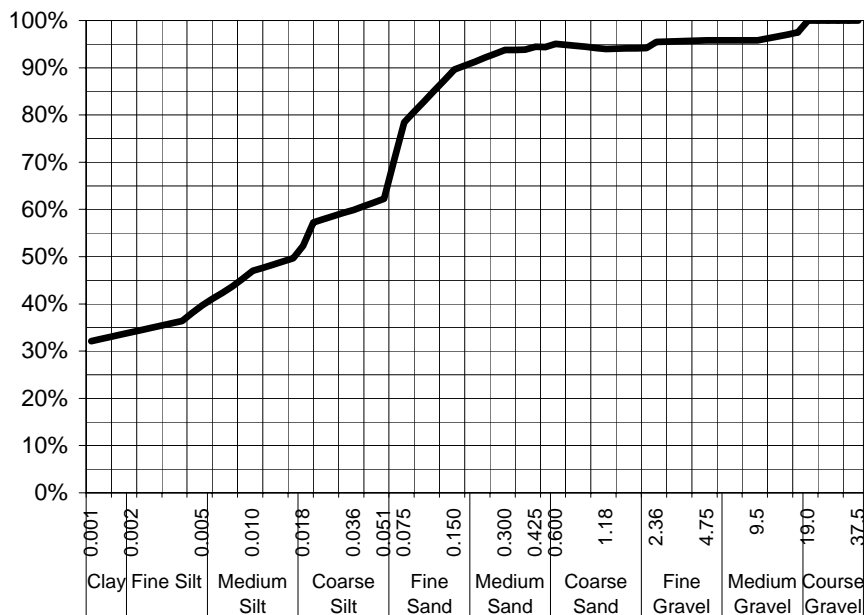
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008246-006 / PSD

PROJECT: NAGD - Asia Pacific LNG

SAMPLE ID: W2 1.0-2.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	96%
4.75	96%
2.36	95%
1.18	94%
0.600	95%
0.425	94%
0.300	94%
0.150	90%
0.075	78%
Particle Size (microns)	
51	62%
36	60%
18	52%
10	47%
5	40%
3	36%
1	32%

Samples analysed as received.

Sample Comments:

Analysed: 14-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Silt, clay & sand

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 5-May-2010

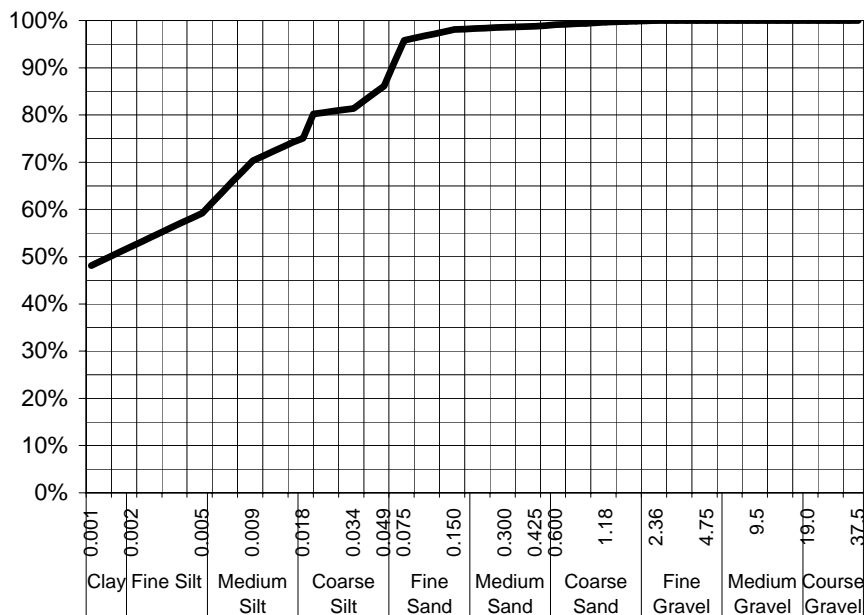
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008246-007 / PSD

PROJECT: NAGD - Asia Pacific LNG

SAMPLE ID: W2 2.0-3.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	100%
0.600	99%
0.425	99%
0.300	99%
0.150	98%
0.075	96%
Particle Size (microns)	
49	86%
34	81%
18	75%
9	70%
5	59%
3	57%
1	48%

Samples analysed as received.

Sample Comments:

Analysed: 14-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Silty clay

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

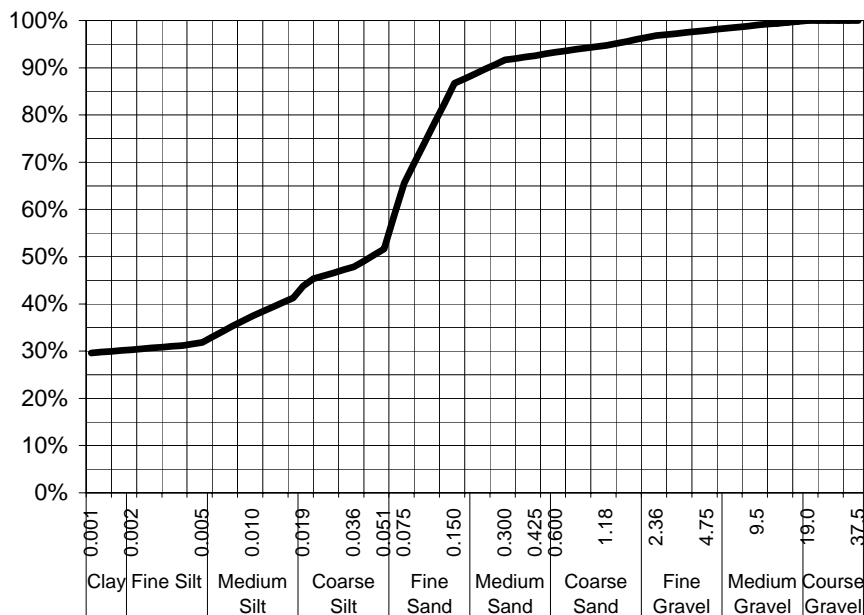
ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto **DATE REPORTED:** 20-May-2010
COMPANY: Worley Parsons - Infrastructure MWE **DATE RECEIVED:** 5-May-2010
ADDRESS: Level 3, 60 Albert Street **REPORT NO:** ES1008246-008 / PSD
PO Box 15081 City East
BRISBANE Qld, 4000
PROJECT: NAGD - Asia Pacific LNG **SAMPLE ID:** W3 0-0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	99%
4.75	98%
2.36	97%
1.18	95%
0.600	93%
0.425	93%
0.300	92%
0.150	87%
0.075	66%
Particle Size (microns)	
51	52%
36	48%
19	44%
10	37%
5	32%
4	31%
1	30%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Sand, silt & clay

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 14-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 5-May-2010

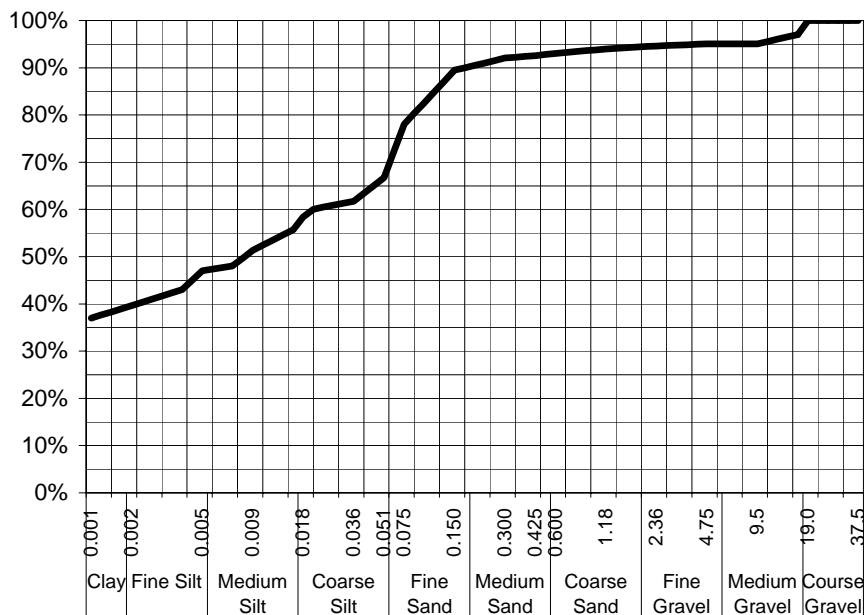
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008246-009 / PSD

PROJECT: NAGD - Asia Pacific LNG

SAMPLE ID: W3 0.5-1

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	95%
4.75	95%
2.36	95%
1.18	94%
0.600	93%
0.425	93%
0.300	92%
0.150	89%
0.075	78%
Particle Size (microns)	
51	67%
36	62%
18	58%
9	51%
5	47%
3	43%
1	37%

Samples analysed as received.

Sample Comments:

Analysed: 14-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Silt, clay & sand

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 5-May-2010

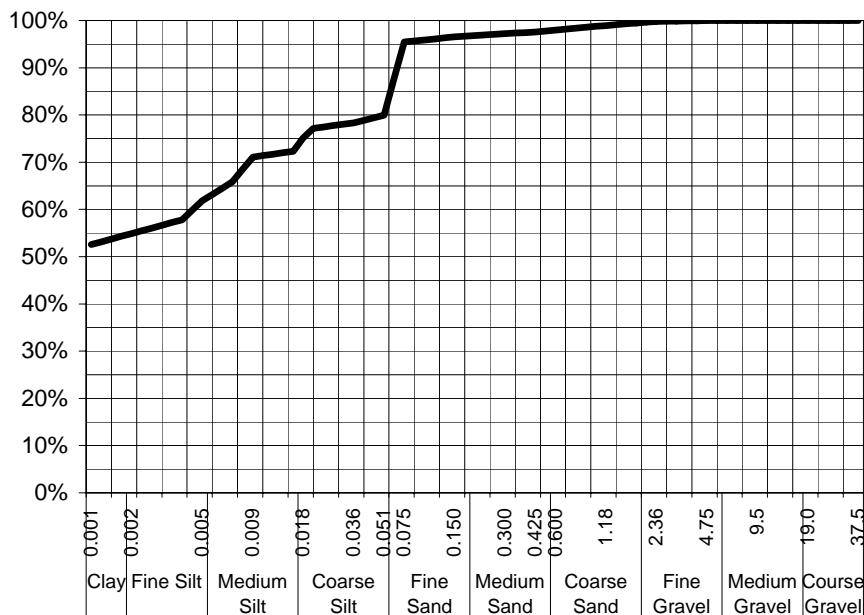
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008246-010 / PSD

PROJECT: NAGD - Asia Pacific LNG

SAMPLE ID: W3 1.0-2.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	98%
0.425	98%
0.300	97%
0.150	97%
0.075	95%
Particle Size (microns)	
51	80%
36	78%
18	75%
9	71%
5	62%
3	58%
1	53%

Samples analysed as received.

Sample Comments:

Analysed: 14-May-10

Loss on Pretreatment: NA

Limit of Reporting: 1%

Sample Description: Silty clay

Dispersion Method: Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type: ASTM E100

Soil Particle Density: 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 5-May-2010

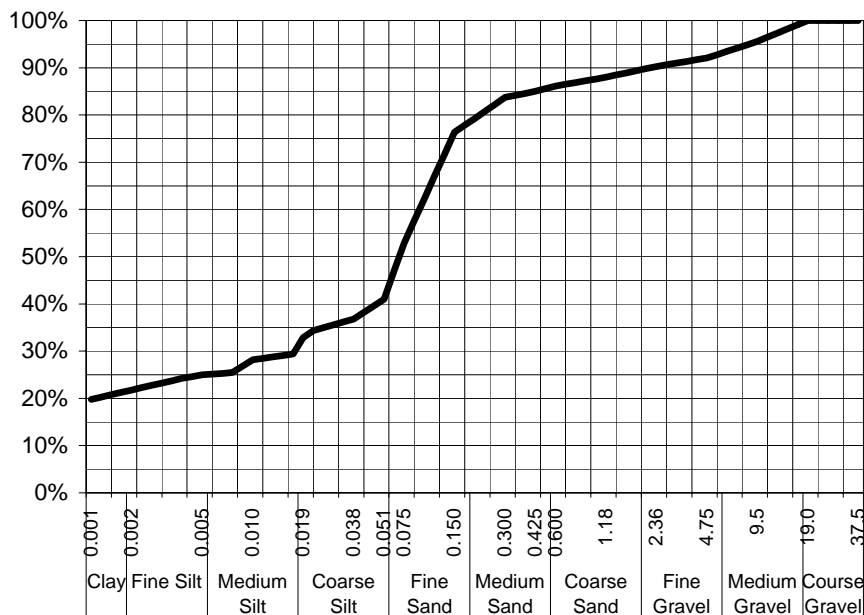
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008246-011 / PSD

PROJECT: NAGD - Asia Pacific LNG

SAMPLE ID: W4 0-0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	96%
4.75	92%
2.36	90%
1.18	88%
0.600	86%
0.425	85%
0.300	84%
0.150	76%
0.075	53%
Particle Size (microns)	
51	41%
38	37%
19	33%
10	28%
5	25%
4	24%
1	20%

Samples analysed as received.

Sample Comments:

Analysed: 14-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand, silt & clay

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

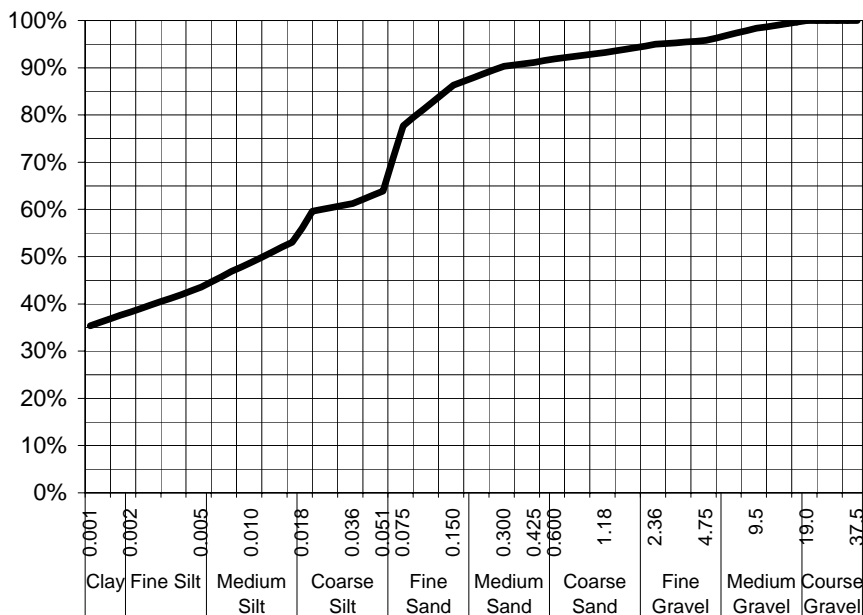
ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto **DATE REPORTED:** 20-May-2010
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 5-May-2010
ADDRESS: Level 3, 60 Albert Street **REPORT NO:** ES1008246-012 / PSD
PO Box 15081 City East
BRISBANE Qld, 4000
PROJECT: NAGD - Asia Pacific LNG **SAMPLE ID:** W4 0.5-1.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	98%
4.75	96%
2.36	95%
1.18	93%
0.600	92%
0.425	91%
0.300	90%
0.150	86%
0.075	78%
Particle Size (microns)	
51	64%
36	61%
18	56%
10	49%
5	44%
3	42%
1	35%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silt, clay & sand

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 14-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 5-May-2010

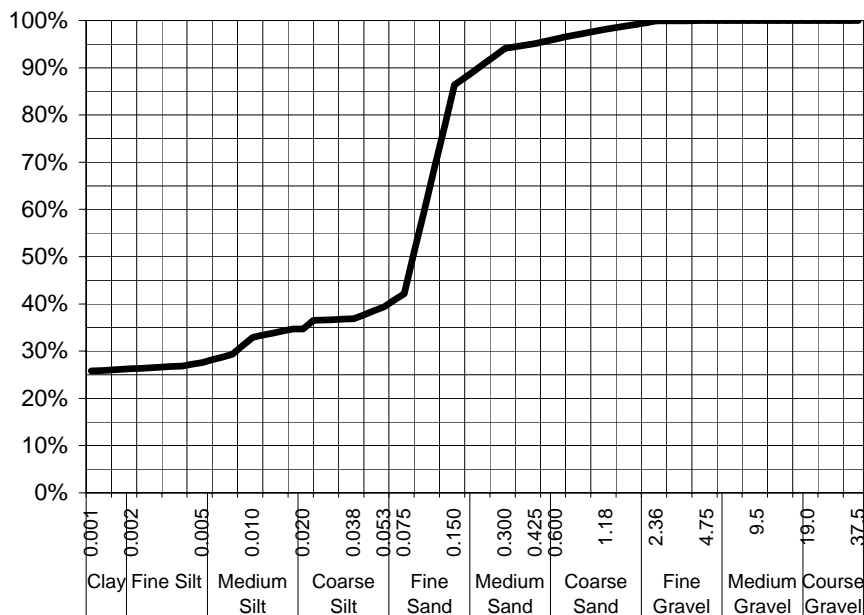
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008246-013 / PSD

PROJECT: NAGD - Asia Pacific LNG

SAMPLE ID: W20 0-0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	98%
0.600	96%
0.425	95%
0.300	94%
0.150	86%
0.075	42%
Particle Size (microns)	
53	39%
38	37%
20	35%
10	33%
5	28%
4	27%
1	26%

Samples analysed as received.

Sample Comments:

Analysed: 14-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand, silt & clay

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

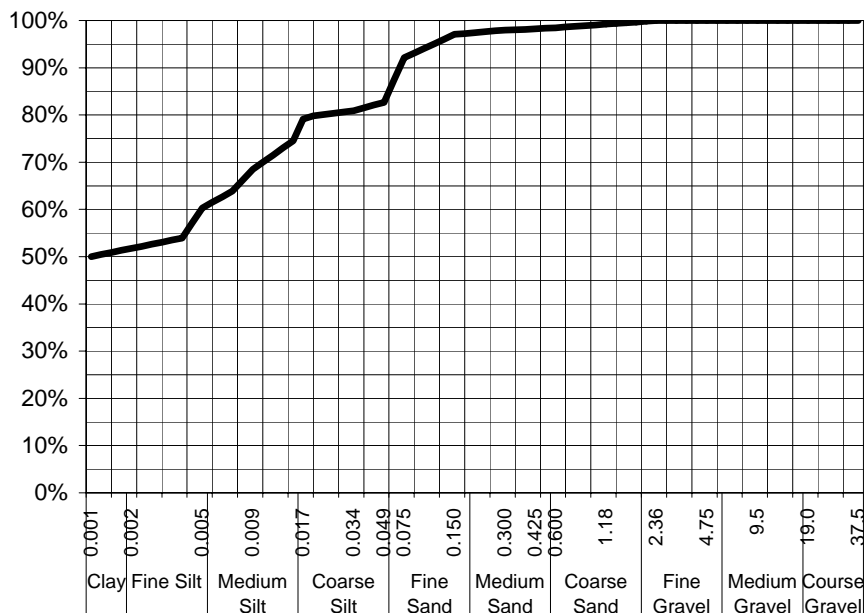
ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto **DATE REPORTED:** 20-May-2010
COMPANY: Worley Parsons - Infrastructure MWE **DATE RECEIVED:** 5-May-2010
ADDRESS: Level 3, 60 Albert Street **REPORT NO:** ES1008246-014 / PSD
PO Box 15081 City East
BRISBANE Qld, 4000
PROJECT: NAGD - Asia Pacific LNG **SAMPLE ID:** W20 0.5-1.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	98%
0.425	98%
0.300	98%
0.150	97%
0.075	92%
Particle Size (microns)	
49	83%
34	81%
17	79%
9	68%
5	60%
3	54%
1	50%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 14-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 6-May-2010

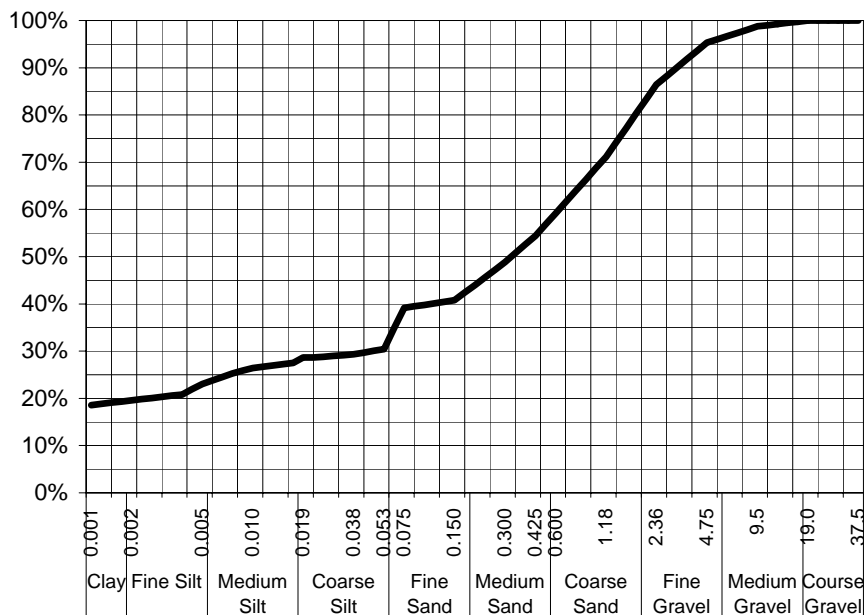
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008369-001 / PSD

PROJECT: NAGD - Asia Pacific LNG
301001-00448

SAMPLE ID: W10 0-0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	99%
4.75	95%
2.36	86%
1.18	71%
0.600	59%
0.425	54%
0.300	49%
0.150	41%
0.075	39%
Particle Size (microns)	
53	30%
38	29%
19	29%
10	26%
5	23%
4	21%
1	19%

Samples analysed as received.

Sample Comments:

Analysed: 17-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand, silt, clay & shell

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 6-May-2010

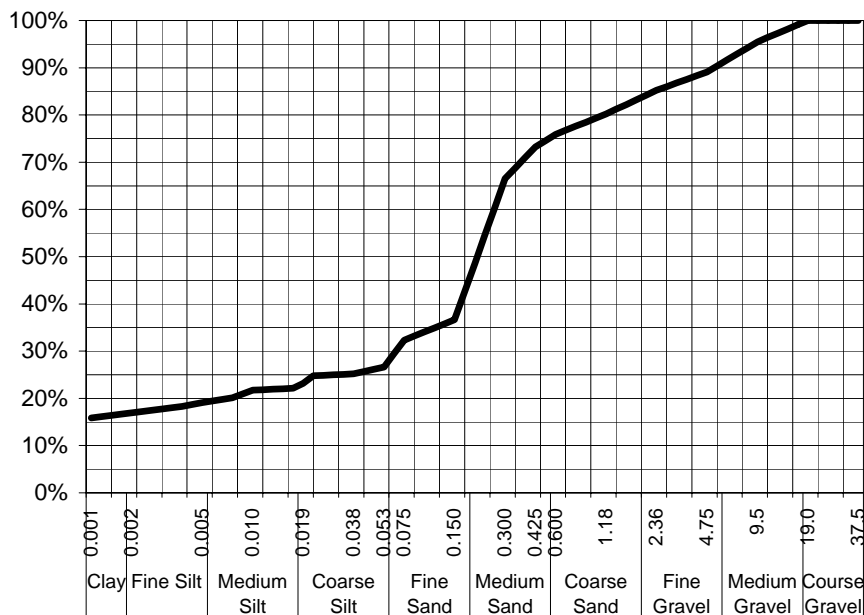
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008369-002 / PSD

PROJECT: NAGD - Asia Pacific LNG
301001-00448

SAMPLE ID: W9 0-0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	95%
4.75	89%
2.36	85%
1.18	80%
0.600	76%
0.425	73%
0.300	67%
0.150	37%
0.075	32%
Particle Size (microns)	
53	27%
38	25%
19	23%
10	22%
5	19%
4	18%
1	16%

Samples analysed as received.

Sample Comments:

Analysed: 17-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand, silt, clay & shells

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 6-May-2010

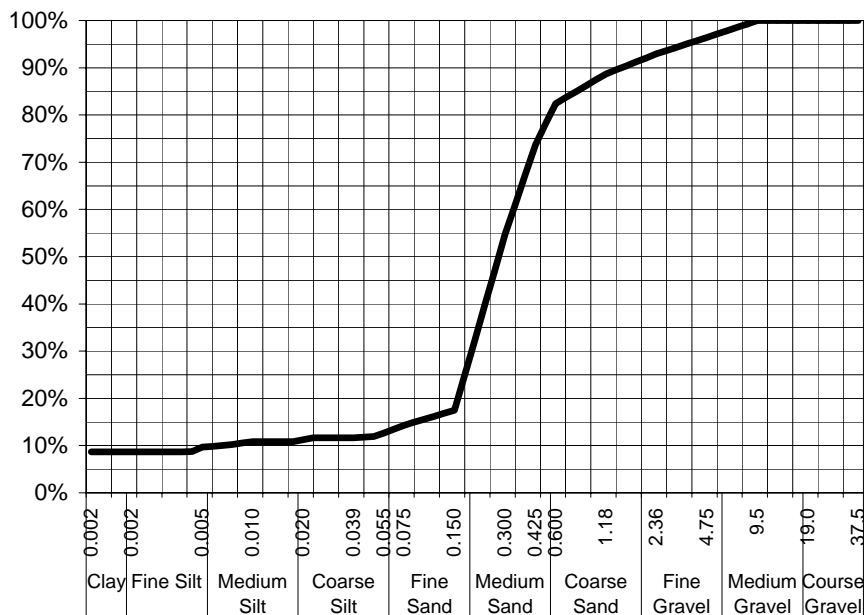
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008369-003 / PSD

PROJECT: NAGD - Asia Pacific LNG
301001-00448

SAMPLE ID: W16 0-0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	96%
2.36	93%
1.18	89%
0.600	82%
0.425	74%
0.300	55%
0.150	17%
0.075	14%
Particle Size (microns)	
55	13%
39	12%
20	11%
10	11%
5	10%
4	9%
2	9%

Samples analysed as received.

Sample Comments:

Analysed: 17-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand, fines & shell

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 6-May-2010

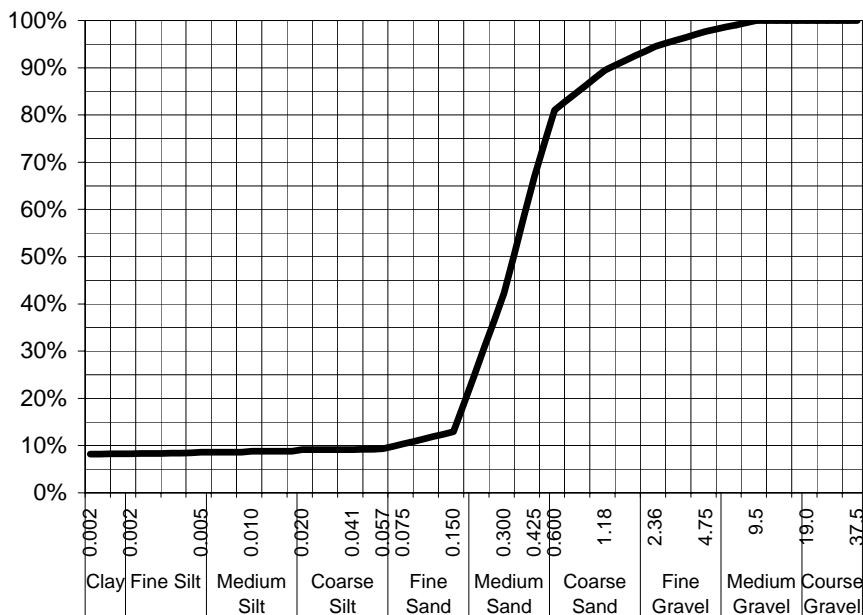
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008369-004 / PSD

PROJECT: NAGD - Asia Pacific LNG
301001-00448

SAMPLE ID: W16 0.5-1.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	98%
2.36	95%
1.18	90%
0.600	81%
0.425	67%
0.300	42%
0.150	13%
0.075	10%
Particle Size (microns)	
57	9%
41	9%
20	9%
10	9%
5	9%
4	8%
2	8%

Samples analysed as received.

Sample Comments:

Analysed: 17-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand, fines & shell

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 6-May-2010

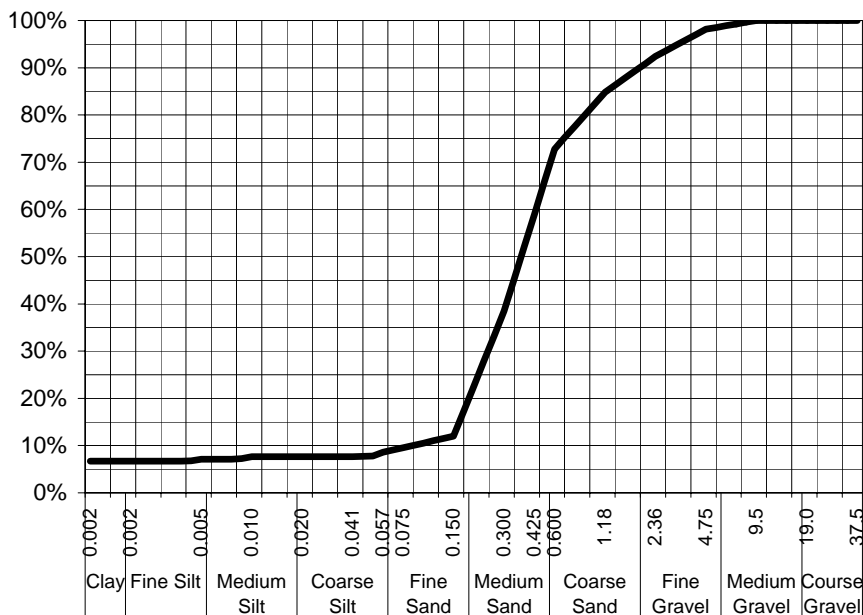
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008369-005 / PSD

PROJECT: NAGD - Asia Pacific LNG
301001-00448

SAMPLE ID: W16 1.0-2.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	98%
2.36	92%
1.18	85%
0.600	73%
0.425	59%
0.300	38%
0.150	12%
0.075	10%
Particle Size (microns)	
57	9%
41	8%
20	8%
10	8%
5	7%
4	7%
2	7%

Samples analysed as received.

Sample Comments:

Analysed: 17-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand, fines & shell

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 6-May-2010

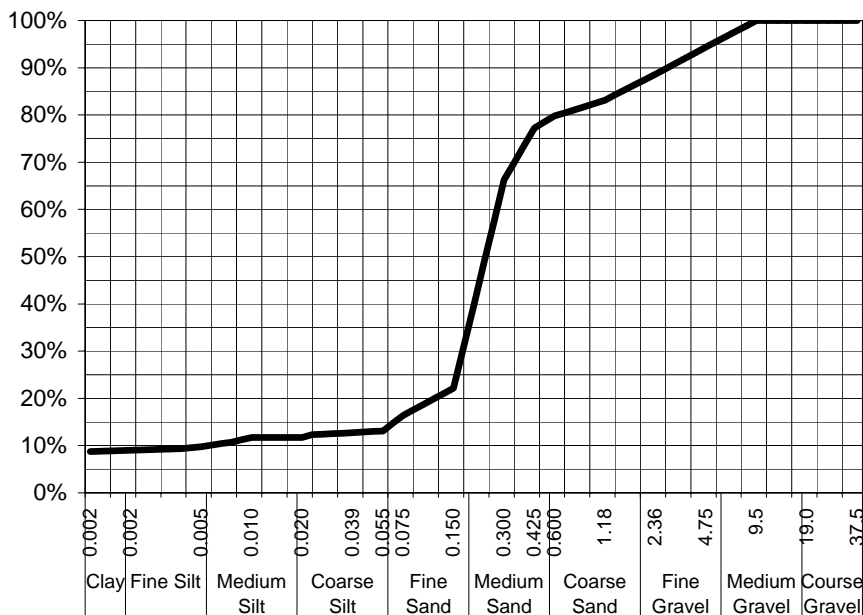
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008369-006 / PSD

PROJECT: NAGD - Asia Pacific LNG
301001-00448

SAMPLE ID: W16 2.0-3.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	94%
2.36	89%
1.18	83%
0.600	80%
0.425	77%
0.300	66%
0.150	22%
0.075	16%
Particle Size (microns)	
55	13%
39	13%
20	12%
10	12%
5	10%
4	9%
2	9%

Samples analysed as received.

Sample Comments:

Analysed: 17-May-10

Loss on Pretreatment: NA

Limit of Reporting: 1%

Sample Description: Sand, fines & shell

Dispersion Method: Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type: ASTM E100

Soil Particle Density: 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 6-May-2010

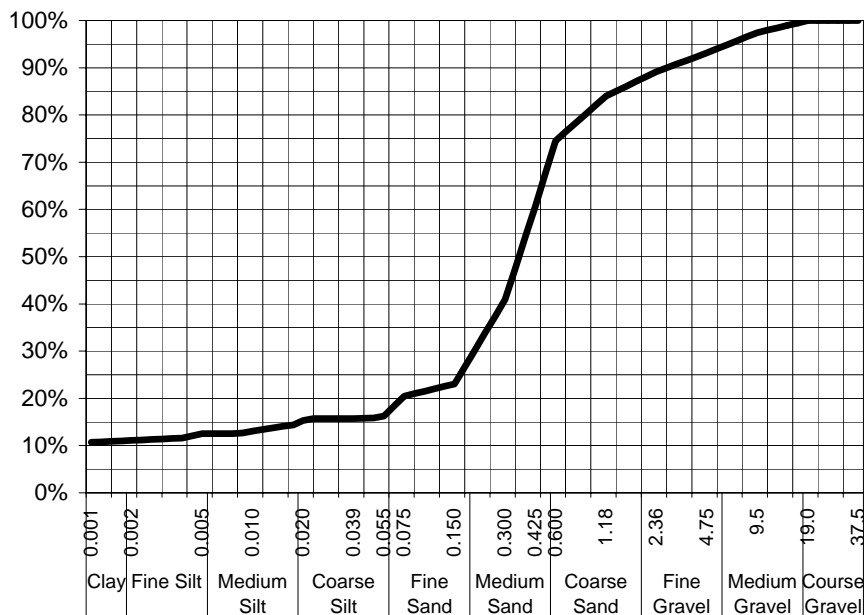
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008369-010 / PSD

PROJECT: NAGD - Asia Pacific LNG
301001-00448

SAMPLE ID: W19 0-0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	97%
4.75	93%
2.36	89%
1.18	84%
0.600	75%
0.425	61%
0.300	41%
0.150	23%
0.075	20%
Particle Size (microns)	
55	16%
39	16%
20	15%
10	13%
5	13%
4	12%
1	11%

Samples analysed as received.

Sample Comments:

Analysed: 17-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand, fines & shell

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 6-May-2010

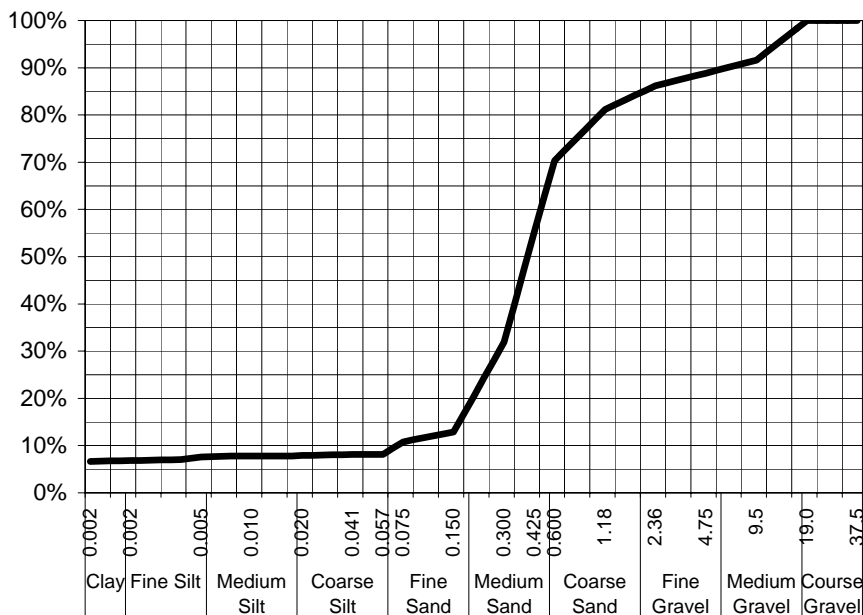
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008369-011 / PSD

PROJECT: NAGD - Asia Pacific LNG
301001-00448

SAMPLE ID: W15 0.5-1.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	92%
4.75	89%
2.36	86%
1.18	81%
0.600	70%
0.425	55%
0.300	32%
0.150	13%
0.075	11%
Particle Size (microns)	
57	8%
41	8%
20	8%
10	8%
5	8%
4	7%
2	7%

Samples analysed as received.

Sample Comments:

Analysed: 17-May-10

Loss on Pretreatment: NA

Limit of Reporting: 1%

Sample Description: Sand, fines & shell

Dispersion Method: Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type: ASTM E100

Soil Particle Density: 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 20-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 6-May-2010

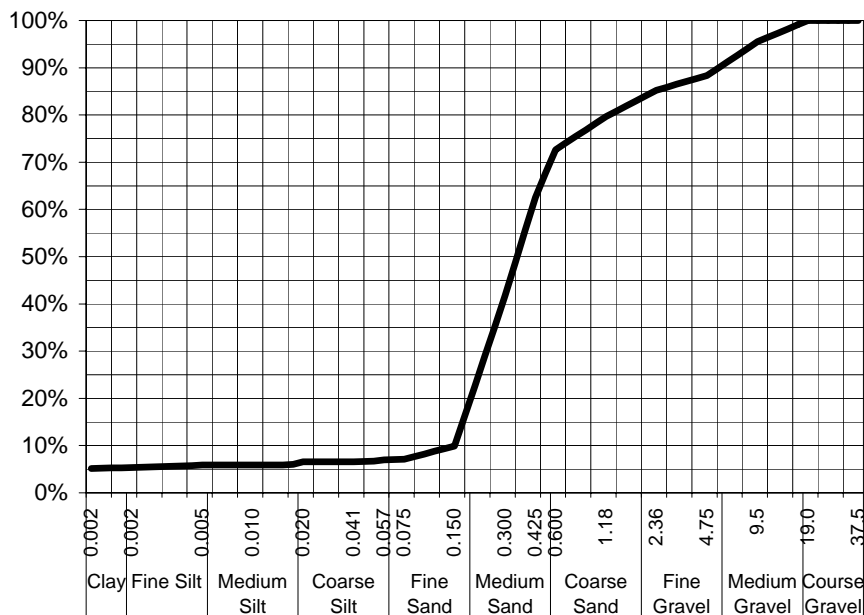
ADDRESS: Level 3, 60 Albert Street
PO Box 15081 City East
BRISBANE Qld, 4000

REPORT NO: ES1008369-012 / PSD

PROJECT: NAGD - Asia Pacific LNG
301001-00448

SAMPLE ID: W15 1.0-2.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	95%
4.75	88%
2.36	85%
1.18	80%
0.600	73%
0.425	63%
0.300	42%
0.150	10%
0.075	7%
Particle Size (microns)	
57	7%
41	7%
20	7%
10	6%
5	6%
4	6%
2	5%

Samples analysed as received.

Sample Comments:

Analysed: 17-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand, fines & shell

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

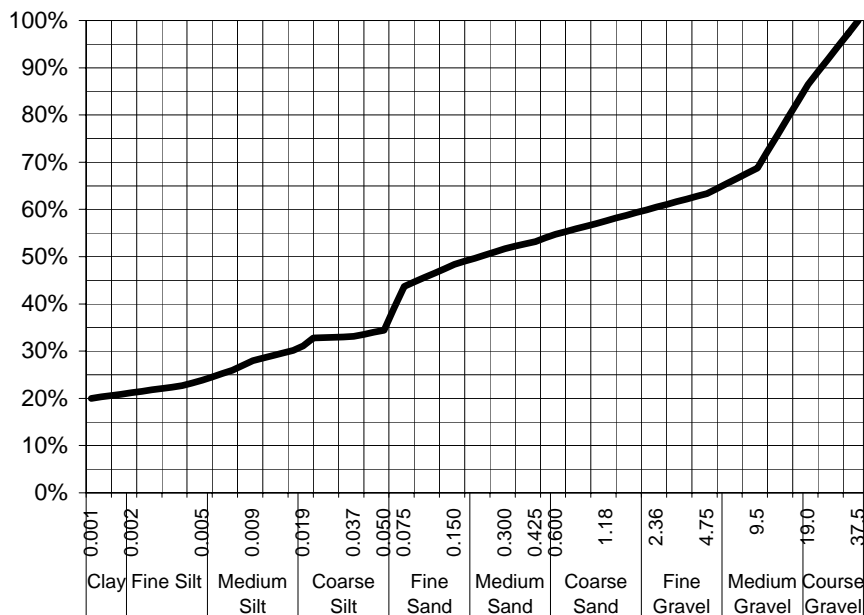
ALS Environmental

Newcastle, NSW



CLIENT: Tom Koskela
DATE REPORTED: 21-May-2010
COMPANY: Worley Parsons - Infrastructure MWE
DATE RECEIVED: 5-May-2010
ADDRESS: Level 3, 60 Albert Street
REPORT NO: ES1008497-001 / PSD
PO Box 15081
PROJECT: NAGD - Asia Pacific LNG
SAMPLE ID: W14 0 - 0.5
301001-00448

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	86%
9.5	69%
4.75	63%
2.36	60%
1.18	58%
0.600	55%
0.425	53%
0.300	52%
0.150	48%
0.075	44%
Particle Size (microns)	
50	34%
37	33%
19	31%
9	28%
5	24%
3	23%
1	20%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Gravel, silty clay, sand & shell

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 17-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
ph 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

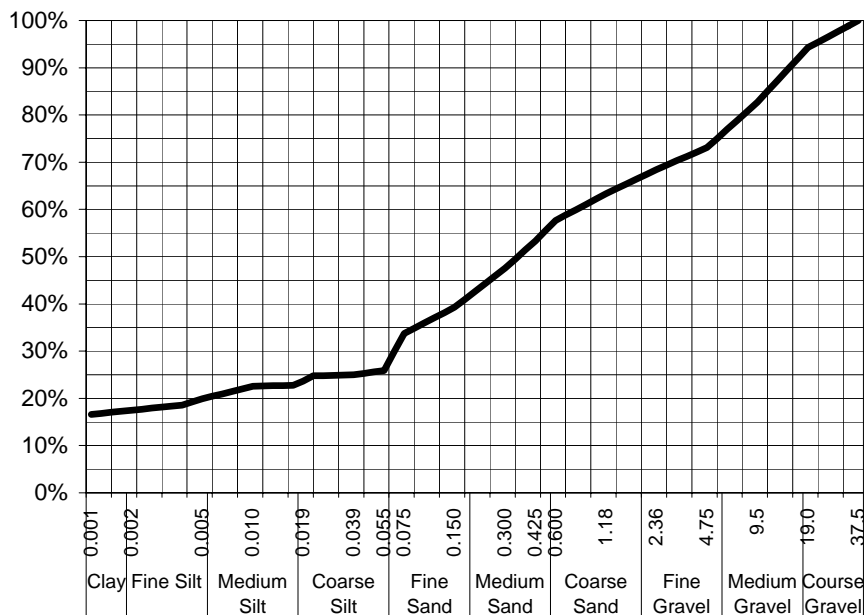
ALS Environmental

Newcastle, NSW



CLIENT: Tom Koskela
DATE REPORTED: 21-May-2010
COMPANY: Worley Parsons - Infrastructure MWE
DATE RECEIVED: 5-May-2010
ADDRESS: Level 3, 60 Albert Street
REPORT NO: ES1008497-002 / PSD
PO Box 15081
PROJECT: NAGD - Asia Pacific LNG
SAMPLE ID: W13 0 - 0.5
301001-00448

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	94%
9.5	83%
4.75	73%
2.36	68%
1.18	63%
0.600	58%
0.425	53%
0.300	48%
0.150	39%
0.075	34%
Particle Size (microns)	
55	26%
39	25%
19	24%
10	23%
5	20%
4	19%
1	17%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Sand, gravel, silty clay & shell

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 17-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

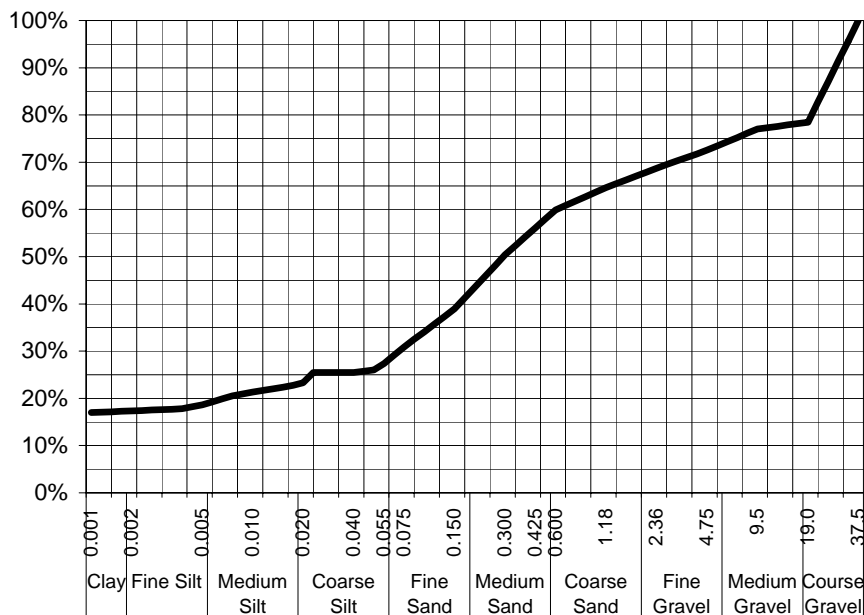
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Tom Koskela
DATE REPORTED: 21-May-2010
COMPANY: Worley Parsons - Infrastructure MWE
DATE RECEIVED: 5-May-2010
ADDRESS: Level 3, 60 Albert Street
REPORT NO: ES1008497-003 / PSD
PO Box 15081
PROJECT: NAGD - Asia Pacific LNG
SAMPLE ID: W12 0 - 0.5
301001-00448

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	78%
9.5	77%
4.75	73%
2.36	69%
1.18	65%
0.600	60%
0.425	56%
0.300	50%
0.150	39%
0.075	31%
Particle Size (microns)	
55	27%
40	25%
20	23%
10	21%
5	19%
4	18%
1	17%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Sand, gravel & silty clay

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 17-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

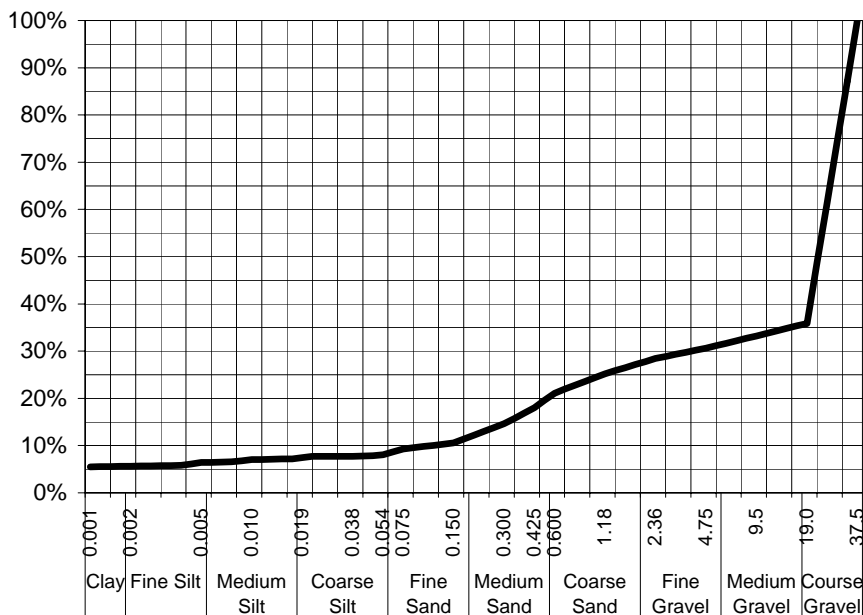
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Tom Koskela **DATE REPORTED:** 21-May-2010
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 5-May-2010
ADDRESS: Level 3, 60 Albert Street **REPORT NO:** ES1008497-004 / PSD
PO Box 15081
PROJECT: NAGD - Asia Pacific LNG **SAMPLE ID:** W11 0 - 0.5
301001-00448

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	36%
9.5	33%
4.75	31%
2.36	28%
1.18	25%
0.600	21%
0.425	18%
0.300	15%
0.150	11%
0.075	9%
Particle Size (microns)	
54	8%
38	8%
19	7%
10	7%
5	6%
4	6%
1	5%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Gravel, sand & fines

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 17-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 26-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

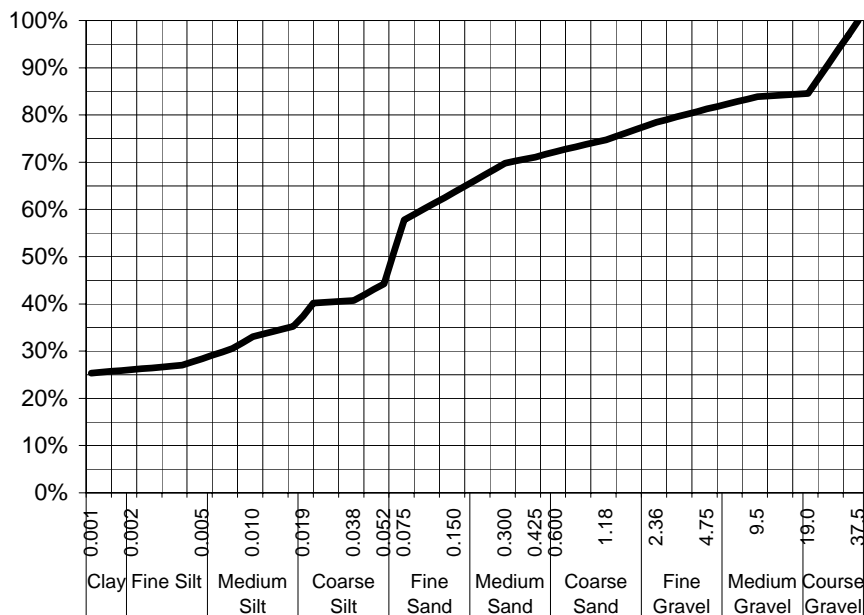
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008682-001 / PSD

PROJECT: 301001-00448

SAMPLE ID: W6 0.0 - 0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	85%
9.5	84%
4.75	81%
2.36	78%
1.18	75%
0.600	72%
0.425	71%
0.300	70%
0.150	64%
0.075	58%
Particle Size (microns)	
52	44%
38	41%
19	37%
10	33%
5	28%
4	27%
1	25%

Samples analysed as received.

Sample Comments:

Analysed: 19-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Silt, clay, sand & gravel

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 26-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

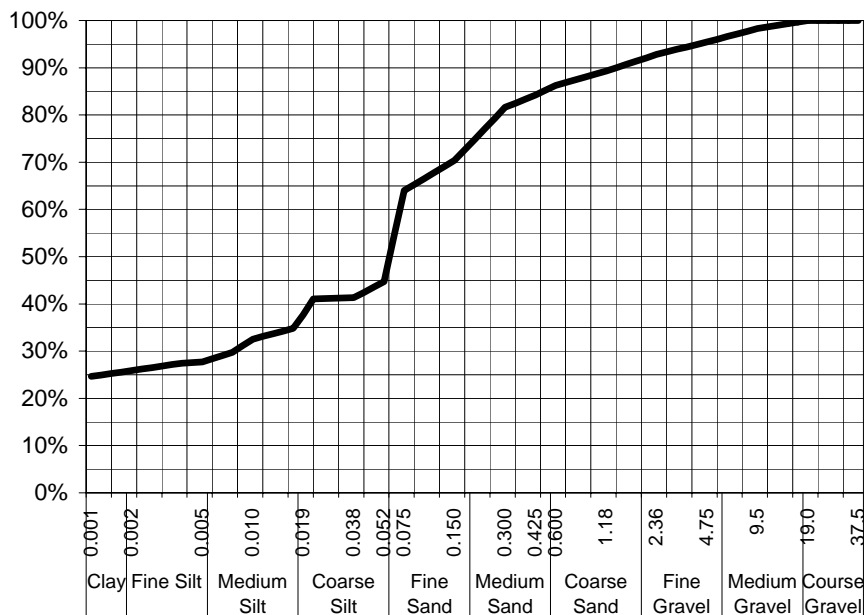
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008682-002 / PSD

PROJECT: 301001-00448

SAMPLE ID: W6 0.5 - 1.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	98%
4.75	95%
2.36	93%
1.18	89%
0.600	86%
0.425	84%
0.300	82%
0.150	70%
0.075	64%
Particle Size (microns)	
52	45%
38	41%
19	38%
10	33%
5	28%
4	27%
1	25%

Samples analysed as received.

Sample Comments:

Analysed: 19-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Silt, sand, clay & shell

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 26-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

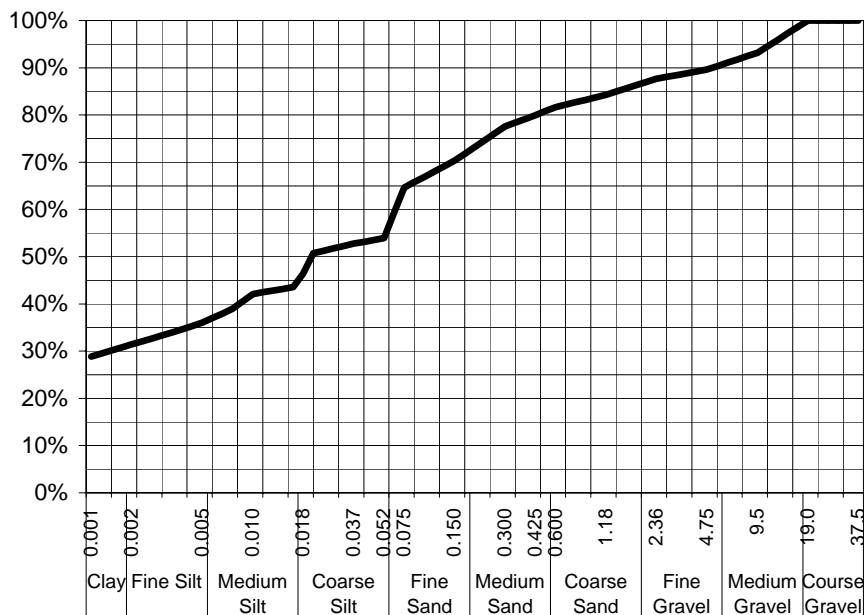
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008682-003 / PSD

PROJECT: 301001-00448

SAMPLE ID: W6 1.0 - 2.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	93%
4.75	90%
2.36	88%
1.18	84%
0.600	82%
0.425	80%
0.300	78%
0.150	70%
0.075	65%
Particle Size (microns)	
52	54%
37	53%
18	46%
10	42%
5	36%
3	35%
1	29%

Samples analysed as received.

Sample Comments:

Analysed: 19-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Silt, clay, sand & shell

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 26-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

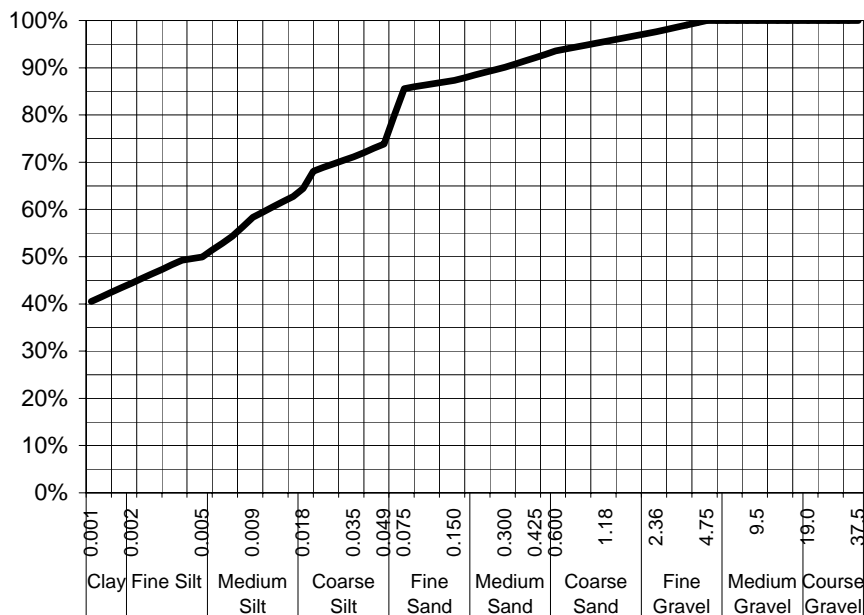
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008682-004 / PSD

PROJECT: 301001-00448

SAMPLE ID: W6 2.0 - 3.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	98%
1.18	96%
0.600	94%
0.425	92%
0.300	90%
0.150	87%
0.075	86%
Particle Size (microns)	
49	74%
35	71%
18	64%
9	58%
5	50%
3	49%
1	41%

Samples analysed as received.

Sample Comments:

Analysed: 19-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Silt, clay & sand

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

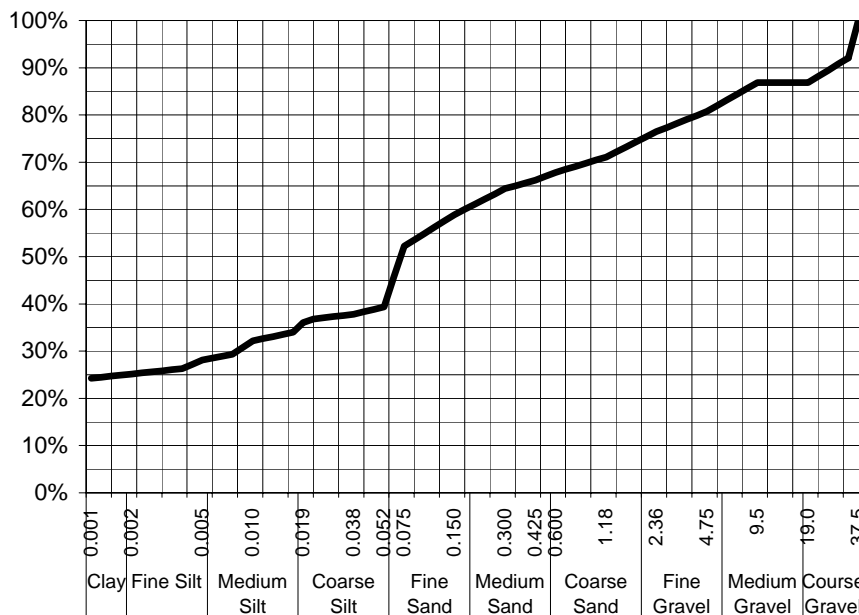
ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto **DATE REPORTED:** 26-May-2010
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 11-May-2010
ADDRESS: Level 3, 60 Albert Street **REPORT NO:** ES1008682-006 / PSD
PO Box 15081, City East
BRISBANE 4000
PROJECT: 301001-00448 **SAMPLE ID:** W7 0.0 - 0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	87%
9.5	87%
4.75	81%
2.36	76%
1.18	71%
0.600	68%
0.425	66%
0.300	64%
0.150	59%
0.075	52%
Particle Size (microns)	
52	39%
38	38%
19	36%
10	32%
5	28%
3	26%
1	24%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Sand, gravel, clay, silt & shell

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 19-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 26-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

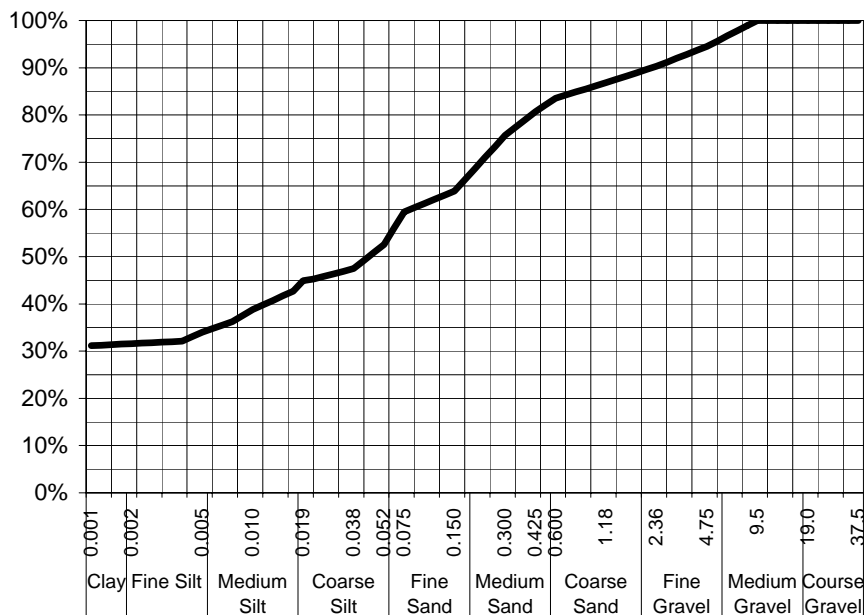
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008682-007 / PSD

PROJECT: 301001-00448

SAMPLE ID: W7 0.5 - 1.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	95%
2.36	90%
1.18	87%
0.600	84%
0.425	81%
0.300	76%
0.150	64%
0.075	59%
Particle Size (microns)	
52	53%
38	47%
19	45%
10	39%
5	34%
3	32%
1	31%

Samples analysed as received.

Sample Comments:

Analysed: 19-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand, clay, silt, gravel & shell

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 26-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

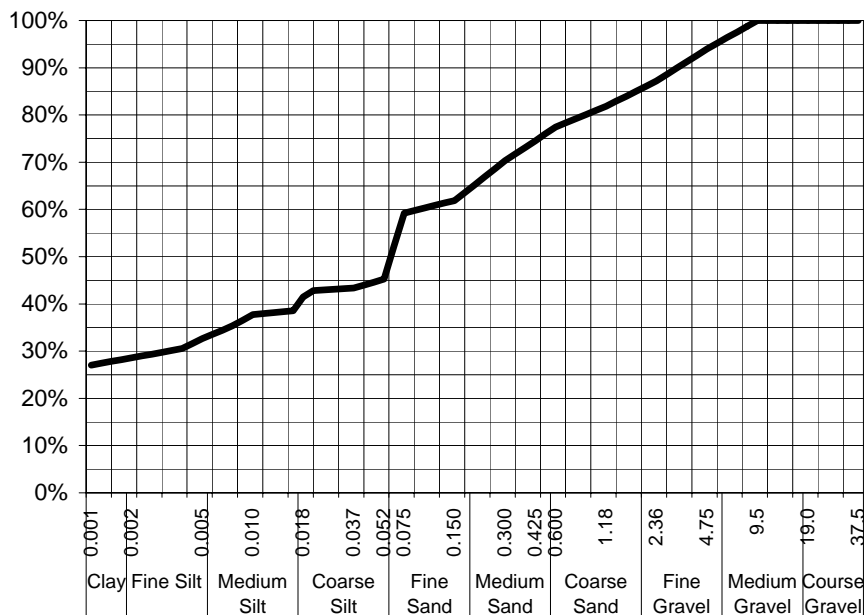
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008682-008 / PSD

PROJECT: 301001-00448

SAMPLE ID: W7 1.0 - 2.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	94%
2.36	87%
1.18	82%
0.600	77%
0.425	75%
0.300	70%
0.150	62%
0.075	59%
Particle Size (microns)	
52	45%
37	43%
18	41%
10	38%
5	33%
3	31%
1	27%

Samples analysed as received.

Sample Comments:

Analysed: 19-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Silt, sand, clay, gravel & shell

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

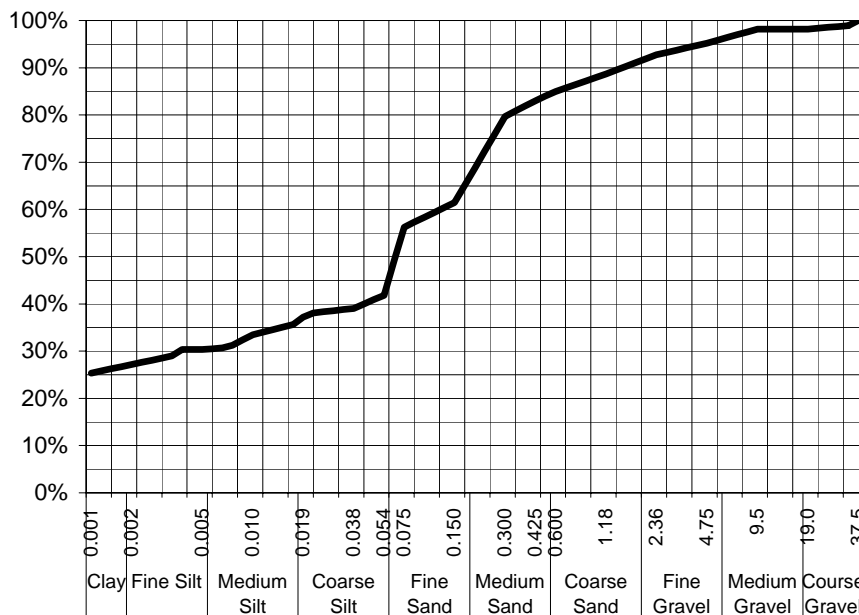
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Vivian Seto **DATE REPORTED:** 26-May-2010
COMPANY: Worley Parsons - Infrastructure MWE **DATE RECEIVED:** 11-May-2010
ADDRESS: Level 3, 60 Albert Street **REPORT NO:** ES1008682-009 / PSD
PO Box 15081, City East
BRISBANE 4000
PROJECT: 301001-00448 **SAMPLE ID:** W8 0.0 - 0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	98%
9.5	98%
4.75	95%
2.36	93%
1.18	89%
0.600	85%
0.425	83%
0.300	80%
0.150	61%
0.075	56%
Particle Size (microns)	
54	42%
38	39%
19	37%
10	33%
5	30%
4	30%
1	25%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Sand, silt, clay, gravel & shell

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 19-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

D Blane

Dianne Blane
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 26-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

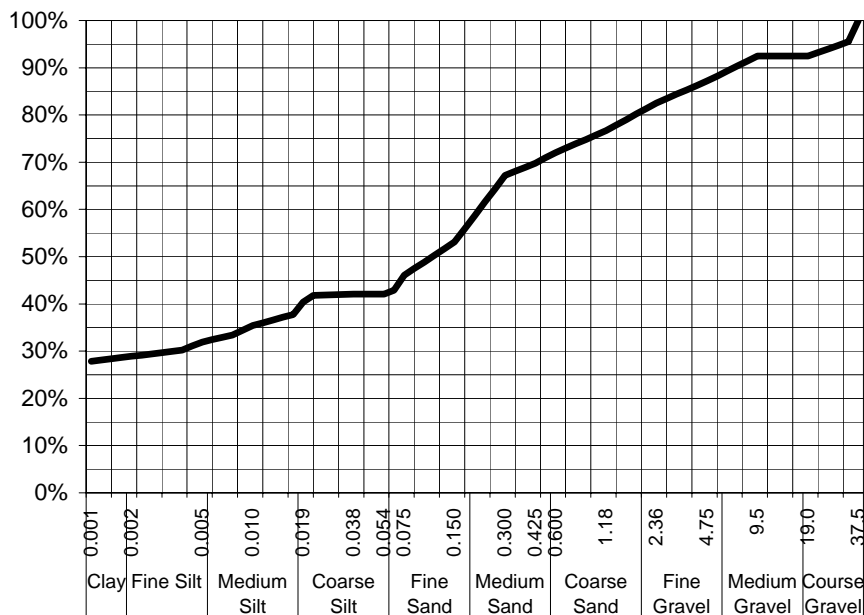
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008682-010 / PSD

PROJECT: 301001-00448

SAMPLE ID: W8 0.5 - 1.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	92%
9.5	92%
4.75	87%
2.36	83%
1.18	77%
0.600	72%
0.425	70%
0.300	67%
0.150	53%
0.075	46%
Particle Size (microns)	
54	42%
38	42%
19	40%
10	35%
5	32%
3	30%
1	28%

Samples analysed as received.

Sample Comments:

Analysed: 19-May-10

Loss on Pretreatment: NA

Limit of Reporting: 1%

Sample Description: Sand, clay, silt, gravel & shell

Dispersion Method: Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type: ASTM E100

Soil Particle Density: 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 25-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

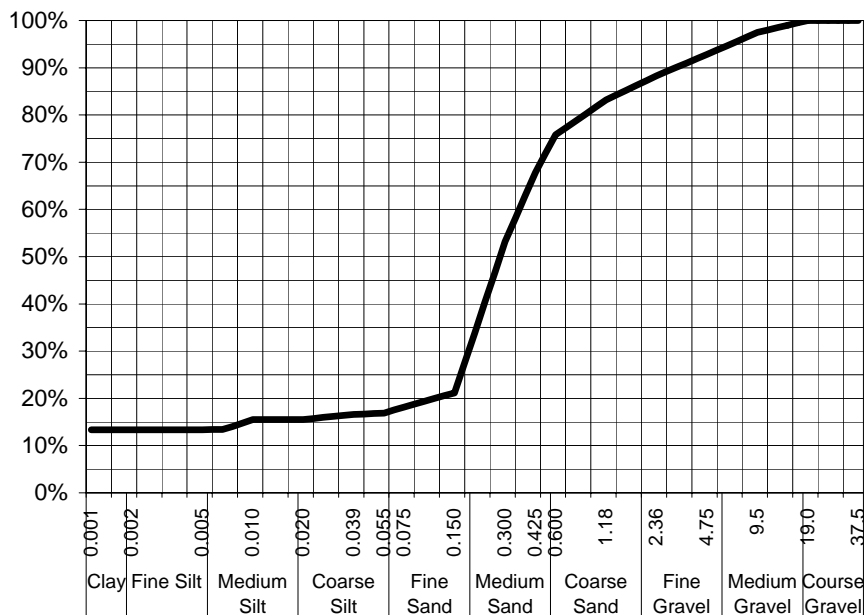
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008688-004 / PSD

PROJECT: 301001-00448

SAMPLE ID: W17 0.0 - 0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	97%
4.75	93%
2.36	88%
1.18	83%
0.600	76%
0.425	68%
0.300	53%
0.150	21%
0.075	18%
Particle Size (microns)	
55	17%
39	17%
20	16%
10	16%
5	13%
4	13%
1	13%

Samples analysed as received.

Sample Comments:

Analysed: 21-May-10

Loss on Pretreatment: NA

Limit of Reporting: 1%

Sample Description: Sand, shell & fines

Dispersion Method: Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type: ASTM E100

Soil Particle Density: 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 25-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

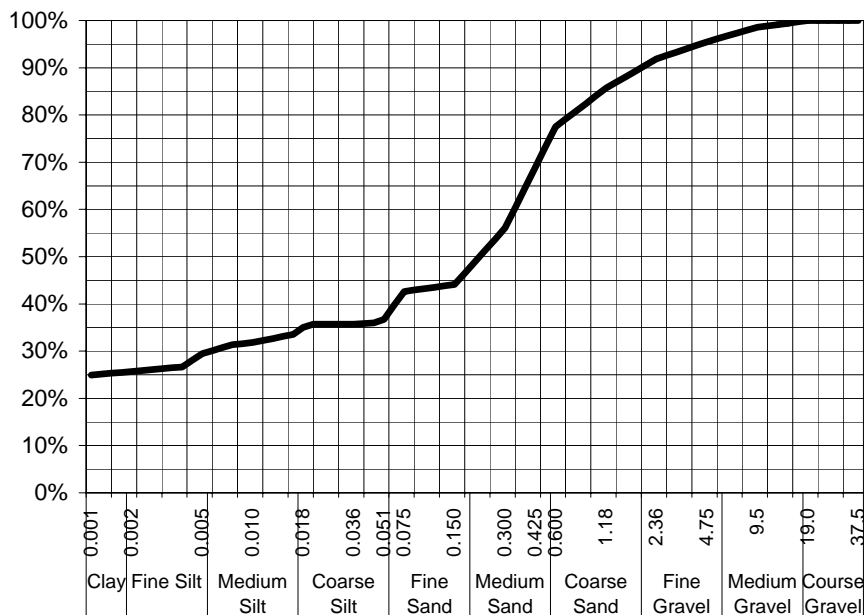
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008688-005 / PSD

PROJECT: 301001-00448

SAMPLE ID: W17 0.5 - 1.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	99%
4.75	95%
2.36	92%
1.18	86%
0.600	78%
0.425	69%
0.300	56%
0.150	44%
0.075	43%
Particle Size (microns)	
51	37%
36	36%
18	35%
10	32%
5	29%
3	27%
1	25%

Samples analysed as received.

Sample Comments:

Analysed: 21-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand, silty clay & shell

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 25-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

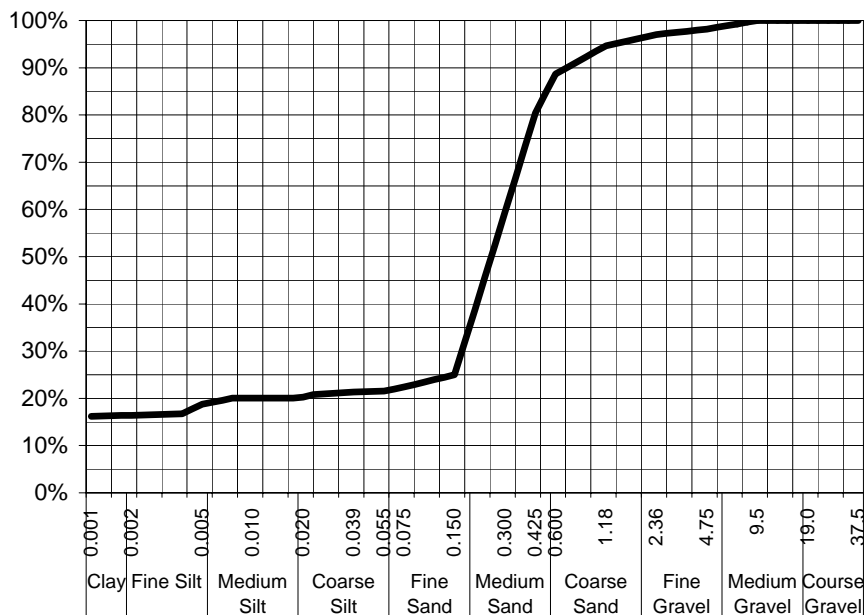
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008688-006 / PSD

PROJECT: 301001-00448

SAMPLE ID: W18 0.0 - 0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	98%
2.36	97%
1.18	95%
0.600	89%
0.425	80%
0.300	59%
0.150	25%
0.075	22%
Particle Size (microns)	
55	22%
39	21%
20	20%
10	20%
5	19%
4	17%
1	16%

Samples analysed as received.

Sample Comments:

Analysed: 21-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Sand & fines

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

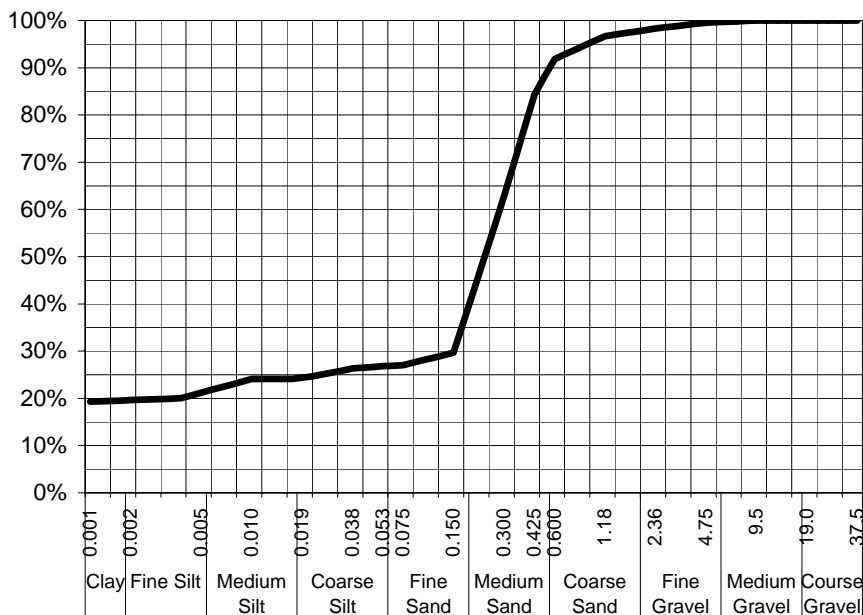
ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto **DATE REPORTED:** 25-May-2010
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 11-May-2010
ADDRESS: Level 3, 60 Albert Street **REPORT NO:** ES1008688-007 / PSD
PO Box 15081, City East
BRISBANE 4000
PROJECT: 301001-00448 **SAMPLE ID:** W18 0.5 - 1.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	98%
1.18	97%
0.600	92%
0.425	84%
0.300	63%
0.150	30%
0.075	27%
Particle Size (microns)	
53	27%
38	26%
19	24%
10	24%
5	21%
4	20%
1	19%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Sand & fines

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 21-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 25-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

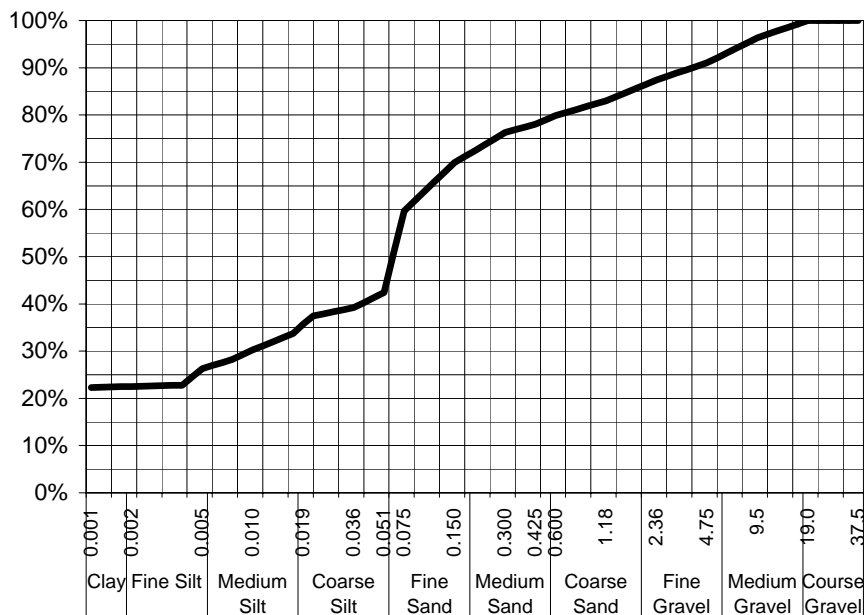
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008688-008 / PSD

PROJECT: 301001-00448

SAMPLE ID: W5 0.0 - 0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	96%
4.75	91%
2.36	87%
1.18	83%
0.600	80%
0.425	78%
0.300	76%
0.150	70%
0.075	60%
Particle Size (microns)	
51	42%
36	39%
19	36%
10	30%
5	26%
4	23%
1	22%

Samples analysed as received.

Sample Comments:

Analysed: 21-May-10

Loss on Pretreatment: NA

Limit of Reporting: 1%

Sample Description: Silty clay & shell

Dispersion Method: Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type: ASTM E100

Soil Particle Density: 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 25-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

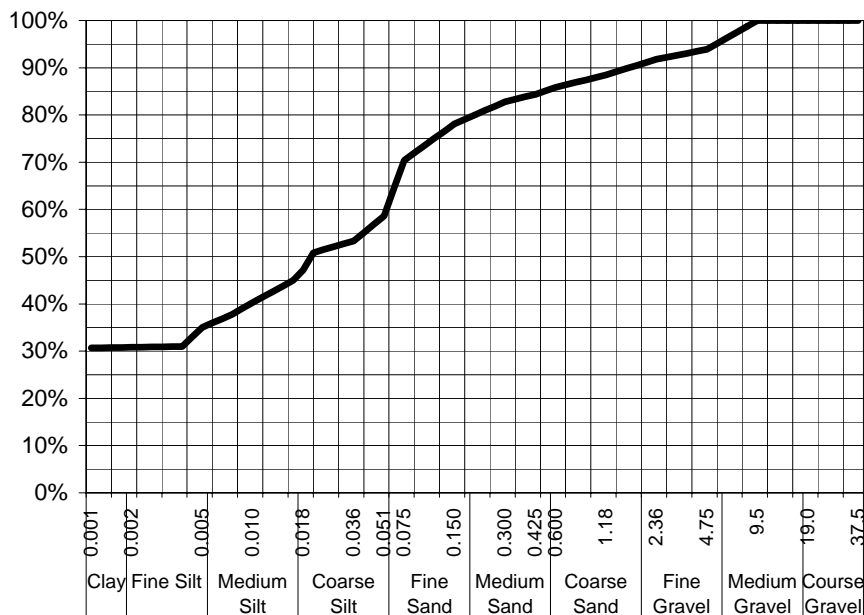
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008688-009 / PSD

PROJECT: 301001-00448

SAMPLE ID: W5 0.5 - 1.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	94%
2.36	92%
1.18	88%
0.600	86%
0.425	84%
0.300	83%
0.150	78%
0.075	70%
Particle Size (microns)	
51	59%
36	53%
18	47%
10	40%
5	35%
4	31%
1	31%

Samples analysed as received.

Sample Comments:

Analysed: 21-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Silty clay & shell

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

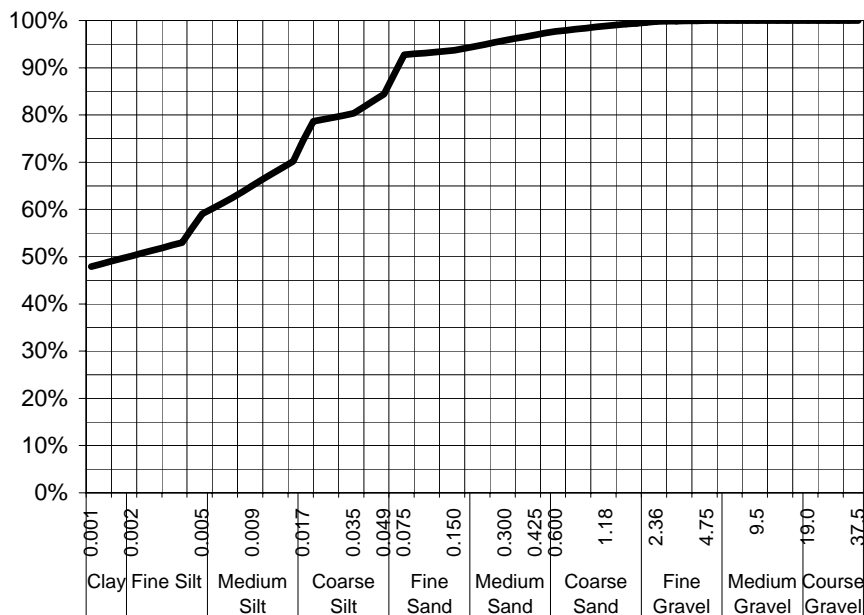
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Vivian Seto **DATE REPORTED:** 25-May-2010
COMPANY: Worley Parsons - Infrastructure MWE **DATE RECEIVED:** 11-May-2010
ADDRESS: Level 3, 60 Albert Street **REPORT NO:** ES1008688-010 / PSD
PO Box 15081, City East
BRISBANE 4000
PROJECT: 301001-00448 **SAMPLE ID:** W5 1.0 - 2.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	98%
0.425	97%
0.300	96%
0.150	94%
0.075	93%
Particle Size (microns)	
49	84%
35	80%
17	75%
9	65%
5	59%
3	53%
1	48%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Analysed: 21-May-10

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental

Newcastle, NSW



CLIENT: Vivian Seto

DATE REPORTED: 25-May-2010

COMPANY: Worley Parsons - Infrastructure
MWE

DATE RECEIVED: 11-May-2010

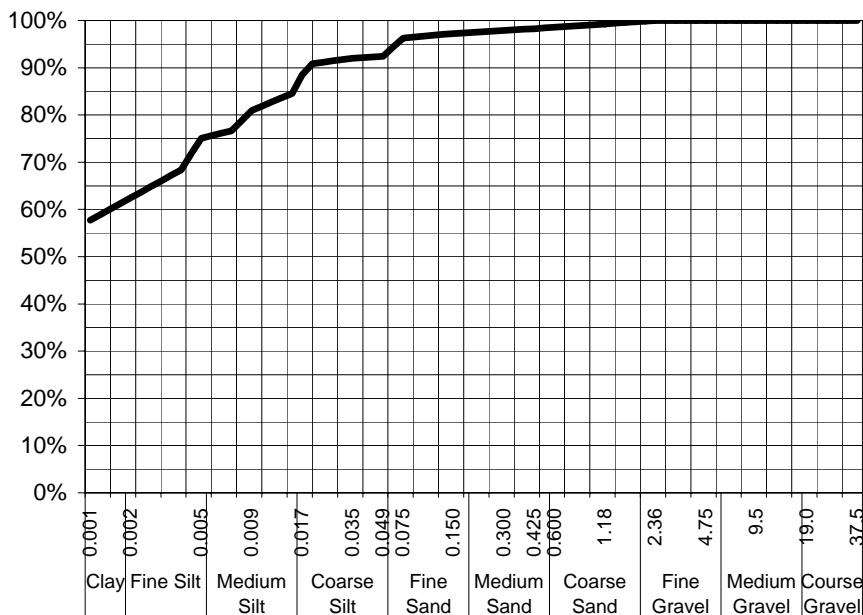
ADDRESS: Level 3, 60 Albert Street
PO Box 15081, City East
BRISBANE 4000

REPORT NO: ES1008688-011 / PSD

PROJECT: 301001-00448

SAMPLE ID: W5 2.0 - 3.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	99%
0.425	98%
0.300	98%
0.150	97%
0.075	96%
Particle Size (microns)	
49	92%
35	92%
17	88%
9	81%
5	75%
3	68%
1	58%

Samples analysed as received.

Sample Comments:

Analysed: 21-May-10

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Silty clay

Dispersion Method Shaker

Test Method: AS1289.3.6.2/AS1289.3.6.3

Hydrometer Type ASTM E100

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 **Site:** Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



D Blane

Dianne Blane

Laboratory Supervisor, Newcastle
Authorised Signatory

Appendix 3 Primary Laboratory Reports (ALS)



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1008241	Page	: 1 of 8
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: NAGD - Asia Pacific LNG	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 05-MAY-2010
C-O-C number	: ----	Issue Date	: 20-MAY-2010
Sampler	: ----	No. of samples received	: 6
Site	: ----	No. of samples analysed	: 6
Quote number	: BN/187/10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

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>
Ashesh Patel	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Dianne Blane	Laboratory Supervisor	Newcastle
Edwandy Fadjar	Senior Organic Chemist	Organics
Matt Frost	Organic Instrument Chemist	Organics
Sarah Ashworth	Organic Chemist	Organics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

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

LOR = Limit of reporting

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



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W19 0-0.5	W19 0.5-1	W19 1-1.6	IB2 0-0.5	IB2 0.5-1.0
				03-MAY-2010 15:00	03-MAY-2010 15:00	03-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00
				ES1008241-001	ES1008241-002	ES1008241-003	ES1008241-004	ES1008241-005
EA150: Particle Sizing								
+75µm	----	1	%	69	62	58	----	----
+150µm	----	1	%	28	36	44	----	----
+300µm	----	1	%	2	4	7	----	----
+425µm	----	1	%	1	3	4	----	----
+600µm	----	1	%	<1	3	3	----	----
+1180µm	----	1	%	<1	2	2	----	----
+2.36mm	----	1	%	<1	1	2	----	----
+4.75mm	----	1	%	<1	<1	1	----	----
+9.5mm	----	1	%	<1	<1	<1	----	----
+19.0mm	----	1	%	<1	<1	<1	----	----
+37.5mm	----	1	%	<1	<1	<1	----	----
+75.0mm	----	1	%	<1	<1	<1	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	33.6	36.4	35.7	44.9	46.5
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	19	25	24	----	----
Silt (2-60 µm)	----	1	%	10	13	19	----	----
Sand (0.06-2.00 mm)	----	1	%	71	62	55	----	----
Gravel (>2mm)	----	1	%	<1	<1	2	----	----
Cobbles (>6cm)	----	1	%	<1	<1	<1	----	----
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	8810	11100	9760	16100	22100
Iron	7439-89-6	50	mg/kg	15300	18200	17000	30600	28600
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	9.49	10.9	9.06	16.6	10.8
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	14.0	16.7	14.6	24.7	27.9
Copper	7440-50-8	1.0	mg/kg	10.2	11.3	12.4	19.3	28.4
Cobalt	7440-48-4	0.5	mg/kg	7.7	8.6	8.7	17.0	13.9
Lead	7439-92-1	1.0	mg/kg	5.1	5.4	5.5	7.9	9.1
Manganese	7439-96-5	10	mg/kg	128	168	333	236	185
Nickel	7440-02-0	1.0	mg/kg	7.4	8.8	7.4	11.6	12.8
Selenium	7782-49-2	0.1	mg/kg	0.4	0.4	0.5	0.7	0.8
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	31.6	37.6	39.0	50.0	63.9
Zinc	7440-66-6	1.0	mg/kg	22.6	26.0	22.0	47.3	47.5



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				W19 0-0.5	W19 0.5-1	W19 1-1.6	IB2 0-0.5	IB2 0.5-1.0
				03-MAY-2010 15:00	03-MAY-2010 15:00	03-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008241-001	ES1008241-002	ES1008241-003	ES1008241-004	ES1008241-005
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.90	1.28	1.20	1.18	1.15
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5
^ Sum of PAHs	----	4	µg/kg	<4	<4	<4	<4	<4
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	77.5	92.5	74.0	58.1	57.7
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	94.6	89.8	84.2	93.1	116
Anthracene-d10	1719-06-8	0.1	%	117	116	119	78.2	80.4
4-Terphenyl-d14	1718-51-0	0.1	%	118	114	118	103	110



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				IB2 1-2.0	----	----	----	----
				01-MAY-2010 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1008241-006	----	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	49.1	----	----	----	----
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	22000	----	----	----	----
Iron	7439-89-6	50	mg/kg	31900	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	----	----	----	----
Arsenic	7440-38-2	1.00	mg/kg	9.06	----	----	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	----	----	----
Chromium	7440-47-3	1.0	mg/kg	23.7	----	----	----	----
Copper	7440-50-8	1.0	mg/kg	37.9	----	----	----	----
Cobalt	7440-48-4	0.5	mg/kg	17.2	----	----	----	----
Lead	7439-92-1	1.0	mg/kg	9.2	----	----	----	----
Manganese	7439-96-5	10	mg/kg	204	----	----	----	----
Nickel	7440-02-0	1.0	mg/kg	14.1	----	----	----	----
Selenium	7782-49-2	0.1	mg/kg	1.0	----	----	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	----	----	----	----
Vanadium	7440-62-2	2.0	mg/kg	83.7	----	----	----	----
Zinc	7440-66-6	1.0	mg/kg	40.3	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	3.46	----	----	----	----
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	----	----	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	----	----	----	----
Acenaphthylene	208-96-8	4	µg/kg	<4	----	----	----	----
Acenaphthene	83-32-9	4	µg/kg	<4	----	----	----	----
Fluorene	86-73-7	4	µg/kg	<4	----	----	----	----
Phenanthrene	85-01-8	4	µg/kg	<4	----	----	----	----
Anthracene	120-12-7	4	µg/kg	<4	----	----	----	----
Fluoranthene	206-44-0	4	µg/kg	<4	----	----	----	----
Pyrene	129-00-0	4	µg/kg	<4	----	----	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	<4	----	----	----	----
Chrysene	218-01-9	4	µg/kg	6	----	----	----	----



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

				IB2 1-2.0	----	----	----	----
Client sampling date / time				01-MAY-2010 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1008241-006	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	----	----	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	----	----	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	----	----	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	----	----	----	----
Perylene	198-55-0	4	µg/kg	<4	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	5	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	----	----	----	----
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	----	----	----	----
Coronene	191-07-1	5	µg/kg	<5	----	----	----	----
^ Sum of PAHs	----	4	µg/kg	11	----	----	----	----
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	54.3	----	----	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	110	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	102	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	110	----	----	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP090S: Organotin Surrogate			
Tripopyltin	----	34	108
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	30	115
Anthracene-d10	1719-06-8	27	133
4-Terphenyl-d14	1718-51-0	18	137



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1008241	Page	: 1 of 9
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: NAGD - Asia Pacific LNG	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 05-MAY-2010
C-O-C number	: ----	Issue Date	: 20-MAY-2010
Sampler	: ----		
Order number	: ----		
Quote number	: BN/187/10	No. of samples received	: 6
		No. of samples analysed	: 6

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

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



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

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>
Ashesh Patel	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Dianne Blane	Laboratory Supervisor	Newcastle
Edwandy Fadjar	Senior Organic Chemist	Organics
Matt Frost	Organic Instrument Chemist	Organics
Sarah Ashworth	Organic Chemist	Organics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY



General Comments

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

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

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

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

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 1334524)									
ES1008199-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	9.9	10.5	6.1	0% - 50%
ES1008246-002	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	44.1	45.1	2.2	0% - 20%
EG005-SD: Total Metals in Sediments by ICP-AES (QC Lot: 1334302)									
ES1007990-001	Anonymous	EG005-SD: Aluminium	7429-90-5	50	mg/kg	21000	20500	2.6	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	26400	29300	10.5	0% - 20%
ES1008245-002	Anonymous	EG005-SD: Aluminium	7429-90-5	50	mg/kg	23200	22600	2.6	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	34500	29700	14.9	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1334301)									
ES1007990-001	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.9	0.9	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	9.0	10.1	11.9	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	16.3	15.8	3.4	0% - 50%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	31.4	29.7	5.5	0% - 20%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	7.8	9.2	16.0	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	8.2	8.4	2.0	No Limit
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	28.6	28.0	2.3	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	3.69	4.20	12.8	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	129	130	0.9	0% - 50%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	87.4	94.7	8.1	0% - 20%
ES1008245-002	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.9	0.9	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	12.1	10.9	10.1	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	29.0	28.5	1.6	0% - 20%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	33.0	34.1	3.3	0% - 20%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	9.6	9.6	0.0	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	14.0	13.8	1.6	0% - 50%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	47.3	46.7	1.3	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	13.3	9.57	32.9	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	195	198	1.2	0% - 50%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	83.6	70.7	16.7	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1334300)									



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: 1334300) - continued									
ES1007990-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
ES1008245-002	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 1337239)									
ES1008241-001	W19 0-0.5	EP005: Total Organic Carbon	----	0.02	%	0.90	0.92	2.0	0% - 20%
EP090: Organotin Compounds (QC Lot: 1338950)									
ES1008241-001	W19 0-0.5	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
ES1008245-007	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1334261)									
ES1008241-001	W19 0-0.5	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit
ES1008246-006	Anonymous	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	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 (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1334261) - continued									
ES1008246-006	Anonymous	EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit



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

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

Sub-Matrix: **SOIL**

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				
EG005-SD: Total Metals in Sediments by ICP-AES (QCLot: 1334302)								
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1334301)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	110	70	130
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	92.7	70	130
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	95.1	70	130
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	97.4	70	130
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	94.3	70	130
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	94.2	70	130
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	91.6	70	130
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	98.5	70	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	106	70	130
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	50 mg/kg	100	70	130
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	101	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1334300)								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	81.1	74.2	126
EP005: Total Organic Carbon (TOC) (QCLot: 1337239)								
EP005: Total Organic Carbon	----	0.02	%	<0.02	100 %	98.5	70	130
EP090: Organotin Compounds (QCLot: 1338950)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	99.2	19.5	129
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1334261)								
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	100	----	----
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	98.6	----	----
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	110	----	----
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	108	----	----
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	116	----	----
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	111	----	----
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	105	----	----
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	104	----	----



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			LCS	Low
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1334261) - continued								
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	97.6	----	----
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	91.5	----	----
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	75.8	----	----
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	95.8	----	----
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	105	----	----
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	96.8	----	----
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	97.5	----	----
EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	90.9	----	----
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	116	----	----
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----



Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1334301)							
ES1007990-001	Anonymous	EG020-SD: Arsenic	7440-38-2	50 mg/kg	82.2	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	90.2	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	90.7	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	85.8	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	91.3	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	89.2	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	91.7	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1334300)							
ES1007990-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	78.6	70	130
EP090: Organotin Compounds (QCLot: 1338950)							
ES1008241-002	W19 0.5-1	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	83.7	20	130
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1334261)							
ES1008241-001	W19 0-0.5	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	102	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	86.2	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	110	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	106	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	112	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	107	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	94.8	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	101	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	99.1	70	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	104	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	104	70	130
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	91.0	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	# 64.2	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	# 64.0	70	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	74.3	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	83.9	70	130
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	81.4	70	130
		EP132B-SD: Dibenzo(a,h)anthracene	53-70-3	25 µg/kg	91.2	70	130
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	25 µg/kg	71.7	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	102	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1008241	Page	: 1 of 6
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: NAGD - Asia Pacific LNG	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 05-MAY-2010
C-O-C number	: ----	Issue Date	: 20-MAY-2010
Sampler	: ----		
Order number	: ----	No. of samples received	: 6
Quote number	: BN/187/10	No. of samples analysed	: 6

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

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 IB2 - 0-0.5, IB2 - 1-2.0	IB2 - 0.5-1.0,	01-MAY-2010	----	----	----	05-MAY-2010	08-MAY-2010	✓
Soil Glass Jar - Unpreserved W19 - 0-0.5, W19 - 1-1.6	W19 - 0.5-1,	03-MAY-2010	----	----	----	05-MAY-2010	10-MAY-2010	✓
EA150: Particle Sizing								
Snap Lock Bag W19 - 0-0.5, W19 - 1-1.6	W19 - 0.5-1,	03-MAY-2010	---	---	----	13-MAY-2010	30-OCT-2010	✓
EA150: Soil Classification based on Particle Size								
Snap Lock Bag W19 - 0-0.5, W19 - 1-1.6	W19 - 0.5-1,	03-MAY-2010	---	---	----	13-MAY-2010	30-OCT-2010	✓
EG005-SD: Total Metals in Sediments by ICP-AES								
Soil Glass Jar - Unpreserved IB2 - 0-0.5, IB2 - 1-2.0	IB2 - 0.5-1.0,	01-MAY-2010	05-MAY-2010	29-MAY-2010	✓	06-MAY-2010	28-OCT-2010	✓
Soil Glass Jar - Unpreserved W19 - 0-0.5, W19 - 1-1.6	W19 - 0.5-1,	03-MAY-2010	05-MAY-2010	31-MAY-2010	✓	06-MAY-2010	30-OCT-2010	✓
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved IB2 - 0-0.5, IB2 - 1-2.0	IB2 - 0.5-1.0,	01-MAY-2010	05-MAY-2010	29-MAY-2010	✓	06-MAY-2010	28-OCT-2010	✓
Soil Glass Jar - Unpreserved W19 - 0-0.5, W19 - 1-1.6	W19 - 0.5-1,	03-MAY-2010	05-MAY-2010	31-MAY-2010	✓	06-MAY-2010	30-OCT-2010	✓



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	
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved IB2 - 0-0.5, IB2 - 1-2.0	IB2 - 0.5-1.0,	01-MAY-2010	05-MAY-2010	29-MAY-2010	✓	06-MAY-2010	29-MAY-2010	✓
Soil Glass Jar - Unpreserved W19 - 0-0.5, W19 - 1-1.6	W19 - 0.5-1,	03-MAY-2010	05-MAY-2010	31-MAY-2010	✓	06-MAY-2010	31-MAY-2010	✓
EP005: Total Organic Carbon (TOC)								
Pulp Bag IB2 - 0-0.5, IB2 - 1-2.0	IB2 - 0.5-1.0,	01-MAY-2010	07-MAY-2010	29-MAY-2010	✓	07-MAY-2010	29-MAY-2010	✓
Pulp Bag W19 - 0-0.5, W19 - 1-1.6	W19 - 0.5-1,	03-MAY-2010	07-MAY-2010	31-MAY-2010	✓	07-MAY-2010	31-MAY-2010	✓
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved IB2 - 0-0.5, IB2 - 1-2.0	IB2 - 0.5-1.0,	01-MAY-2010	10-MAY-2010	15-MAY-2010	✓	12-MAY-2010	19-JUN-2010	✓
Soil Glass Jar - Unpreserved W19 - 0-0.5, W19 - 1-1.6	W19 - 0.5-1,	03-MAY-2010	10-MAY-2010	17-MAY-2010	✓	12-MAY-2010	19-JUN-2010	✓
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved IB2 - 0-0.5, IB2 - 1-2.0	IB2 - 0.5-1.0,	01-MAY-2010	05-MAY-2010	15-MAY-2010	✓	11-MAY-2010	14-JUN-2010	✓
Soil Glass Jar - Unpreserved W19 - 0-0.5, W19 - 1-1.6	W19 - 0.5-1,	03-MAY-2010	05-MAY-2010	17-MAY-2010	✓	11-MAY-2010	14-JUN-2010	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	19	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organotin Analysis	EP090	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organotin Analysis	EP090	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organotin Analysis	EP090	1	19	5.3	5.0	✓	ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	20	5.0	5.0	✓	ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	20	5.0	5.0	✓	ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	20	5.0	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Particle Size Analysis (Sieving)	EA150	SOIL	Particle Size Analysis by Sieving according to AS1289.3.6.1 - 1995
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Total Fe and Al in Sediments by ICPAES	EG005-SD	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3). LORs per NODG
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 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 (1999) Schedule B(3)
Total Organic Carbon	EP005	SOIL	In-house. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
Organotin Analysis	EP090	SOIL	(USEPA SW 846 - 8270D) Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quantified against an established calibration curve.
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.
Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. 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 (1999) Schedule B(3) (Method 202)
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.
Organotin Sample Preparation	ORG35	SOIL	In house. 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP132B: Polynuclear Aromatic Hydrocarbons	ES1008241-001	W19 0-0.5	Benzo(k)fluoranthene	207-08-9	64.2 %	70-130%	Recovery less than lower data quality objective
EP132B: Polynuclear Aromatic Hydrocarbons	ES1008241-001	W19 0-0.5	Benzo(e)pyrene	192-97-2	64.0 %	70-130%	Recovery less than lower data quality objective

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP132T: Base/Neutral Extractable Surrogates	ES1008241-005	IB2 0.5-1.0	2-Fluorobiphenyl	321-60-8	116 %	30-115 %	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1008246	Page	: 1 of 13
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: NAGD - Asia Pacific LNG	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 05-MAY-2010
C-O-C number	: ----	Issue Date	: 21-MAY-2010
Sampler	: ----	No. of samples received	: 14
Site	: ----	No. of samples analysed	: 14
Quote number	: BN/187/10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

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>
Alex Rossi	Organic Chemist	Organics
Ankit Joshi	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Dianne Blane	Laboratory Supervisor	Newcastle
Edwandy Fadjar	Senior Organic Chemist	Organics
Sarah Ashworth	Organic Chemist	Organics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

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

LOR = Limit of reporting

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



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W1 0-0.5	W1 0.5-1	TRIP BLANK 5	W2 0-0.5	W2 0.5-1
				01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00
				ES1008246-001	ES1008246-002	ES1008246-003	ES1008246-004	ES1008246-005
EA150: Particle Sizing								
+75µm	----	1	%	28	12	----	42	22
+150µm	----	1	%	8	3	----	16	10
+300µm	----	1	%	7	2	----	10	6
+425µm	----	1	%	6	2	----	9	5
+600µm	----	1	%	6	1	----	8	4
+1180µm	----	1	%	5	<1	----	6	3
+2.36mm	----	1	%	4	<1	----	4	1
+4.75mm	----	1	%	2	<1	----	4	<1
+9.5mm	----	1	%	<1	<1	----	<1	<1
+19.0mm	----	1	%	<1	<1	----	<1	<1
+37.5mm	----	1	%	<1	<1	----	<1	<1
+75.0mm	----	1	%	<1	<1	----	<1	<1
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	41.0	44.1	----	39.4	41.9
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	30	41	----	25	37
Silt (2-60 µm)	----	1	%	40	41	----	28	36
Sand (0.06-2.00 mm)	----	1	%	26	17	----	42	26
Gravel (>2mm)	----	1	%	4	1	----	5	1
Cobbles (>6cm)	----	1	%	<1	<1	----	<1	<1
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	15500	18900	----	14500	18200
Iron	7439-89-6	50	mg/kg	25300	32600	----	29900	30500
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	----	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	13.6	15.7	----	15.4	13.1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	----	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	23.1	29.1	----	23.2	26.6
Copper	7440-50-8	1.0	mg/kg	15.5	24.0	----	15.0	25.5
Cobalt	7440-48-4	0.5	mg/kg	12.9	14.8	----	16.7	13.7
Lead	7439-92-1	1.0	mg/kg	7.3	9.3	----	7.0	9.2
Manganese	7439-96-5	10	mg/kg	204	226	----	242	220
Nickel	7440-02-0	1.0	mg/kg	11.9	14.4	----	11.1	12.2
Selenium	7782-49-2	0.1	mg/kg	0.6	0.8	----	0.7	0.7
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	----	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	44.6	61.5	----	47.7	60.0
Zinc	7440-66-6	1.0	mg/kg	38.8	46.4	----	43.0	42.5



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				W1 0-0.5	W1 0.5-1	TRIP BLANK 5	W2 0-0.5	W2 0.5-1
				01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008246-001	ES1008246-002	ES1008246-003	ES1008246-004	ES1008246-005
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.03	0.01	----	<0.01	<0.01
EK055: Ammonia as N								
Ammonia as N	7664-41-7	1	mg/kg	<1	<1	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	0.2	----	----	----
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	0.2	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	770	1660	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	248	208	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.1	mg/kg	0.6	2.3	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	1.41	1.24	----	1.25	1.15
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	----	----
C10 - C14 Fraction	----	3	mg/kg	<3	<3	----	----	----
C15 - C28 Fraction	----	3	mg/kg	<3	<3	----	----	----
C29 - C36 Fraction	----	5	mg/kg	<5	<5	----	----	----
C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	----	----	----
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	----	----
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	----	<0.5	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	----	----	----
Carbophenothion	786-19-6	10	µg/kg	<10	<10	----	----	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W1 0-0.5	W1 0.5-1	TRIP BLANK 5	W2 0-0.5	W2 0.5-1
				01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00
				ES1008246-001	ES1008246-002	ES1008246-003	ES1008246-004	ES1008246-005
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	<10.0	----	----	----
Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	<10	----	----	----
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	----	----	----
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	----	----	----
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	----	----	----
Diazinon	333-41-5	10	µg/kg	<10	<10	----	----	----
Dichlorvos	62-73-7	10	µg/kg	<10	<10	----	----	----
Dimethoate	60-51-5	10	µg/kg	<10	<10	----	----	----
Ethion	563-12-2	10	µg/kg	<10	<10	----	----	----
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	----	----	----
Fenthion	55-38-9	10	µg/kg	<10	<10	----	----	----
Malathion	121-75-5	10	µg/kg	<10	<10	----	----	----
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	----	----	----
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	----	----	----
Parathion	56-38-2	10	µg/kg	<10	<10	----	----	----
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	----	----	----
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	----	----	----
Prothiofos	34643-46-4	10	µg/kg	<10	<10	----	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	----	----	----
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	----	----	----
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	----	----	----
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	----	----	----
4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	----	----	----
4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	----	----	----
4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	----	----	----
^ DDT (total)	----	0.50	µg/kg	<0.50	<0.50	----	----	----
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	----	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	----	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	----	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	----	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	----	----	----
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	----	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	----	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	----	----	----
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	----	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	----	----	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W1 0-0.5	W1 0.5-1	TRIP BLANK 5	W2 0-0.5	W2 0.5-1
				01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00
				ES1008246-001	ES1008246-002	ES1008246-003	ES1008246-004	ES1008246-005
EP131A: Organochlorine Pesticides - Continued								
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	----	----	----
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	----	----	----
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	----	----	----
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	----	----	----
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	----	----	----
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	----	----	----
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	----	<5	10
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	----	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	----	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	----	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	----	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	----	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	----	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	----	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	----	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	----	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	<4	----	<4	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	----	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	----	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	----	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	----	<4	<4
Perylene	198-55-0	4	µg/kg	<4	<4	----	4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	----	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	----	<4	<4
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	----	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	----	<5	<5



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				W1 0-0.5	W1 0.5-1	TRIP BLANK 5	W2 0-0.5	W2 0.5-1
				01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008246-001	ES1008246-002	ES1008246-003	ES1008246-004	ES1008246-005
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Sum of PAHs	----	4	µg/kg	<4	<4	----	4	10
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	96.2	87.1	123	----	----
Toluene-D8	2037-26-5	0.1	%	83.2	90.0	99.6	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	98.0	83.1	109	----	----
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	81.7	72.2	----	63.2	55.9
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	63.6	70.4	----	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	42.3	36.1	----	----	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	40.2	48.6	----	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	107	113	----	117	116
Anthracene-d10	1719-06-8	0.1	%	103	111	----	89.1	113
4-Terphenyl-d14	1718-51-0	0.1	%	116	94.2	----	81.1	105



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W2 1-2.0	W2 2.0-3.0	W3 0-0.5	W3 0.5-1	W3 1.0-2.0
				01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00
				ES1008246-006	ES1008246-007	ES1008246-008	ES1008246-009	ES1008246-010
EA150: Particle Sizing								
+75µm	----	1	%	22	4	34	22	5
+150µm	----	1	%	11	2	13	10	4
+300µm	----	1	%	7	1	8	8	3
+425µm	----	1	%	6	1	7	8	3
+600µm	----	1	%	5	<1	6	7	2
+1180µm	----	1	%	6	<1	5	6	2
+2.36mm	----	1	%	5	<1	3	5	<1
+4.75mm	----	1	%	5	<1	2	5	<1
+9.5mm	----	1	%	5	<1	<1	5	<1
+19.0mm	----	1	%	<1	<1	<1	<1	<1
+37.5mm	----	1	%	<1	<1	<1	<1	<1
+75.0mm	----	1	%	<1	<1	<1	<1	<1
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	41.5	43.2	42.2	46.3	53.2
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	32	48	30	37	53
Silt (2-60 µm)	----	1	%	41	45	32	39	42
Sand (0.06-2.00 mm)	----	1	%	22	7	35	19	5
Gravel (>2mm)	----	1	%	5	<1	3	5	<1
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	21300	22000	16000	20300	25300
Iron	7439-89-6	50	mg/kg	27700	33800	28800	30700	33800
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	9.78	11.5	13.4	12.0	8.66
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	27.6	26.2	23.9	27.7	25.7
Copper	7440-50-8	1.0	mg/kg	34.8	33.6	17.3	25.1	42.9
Cobalt	7440-48-4	0.5	mg/kg	14.9	16.1	15.4	15.3	16.0
Lead	7439-92-1	1.0	mg/kg	10.2	10.5	7.4	8.7	10.4
Manganese	7439-96-5	10	mg/kg	113	155	209	200	225
Nickel	7440-02-0	1.0	mg/kg	13.0	13.8	11.0	12.6	14.9
Selenium	7782-49-2	0.1	mg/kg	0.8	0.7	0.6	0.9	1.1
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	73.7	76.0	48.6	60.6	77.5
Zinc	7440-66-6	1.0	mg/kg	42.8	42.7	44.3	44.5	41.8



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W2 1-2.0	W2 2.0-3.0	W3 0-0.5	W3 0.5-1	W3 1.0-2.0
				01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00
				ES1008246-006	ES1008246-007	ES1008246-008	ES1008246-009	ES1008246-010
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	0.01	<0.01
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	1.11	0.99	0.98	1.12	3.19
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	14
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<5
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<5
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<5
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	5	<5
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<5
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<5
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<5
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<5
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	7
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	5	<4	8
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<5
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<5
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<5
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<5
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	5
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<5
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<5
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5
^ Sum of PAHs	----	4	µg/kg	<4	<4	5	5	34
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	80.3	64.8	74.0	81.4	83.3
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	107	100	92.7	90.4	119
Anthracene-d10	1719-06-8	0.1	%	115	110	110	106	94.9
4-Terphenyl-d14	1718-51-0	0.1	%	96.7	84.2	93.3	98.4	94.9



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W4 0-0.5	W4 0.5-1.0	W20 0-0.5	W20 0.5-1.0	----
				01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	----
				ES1008246-011	ES1008246-012	ES1008246-013	ES1008246-014	----
EA150: Particle Sizing								
+75µm	----	1	%	47	22	58	8	----
+150µm	----	1	%	24	13	14	3	----
+300µm	----	1	%	16	9	6	2	----
+425µm	----	1	%	15	9	5	2	----
+600µm	----	1	%	14	8	4	2	----
+1180µm	----	1	%	12	6	2	<1	----
+2.36mm	----	1	%	10	5	<1	<1	----
+4.75mm	----	1	%	8	4	<1	<1	----
+9.5mm	----	1	%	4	1	<1	<1	----
+19.0mm	----	1	%	<1	<1	<1	<1	----
+37.5mm	----	1	%	<1	<1	<1	<1	----
+75.0mm	----	1	%	<1	<1	<1	<1	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	39.0	41.7	45.6	46.6	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	20	35	26	50	----
Silt (2-60 µm)	----	1	%	31	39	14	41	----
Sand (0.06-2.00 mm)	----	1	%	39	21	60	9	----
Gravel (>2mm)	----	1	%	10	5	<1	<1	----
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	----
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	15300	17800	12000	22900	----
Iron	7439-89-6	50	mg/kg	28900	29300	23000	28400	----
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	----
Arsenic	7440-38-2	1.00	mg/kg	13.7	12.8	16.9	11.6	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
Chromium	7440-47-3	1.0	mg/kg	24.5	25.9	19.5	28.4	----
Copper	7440-50-8	1.0	mg/kg	17.6	21.9	16.8	33.5	----
Cobalt	7440-48-4	0.5	mg/kg	16.9	15.3	10.1	14.4	----
Lead	7439-92-1	1.0	mg/kg	7.4	8.4	7.5	10.2	----
Manganese	7439-96-5	10	mg/kg	242	242	231	269	----
Nickel	7440-02-0	1.0	mg/kg	11.5	12.3	10.0	14.4	----
Selenium	7782-49-2	0.1	mg/kg	0.7	0.8	0.7	0.9	----
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
Vanadium	7440-62-2	2.0	mg/kg	47.6	53.1	43.8	71.3	----
Zinc	7440-66-6	1.0	mg/kg	46.8	43.8	27.0	45.6	----



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				W4 0-0.5	W4 0.5-1.0	W20 0-0.5	W20 0.5-1.0	----
				01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	01-MAY-2010 15:00	----
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES1008246-011	ES1008246-012	ES1008246-013	ES1008246-014	----
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.01	0.01	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.79	1.04	2.24	2.36	----
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	6	<5	12	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	5	----
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	----
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	----
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	4	----
Phenanthrene	85-01-8	4	µg/kg	<4	<4	12	5	----
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	----
Fluoranthene	206-44-0	4	µg/kg	<4	<4	25	<4	----
Pyrene	129-00-0	4	µg/kg	<4	<4	23	<4	----
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	13	9	----
Chrysene	218-01-9	4	µg/kg	4	<4	15	8	----
Benzo(b)fluoranthene	205-99-2	4	µg/kg	7	<4	23	7	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	5	<4	6	7	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	11	<4	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	14	<4	----
Perylene	198-55-0	4	µg/kg	<4	7	11	20	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	6	<4	13	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	----
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	<4	5	7	----
Coronene	191-07-1	5	µg/kg	<5	6	<5	<5	----
^ Sum of PAHs	----	4	µg/kg	16	25	158	97	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	62.4	65.1	85.1	75.6	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	110	97.6	85.3	108	----
Anthracene-d10	1719-06-8	0.1	%	108	84.5	79.6	105	----
4-Terphenyl-d14	1718-51-0	0.1	%	80.0	77.6	94.8	67.7	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080-SD: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	67	137
Toluene-D8	2037-26-5	74	134
4-Bromofluorobenzene	460-00-4	73	137
EP090S: Organotin Surrogate			
Tripopyltin	----	34	108
EP130S: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	51.3	136.9
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	136
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	164
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	30	115
Anthracene-d10	1719-06-8	27	133
4-Terphenyl-d14	1718-51-0	18	137



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1008246	Page	: 1 of 21
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: NAGD - Asia Pacific LNG	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 05-MAY-2010
C-O-C number	: ----	Issue Date	: 21-MAY-2010
Sampler	: ----		
Order number	: ----		
Quote number	: BN/187/10	No. of samples received	: 14
		No. of samples analysed	: 14

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

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



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

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>
Alex Rossi	Organic Chemist	Organics
Ankit Joshi	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Dianne Blane	Laboratory Supervisor	Newcastle
Edwandy Fadjar	Senior Organic Chemist	Organics
Sarah Ashworth	Organic Chemist	Organics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY



General Comments

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

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

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

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

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 1334524)									
ES1008199-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	9.9	10.5	6.1	0% - 50%
ES1008246-002	W1 0.5-1	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	44.1	45.1	2.2	0% - 20%
EA055: Moisture Content (QC Lot: 1334525)									
ES1008246-014	W20 0.5-1.0	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	46.6	46.2	0.9	0% - 20%
ES1008252-009	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	52.8	52.1	1.4	0% - 20%
EG005-SD: Total Metals in Sediments by ICP-AES (QC Lot: 1334302)									
ES1007990-001	Anonymous	EG005-SD: Aluminium	7429-90-5	50	mg/kg	21000	20500	2.6	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	26400	29300	10.5	0% - 20%
ES1008245-002	Anonymous	EG005-SD: Aluminium	7429-90-5	50	mg/kg	23200	22600	2.6	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	34500	29700	14.9	0% - 20%
EG005-SD: Total Metals in Sediments by ICP-AES (QC Lot: 1334305)									
ES1008246-002	W1 0.5-1	EG005-SD: Aluminium	7429-90-5	50	mg/kg	18900	19400	2.2	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	32600	33300	2.1	0% - 20%
ES1008246-013	W20 0-0.5	EG005-SD: Aluminium	7429-90-5	50	mg/kg	12000	11000	8.5	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	23000	21900	4.7	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1334301)									
ES1007990-001	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.9	0.9	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	9.0	10.1	11.9	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	16.3	15.8	3.4	0% - 50%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	31.4	29.7	5.5	0% - 20%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	7.8	9.2	16.0	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	8.2	8.4	2.0	No Limit
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	28.6	28.0	2.3	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	3.69	4.20	12.8	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	129	130	0.9	0% - 50%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	87.4	94.7	8.1	0% - 20%
ES1008245-002	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.9	0.9	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	12.1	10.9	10.1	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	29.0	28.5	1.6	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 (%)
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1334301) - continued									
ES1008245-002	Anonymous	EG020-SD: Copper	7440-50-8	1.0	mg/kg	33.0	34.1	3.3	0% - 20%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	9.6	9.6	0.0	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	14.0	13.8	1.6	0% - 50%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	47.3	46.7	1.3	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	13.3	9.57	32.9	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	195	198	1.2	0% - 50%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	83.6	70.7	16.7	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1334304)									
ES1008246-002	W1 0.5-1	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.8	0.6	29.4	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	14.8	14.8	0.0	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	29.1	29.5	1.6	0% - 20%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	24.0	24.1	0.6	0% - 20%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	9.3	9.4	0.0	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	14.4	14.7	2.4	0% - 50%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	46.4	48.4	4.2	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	15.7	15.2	2.9	0% - 50%
		EG020-SD: Manganese	7439-96-5	10	mg/kg	226	232	2.5	0% - 20%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	61.5	60.0	2.4	0% - 20%
ES1008246-013	W20 0-0.5	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.7	0.6	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	10.1	9.4	6.9	0% - 50%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	19.5	18.6	4.6	0% - 50%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	16.8	15.9	5.3	0% - 50%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	7.5	7.6	1.4	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	10.0	9.1	8.6	No Limit
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	27.0	26.3	2.4	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	16.9	16.2	4.4	0% - 50%
		EG020-SD: Manganese	7439-96-5	10	mg/kg	231	230	0.0	0% - 20%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	43.8	42.3	3.3	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1334300)									
ES1007990-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
ES1008245-002	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1334303)									
ES1008246-002	W1 0.5-1	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.01	<0.01	0.0	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: 1334303) - continued									
ES1008246-013	W20 0-0.5	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.01	0.02	0.0	No Limit
EK055: Ammonia as N (QC Lot: 1342139)									
ES1008245-001	Anonymous	EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	<1	0.0	No Limit
ES1008252-001	Anonymous	EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	4	4	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1340499)									
ES1008245-001	Anonymous	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1008246-002	W1 0.5-1	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EK059G: NOX as N by Discrete Analyser (QC Lot: 1340496)									
ES1008041-004	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	3.5	3.4	3.6	0% - 20%
ES1008245-009	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1338779)									
ES1008041-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	3080	2940	4.9	0% - 20%
ES1008245-009	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	220	360	47.2	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1338780)									
ES1008041-001	Anonymous	EK067G: Total Phosphorus as P	----	2	mg/kg	852	769	10.2	0% - 20%
ES1008245-009	Anonymous	EK067G: Total Phosphorus as P	----	2	mg/kg	157	169	7.7	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1340500)									
ES1008245-001	Anonymous	EK071G: Reactive Phosphorus as P	----	0.1	mg/kg	0.3	0.4	0.0	No Limit
ES1008246-002	W1 0.5-1	EK071G: Reactive Phosphorus as P	----	0.1	mg/kg	2.3	2.4	0.0	0% - 20%
EP005: Total Organic Carbon (TOC) (QC Lot: 1337242)									
ES1008246-001	W1 0-0.5	EP005: Total Organic Carbon	----	0.02	%	1.41	1.36	3.5	0% - 20%
ES1008246-012	W4 0.5-1.0	EP005: Total Organic Carbon	----	0.02	%	1.04	1.07	3.4	0% - 20%
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1334225)									
ES1008245-001	Anonymous	EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
ES1008246-002	W1 0.5-1	EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1334260)									
ES1008245-001	Anonymous	EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	<5	0.0	No Limit
ES1008252-001	Anonymous	EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	<5	0.0	No Limit
EP080-SD: BTEX (QC Lot: 1334225)									
ES1008245-001	Anonymous	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	0.0	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-SD: BTEX (QC Lot: 1334225) - continued									
ES1008245-001	Anonymous	EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES1008246-002	W1 0.5-1	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
			106-42-3						
		EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP090: Organotin Compounds (QC Lot: 1338950)									
ES1008241-001	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
ES1008245-007	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
EP090: Organotin Compounds (QC Lot: 1342585)									
ES1008246-006	W2 1-2.0	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
ES1008369-002	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
EP130A: Organophosphorus Pesticides (Ultra-trace) (QC Lot: 1334458)									
ES1008245-001	Anonymous	EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	<10.0	0.0	No Limit
ES1008252-001	Anonymous	EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.0	No Limit



Sub-Matrix: **SOIL**

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 (%)
EP130A: Organophosphorus Pesticides (Ultra-trace) (QC Lot: 1334458) - continued									
ES1008252-001	Anonymous	EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	<10.0	0.0	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 1334459)									
ES1008245-001	Anonymous	EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: DDT (total)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit



Sub-Matrix: **SOIL**

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 (%)
EP131A: Organochlorine Pesticides (QC Lot: 1334459) - continued									
ES1008245-001	Anonymous	EP131A: Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
ES1008252-001	Anonymous	EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: DDT (total)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
				EP131A: Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1334460)									
ES1008245-001	Anonymous	EP131B: Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
ES1008252-001	Anonymous	EP131B: Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	0.0	No Limit



Sub-Matrix: **SOIL**

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 (%)
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1334460) - continued									
ES1008252-001	Anonymous	EP131B: Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1334259)									
ES1008245-001	Anonymous	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit
ES1008252-001	Anonymous	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	42	37	11.7	No Limit



Sub-Matrix: **SOIL**

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 (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1334259) - continued									
ES1008252-001	Anonymous	EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	42	37	12.6	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1334261)									
ES1008241-001	Anonymous	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit
ES1008246-006	W2 1-2.0	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	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 (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1334261) - continued									
ES1008246-006	W2 1-2.0	EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit



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

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

Sub-Matrix: **SOIL**

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				
EG005-SD: Total Metals in Sediments by ICP-AES (QCLot: 1334302)								
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG005-SD: Total Metals in Sediments by ICP-AES (QCLot: 1334305)								
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1334301)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	110	70	130
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	92.7	70	130
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	95.1	70	130
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	97.4	70	130
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	94.3	70	130
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	94.2	70	130
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	91.6	70	130
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	98.5	70	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	106	70	130
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	50 mg/kg	100	70	130
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	101	70	130
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1334304)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	112	70	130
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	94.7	70	130
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	99.9	70	130
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	96.7	70	130
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	101	70	130
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	98.6	70	130
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	94.2	70	130
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	100	70	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	106	70	130
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	50 mg/kg	100	70	130
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	100	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1334300)								



Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1334300) - continued								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	81.1	74.2	126
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1334303)								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	75.6	74.2	126
EK055: Ammonia as N (QCLot: 1342139)								
EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	25 mg/kg	87.4	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1340499)								
EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	4.8 mg/kg	102	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1340496)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	4.8 mg/kg	102	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1338779)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	1000 mg/kg	107	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1338780)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	442 mg/kg	95.5	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1340500)								
EK071G: Reactive Phosphorus as P	----	0.1	mg/kg	<0.1	2.5 mg/kg	97.6	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1337242)								
EP005: Total Organic Carbon	----	0.02	%	<0.02	100 %	98.5	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1334225)								
EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	26 mg/kg	104	68.4	128
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1334260)								
EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	5 mg/kg	95.0	75.2	116
EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	5 mg/kg	92.0	75.3	113
EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	5 mg/kg	91.0	72.6	117
EP080-SD: BTEX (QCLot: 1334225)								
EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	114	67.5	125
EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	1 mg/kg	108	69	122
EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	1 mg/kg	116	65.3	126
EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	2 mg/kg	123	66.5	124
	106-42-3							
EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	1 mg/kg	117	66.7	123
EP090: Organotin Compounds (QCLot: 1338950)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	99.2	19.5	129
EP090: Organotin Compounds (QCLot: 1342585)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	118	19.5	129
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 1334458)								
EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	50 µg/kg	83.3	36.9	142



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				
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 1334458) - continued								
EP130: Carbophenothion	786-19-6	10	µg/kg	<10	50 µg/kg	83.8	0.5	157
EP130: Chlorfenvinphos (E)	470-90-6	10	µg/kg	<10.0	5 µg/kg	104	50.3	137
EP130: Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	50 µg/kg	91.0	55.9	152
EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	50 µg/kg	82.2	49	140
EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	50 µg/kg	83.8	28.1	142
EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	50 µg/kg	88.3	36.6	172
EP130: Diazinon	333-41-5	10	µg/kg	<10	50 µg/kg	86.8	37.2	148
EP130: Dichlorvos	62-73-7	10	µg/kg	<10	50 µg/kg	78.4	32.7	153
EP130: Dimethoate	60-51-5	10	µg/kg	<10	50 µg/kg	89.9	33.2	150
EP130: Ethion	563-12-2	10	µg/kg	<10	50 µg/kg	89.7	44	146
EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	50 µg/kg	108	3.08	162
EP130: Fenthion	55-38-9	10	µg/kg	<10	50 µg/kg	81.6	10.6	157
EP130: Malathion	121-75-5	10	µg/kg	<10	50 µg/kg	88.4	38.1	143
EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	50 µg/kg	83.8	8.13	159
EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	50 µg/kg	127	19.7	176
EP130: Parathion	56-38-2	10	µg/kg	<10	50 µg/kg	92.0	39.2	145
EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	50 µg/kg	89.8	23.5	152
EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	50 µg/kg	80.9	47.1	141
EP130: Prothiofos	34643-46-4	10	µg/kg	<10	50 µg/kg	87.4	36.1	148
EP131A: Organochlorine Pesticides (QCLot: 1334459)								
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	81.3	31.7	140
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	81.0	24.5	150
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	103	36.9	139
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	107	38.2	137
EP131A: 4,4'-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	72.4	42.5	141
EP131A: 4,4'-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	103	34.8	140
EP131A: 4,4'-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	90.0	38	143
EP131A: DDT (total)	----	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	66.0	43.2	134
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	97.0	23.7	139
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	89.5	35.8	138
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	105	7.45	158
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	101	21.6	162
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	86.1	19.3	131
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	101	17.9	141
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	105	31	153
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	93.9	34.3	138
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	70.7	18.6	146



Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP131A: Organochlorine Pesticides (QCLot: 1334459) - continued								
EP131A: gamma-BHC	58-89-9	0.5	µg/kg	<0.50	5 µg/kg	92.2	30.7	145
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	118	15	157
EP131A: cis-Chlordane	5103-71-9	0.5	µg/kg	<0.50	5 µg/kg	79.4	22.3	145
EP131A: trans-Chlordane	5103-74-2	0.5	µg/kg	<0.50	5 µg/kg	94.0	42.4	139
EP131A: Total Chlordane (sum)	----	0.5	µg/kg	<0.50	----	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1334460)								
EP131B: Total Polychlorinated biphenyls	----	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1016	12974-11-2	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	50 µg/kg	95.1	61.3	121
EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1334259)								
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	115	----	----
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	109	----	----
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	113	----	----
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	98.3	----	----
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	103	----	----
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	117	----	----
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	117	----	----
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	120	----	----
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	118	----	----
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	118	----	----
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	85.1	----	----
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	99.6	----	----
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	95.6	----	----
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	84.2	----	----
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	101	----	----
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	111	----	----
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	82.6	----	----
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	93.6	----	----
EP132B-SD: Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	81.2	----	----
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	50.2	----	----
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1334261)								
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	100	----	----
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	98.6	----	----



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) LowHigh	
Method: Compound	CAS Number	LOR	Unit	Result				
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1334261) - continued								
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	110	----	----
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	108	----	----
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	116	----	----
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	111	----	----
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	105	----	----
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	104	----	----
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	97.6	----	----
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	91.5	----	----
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	75.8	----	----
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	95.8	----	----
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	105	----	----
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	96.8	----	----
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	97.5	----	----
EP132B-SD: Indeno(1,2,3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	90.9	----	----
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	116	----	----
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----



Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%) LowHigh	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1334301)							
ES1007990-001	Anonymous	EG020-SD: Arsenic	7440-38-2	50 mg/kg	82.2	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	90.2	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	90.7	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	85.8	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	91.3	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	89.2	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	91.7	70	130
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1334304)							
ES1008246-002	W1 0.5-1	EG020-SD: Arsenic	7440-38-2	50 mg/kg	89.7	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	88.6	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	93.0	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	85.5	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	85.5	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	88.7	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	90.5	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1334300)							
ES1007990-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	78.6	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1334303)							
ES1008246-002	W1 0.5-1	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	77.8	70	130
EK055: Ammonia as N (QCLot: 1342139)							
ES1008245-001	Anonymous	EK055-SD: Ammonia as N	7664-41-7	25 mg/kg	81.2	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1340499)							
ES1008245-001	Anonymous	EK057G: Nitrite as N (Sol.)	----	3.0 mg/kg	100	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1340496)							
ES1008041-004	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	3.0 mg/kg	87.3	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1338779)							
ES1008041-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	# Not Determined	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1338780)							
ES1008041-001	Anonymous	EK067G: Total Phosphorus as P	----	100 mg/kg	# Not Determined	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1340500)							
ES1008245-001	Anonymous	EK071G: Reactive Phosphorus as P	----	2.5 mg/kg	97.6	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1334225)							
ES1008245-001	Anonymous	EP080-SD: C6 - C9 Fraction	----	26 mg/kg	93.0	70	130

Page : 19 of 21
 Work Order : ES1008246
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : NAGD - Asia Pacific LNG



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1334260)							
ES1008245-001	Anonymous	EP071-SD: C10 - C14 Fraction	----	19.75 mg/kg	77.2	130	
		EP071-SD: C15 - C28 Fraction	----	87.25 mg/kg	80.3	130	
		EP071-SD: C29 - C36 Fraction	----	60 mg/kg	112	130	
EP080-SD: BTEX (QCLot: 1334225)							
ES1008245-001	Anonymous	EP080-SD: Benzene	71-43-2	2.5 mg/kg	103	130	
		EP080-SD: Toluene	108-88-3	2.5 mg/kg	88.2	130	
		EP080-SD: Ethylbenzene	100-41-4	2.5 mg/kg	86.0	130	
		EP080-SD: meta- & para-Xylene	108-38-3	2.5 mg/kg	92.5	130	
			106-42-3				
EP080-SD: ortho-Xylene	95-47-6	2.5 mg/kg	99.1	130			
EP090: Organotin Compounds (QCLot: 1338950)							
ES1008241-002	Anonymous	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	83.7	130	
EP090: Organotin Compounds (QCLot: 1342585)							
ES1008246-007	W2 2.0-3.0	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	64.9	130	
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 1334458)							
ES1008245-001	Anonymous	EP130: Bromophos-ethyl	4824-78-6	50 µg/kg	58.1	142	
		EP130: Carbophenothion	786-19-6	50 µg/kg	64.7	157	
		EP130: Chlorfenvinphos (E)	470-90-6	5 µg/kg	71.8	137	
		EP130: Chlorfenvinphos (Z)	470-90-8	50 µg/kg	62.3	152	
		EP130: Chlorpyrifos	2921-88-2	50 µg/kg	56.7	140	
		EP130: Chlorpyrifos-methyl	5598-13-0	50 µg/kg	53.4	142	
		EP130: Demeton-S-methyl	919-86-8	50 µg/kg	61.5	172	
		EP130: Diazinon	333-41-5	50 µg/kg	65.6	148	
		EP130: Dichlorvos	62-73-7	50 µg/kg	63.8	153	
		EP130: Dimethoate	60-51-5	50 µg/kg	67.9	150	
		EP130: Ethion	563-12-2	50 µg/kg	62.0	146	
		EP130: Fenamiphos	22224-92-6	50 µg/kg	80.8	162	
		EP130: Fenthion	55-38-9	50 µg/kg	55.4	157	
		EP130: Malathion	121-75-5	50 µg/kg	58.2	143	
		EP130: Azinphos Methyl	86-50-0	50 µg/kg	45.1	159	
		EP130: Monocrotophos	6923-22-4	50 µg/kg	100	176	
		EP130: Parathion	56-38-2	50 µg/kg	66.6	145	
		EP130: Parathion-methyl	298-00-0	50 µg/kg	56.9	152	
		EP130: Pirimphos-ethyl	23505-41-1	50 µg/kg	58.0	141	
		EP130: Prothiofos	34643-46-4	50 µg/kg	63.2	148	
EP131A: Organochlorine Pesticides (QCLot: 1334459)							
ES1008245-001	Anonymous	EP131A: Aldrin	309-00-2	5 µg/kg	51.3	140	
		EP131A: alpha-BHC	319-84-6	5 µg/kg	26.1	150	



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EP131A: Organochlorine Pesticides (QCLot: 1334459) - continued							
ES1008245-001	Anonymous	EP131A: beta-BHC	319-85-7	5 µg/kg	54.3	36.9	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	39.9	38.2	137
		EP131A: 4,4`-DDD	72-54-8	5 µg/kg	# 24.5	42.5	141
		EP131A: 4,4`-DDE	72-55-9	5 µg/kg	43.4	34.8	140
		EP131A: 4,4`-DDT	50-29-3	5 µg/kg	# 33.2	38	143
		EP131A: Dieldrin	60-57-1	5 µg/kg	# 33.9	43.2	134
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	53.9	23.7	139
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	# 34.5	35.8	138
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	39.6	7.45	158
		EP131A: Endrin	72-20-8	5 µg/kg	35.8	21.6	162
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	36.1	19.3	131
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	40.4	17.9	141
		EP131A: Heptachlor	76-44-8	5 µg/kg	43.5	31	153
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	55.1	34.3	138
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	30.5	18.6	146
		EP131A: gamma-BHC	58-89-9	5 µg/kg	37.5	30.7	145
		EP131A: Methoxychlor	72-43-5	5 µg/kg	49.9	15	157
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	34.8	22.3	145
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	52.6	42.4	139
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1334460)							
ES1008245-001	Anonymous	EP131B: Aroclor 1254	11097-69-1	50 µg/kg	# 51.4	61.3	121
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1334259)							
ES1008245-001	Anonymous	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	91.6	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	105	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	120	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	106	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	102	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	114	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	114	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	118	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	113	70	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	110	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	76.7	70	130
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	104	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	96.8	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	91.7	70	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	112	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	121	70	130



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number		MS	Low	High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1334259) - continued							
ES1008245-001	Anonymous	EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	99.4	70	130
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	25 µg/kg	109	70	130
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	25 µg/kg	98.6	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	81.0	70	130
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1334261)							
ES1008241-001	Anonymous	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	102	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	86.2	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	110	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	106	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	112	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	107	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	94.8	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	101	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	99.1	70	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	104	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	104	70	130
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	91.0	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	# 64.2	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	# 64.0	70	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	74.3	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	83.9	70	130
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	81.4	70	130
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	25 µg/kg	91.2	70	130
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	25 µg/kg	71.7	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	102	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1008246	Page	: 1 of 11
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: NAGD - Asia Pacific LNG	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 05-MAY-2010
C-O-C number	: ----	Issue Date	: 21-MAY-2010
Sampler	: ----		
Order number	: ----	No. of samples received	: 14
Quote number	: BN/187/10	No. of samples analysed	: 14

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

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	01-MAY-2010	----	----	----	05-MAY-2010	08-MAY-2010	✔	
W1 - 0-0.5,								W1 - 0.5-1,
W2 - 0-0.5,								W2 - 0.5-1,
W2 - 1-2.0,								W2 - 2.0-3.0,
W3 - 0-0.5,								W3 - 0.5-1,
W3 - 1.0-2.0,								W4 - 0-0.5,
W4 - 0.5-1.0,								W20 - 0-0.5,
W20 - 0.5-1.0								
EA150: Particle Sizing								
Snap Lock Bag	01-MAY-2010	---	---	----	19-MAY-2010	28-OCT-2010	✔	
W1 - 0-0.5,								W1 - 0.5-1,
W2 - 0-0.5,								W2 - 0.5-1,
W2 - 1-2.0,								W2 - 2.0-3.0,
W3 - 0-0.5,								W3 - 0.5-1,
W3 - 1.0-2.0,								W4 - 0-0.5,
W4 - 0.5-1.0,								W20 - 0-0.5,
W20 - 0.5-1.0								
EA150: Soil Classification based on Particle Size								
Snap Lock Bag	01-MAY-2010	---	---	----	19-MAY-2010	28-OCT-2010	✔	
W1 - 0-0.5,								W1 - 0.5-1,
W2 - 0-0.5,								W2 - 0.5-1,
W2 - 1-2.0,								W2 - 2.0-3.0,
W3 - 0-0.5,								W3 - 0.5-1,
W3 - 1.0-2.0,								W4 - 0-0.5,
W4 - 0.5-1.0,								W20 - 0-0.5,
W20 - 0.5-1.0								



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
EG005-SD: Total Metals in Sediments by ICP-AES								
Soil Glass Jar - Unpreserved		01-MAY-2010	05-MAY-2010	29-MAY-2010	✓	06-MAY-2010	28-OCT-2010	✓
W1 - 0-0.5,	W1 - 0.5-1,							
W2 - 0-0.5,	W2 - 0.5-1,							
W2 - 1-2.0,	W2 - 2.0-3.0,							
W3 - 0-0.5,	W3 - 0.5-1,							
W3 - 1.0-2.0,	W4 - 0-0.5,							
W4 - 0.5-1.0,	W20 - 0-0.5,							
W20 - 0.5-1.0								
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved		01-MAY-2010	05-MAY-2010	29-MAY-2010	✓	06-MAY-2010	28-OCT-2010	✓
W1 - 0-0.5,	W1 - 0.5-1,							
W2 - 0-0.5,	W2 - 0.5-1,							
W2 - 1-2.0,	W2 - 2.0-3.0,							
W3 - 0-0.5,	W3 - 0.5-1,							
W3 - 1.0-2.0,	W4 - 0-0.5,							
W4 - 0.5-1.0,	W20 - 0-0.5,							
W20 - 0.5-1.0								
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved		01-MAY-2010	05-MAY-2010	29-MAY-2010	✓	06-MAY-2010	29-MAY-2010	✓
W1 - 0-0.5,	W1 - 0.5-1,							
W2 - 0-0.5,	W2 - 0.5-1,							
W2 - 1-2.0,	W2 - 2.0-3.0,							
W3 - 0-0.5,	W3 - 0.5-1,							
W3 - 1.0-2.0,	W4 - 0-0.5,							
W4 - 0.5-1.0,	W20 - 0-0.5,							
W20 - 0.5-1.0								
EK055: Ammonia as N								
Soil Glass Jar - Unpreserved		01-MAY-2010	----	----	----	12-MAY-2010	28-OCT-2010	✓
W1 - 0-0.5,	W1 - 0.5-1							
EK057G: Nitrite as N by Discrete Analyser								
Soil Glass Jar - Unpreserved		01-MAY-2010	11-MAY-2010	28-OCT-2010	✓	11-MAY-2010	28-OCT-2010	✓
W1 - 0-0.5,	W1 - 0.5-1							
EK059G: NOX as N by Discrete Analyser								
Soil Glass Jar - Unpreserved		01-MAY-2010	11-MAY-2010	28-OCT-2010	✓	11-MAY-2010	28-OCT-2010	✓
W1 - 0-0.5,	W1 - 0.5-1							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Soil Glass Jar - Unpreserved		01-MAY-2010	10-MAY-2010	28-OCT-2010	✓	10-MAY-2010	28-OCT-2010	✓
W1 - 0-0.5,	W1 - 0.5-1							



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
EK067G: Total Phosphorus as P by Discrete Analyser								
Soil Glass Jar - Unpreserved W1 - 0-0.5, W1 - 0.5-1		01-MAY-2010	10-MAY-2010	28-OCT-2010	✓	10-MAY-2010	28-OCT-2010	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Soil Glass Jar - Unpreserved W1 - 0-0.5, W1 - 0.5-1		01-MAY-2010	11-MAY-2010	28-OCT-2010	✓	11-MAY-2010	28-OCT-2010	✓
EP005: Total Organic Carbon (TOC)								
Pulp Bag W1 - 0-0.5, W2 - 0-0.5, W2 - 1-2.0, W3 - 0-0.5, W3 - 1.0-2.0, W4 - 0.5-1.0, W20 - 0.5-1.0	W1 - 0.5-1, W2 - 0.5-1, W2 - 2.0-3.0, W3 - 0.5-1, W4 - 0-0.5, W20 - 0-0.5,	01-MAY-2010	07-MAY-2010	29-MAY-2010	✓	07-MAY-2010	29-MAY-2010	✓
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved W1 - 0-0.5, W1 - 0.5-1		01-MAY-2010	05-MAY-2010	15-MAY-2010	✓	06-MAY-2010	14-JUN-2010	✓
Soil Glass Jar - Unpreserved W1 - 0-0.5, TRIP BLANK 5	W1 - 0.5-1,	01-MAY-2010	05-MAY-2010	15-MAY-2010	✓	10-MAY-2010	15-MAY-2010	✓
EP080-SD: BTEX								
Soil Glass Jar - Unpreserved W1 - 0-0.5, TRIP BLANK 5	W1 - 0.5-1,	01-MAY-2010	05-MAY-2010	15-MAY-2010	✓	10-MAY-2010	15-MAY-2010	✓
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved W1 - 0-0.5, W2 - 0-0.5,	W1 - 0.5-1, W2 - 0.5-1	01-MAY-2010	10-MAY-2010	15-MAY-2010	✓	12-MAY-2010	19-JUN-2010	✓
Soil Glass Jar - Unpreserved W2 - 1-2.0, W3 - 0-0.5, W3 - 1.0-2.0, W4 - 0.5-1.0, W20 - 0.5-1.0	W2 - 2.0-3.0, W3 - 0.5-1, W4 - 0-0.5, W20 - 0-0.5,	01-MAY-2010	12-MAY-2010	15-MAY-2010	✓	14-MAY-2010	21-JUN-2010	✓
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Soil Glass Jar - Unpreserved W1 - 0-0.5, W1 - 0.5-1		01-MAY-2010	05-MAY-2010	15-MAY-2010	✓	12-MAY-2010	14-JUN-2010	✓
EP131A: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved W1 - 0-0.5, W1 - 0.5-1		01-MAY-2010	05-MAY-2010	15-MAY-2010	✓	12-MAY-2010	14-JUN-2010	✓



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
EP131B: Polychlorinated Biphenyls (as Aroclors)								
Soil Glass Jar - Unpreserved W1 - 0-0.5, W1 - 0.5-1		01-MAY-2010	05-MAY-2010	15-MAY-2010	✔	12-MAY-2010	14-JUN-2010	✔
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved W1 - 0-0.5, W1 - 0.5-1		01-MAY-2010	05-MAY-2010	15-MAY-2010	✔	07-MAY-2010	14-JUN-2010	✔
Soil Glass Jar - Unpreserved W2 - 0-0.5, W2 - 1-2.0, W3 - 0-0.5, W3 - 1.0-2.0, W4 - 0.5-1.0, W20 - 0.5-1.0 W2 - 0.5-1, W2 - 2.0-3.0, W3 - 0.5-1, W4 - 0-0.5, W20 - 0-0.5,		01-MAY-2010	05-MAY-2010	15-MAY-2010	✔	11-MAY-2010	14-JUN-2010	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	4	40	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	2	16	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	2	16	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	2	16	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	4	38	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	4	36	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	2	16	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	2	16	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	21	9.5	9.5	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	4	40	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	4	40	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	4	40	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	2	16	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	38	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	36	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	1	21	4.8	4.8	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	40	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	40	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



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 Control Samples (LCS) - Continued							
TPH - Semivolatile Fraction	EP071-SD	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	38	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	36	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	1	21	4.8	4.8	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	2	40	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	40	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	40	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	1	20	5.0	5.0	✓	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	20	5.0	5.0	✓	ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	16	6.3	5.0	✓	ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	16	6.3	5.0	✓	ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	16	6.3	5.0	✓	ALS QCS3 requirement
Organotin Analysis	EP090	2	38	5.3	5.0	✓	ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	36	5.6	5.0	✓	ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	16	6.3	5.0	✓	ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	16	6.3	5.0	✓	ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	1	21	4.8	4.8	✓	ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	40	5.0	5.0	✓	ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	40	5.0	5.0	✓	ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	1	20	5.0	5.0	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	16	6.3	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	18	5.6	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Particle Size Analysis (Sieving)	EA150	SOIL	Particle Size Analysis by Sieving according to AS1289.3.6.1 - 1995
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Total Fe and Al in Sediments by ICPAES	EG005-SD	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3). LORs per NODG
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 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 (1999) Schedule B(3)
Buchi Ammonia - Low-Level in Sediment	EK055-SD	SOIL	APHA 21st ed., 4500 NH ₃ +B&G, H Samples are steam distilled (Buchi) prior to analysis and quantified using titrimetric determination.
Nitrite as N - Soluble by Discrete Analyser	EK057G	SOIL	APHA 21st ed., 4500 NO ₃ - B. Nitrite in a water extract is determined by direct colourimetry by Discrete Analyser.
Nitrate as N - Soluble by Discrete Analyser	EK058G	SOIL	APHA 21st ed., 4500 NO ₃ --F. Nitrate in the 1:5 soil:water extract is reduced to nitrite by way of a cadmium reduction column followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results.
Nitrite and Nitrate as N (NO _x)- Soluble by Discrete Analyser	EK059G	SOIL	APHA 21st ed., 4500 NO ₃ - F. Combined oxidised Nitrogen (NO ₂ +NO ₃) in a water extract is determined by Cadmium Reduction, and direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	APHA 21st ed., 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Phosphorus By Discrete Analyser	EK067G	SOIL	APHA 21st ed., 4500 P-B&F This procedure involves sulfuric acid digestion and quantification using Discrete Analyser.
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	SOIL	APHA 21st ed., 4500 P-F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2



Analytical Methods	Method	Matrix	Method Descriptions
Total Organic Carbon	EP005	SOIL	In-house. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
TPH - Semivolatile Fraction	EP071-SD	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504)
TPH Volatiles/BTEX in Sediments	EP080-SD	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Organotin Analysis	EP090	SOIL	(USEPA SW 846 - 8270D) Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quantified against an established calibration curve.
Organophosphorus Pesticides (Ultra-trace)	EP130	SOIL	USEPA Method 3640 (GPC cleanup), 8141 (GC/FPD - Capillary Column) This technique is compliant with NEPM (1999) Schedule B(3) (Method 505)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	USEPA Method 3640 (GPC cleanup), 3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PCB's (Ultra-trace)	EP131B	SOIL	USEPA Method 3640 (GPC cleanup), 3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.
Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	SOIL	APHA 21st ed., 4500 Norg- D; APHA 21st ed., 4500 P - H. Macro Kjeldahl digestion.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. 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 (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids/ Sample Cleanup	ORG17A-UTP	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na ₂ SO ₄ and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.
Organotin Sample Preparation	ORG35	SOIL	In house. 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser	ES1008041-001	Anonymous	Total Kjeldahl Nitrogen as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EK067G: Total Phosphorus as P by Discrete Analyser	ES1008041-001	Anonymous	Total Phosphorus as P	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP131A: Organochlorine Pesticides	ES1008245-001	Anonymous	4,4'-DDD	72-54-8	24.5 %	42.5-141%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008245-001	Anonymous	4,4'-DDT	50-29-3	33.2 %	38-143%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008245-001	Anonymous	Dieldrin	60-57-1	33.9 %	43.2-134%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008245-001	Anonymous	beta-Endosulfan	33213-65-9	34.5 %	35.8-138%	Recovery less than lower data quality objective
EP131B: Polychlorinated Biphenyls (as Aroclors)	ES1008245-001	Anonymous	Aroclor 1254	11097-69-1	51.4 %	61.3-121%	Recovery less than lower data quality objective
EP132B: Polynuclear Aromatic Hydrocarbons	ES1008241-001	Anonymous	Benzo(k)fluoranthene	207-08-9	64.2 %	70-130%	Recovery less than lower data quality objective
EP132B: Polynuclear Aromatic Hydrocarbons	ES1008241-001	Anonymous	Benzo(e)pyrene	192-97-2	64.0 %	70-130%	Recovery less than lower data quality objective

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP132T: Base/Neutral Extractable Surrogates	ES1008246-005	W2 0.5-1	2-Fluorobiphenyl	321-60-8	116 %	30-115 %	Recovery greater than upper data quality objective
EP132T: Base/Neutral Extractable Surrogates	ES1008246-004	W2 0-0.5	2-Fluorobiphenyl	321-60-8	117 %	30-115 %	Recovery greater than upper data quality objective



Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted - Continued							
EP132T: Base/Neutral Extractable Surrogates	ES1008246-010	W3 1.0-2.0	2-Fluorobiphenyl	321-60-8	119 %	30-115 %	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1008369	Page	: 1 of 17
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: NAGD - Asia Pacific LNG 301001-00448	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 06-MAY-2010
C-O-C number	: ----	Issue Date	: 21-MAY-2010
Sampler	: ----	No. of samples received	: 14
Site	: ----	No. of samples analysed	: 14
Quote number	: BN/187/10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

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>
Alex Rossi	Organic Chemist	Organics
Ankit Joshi	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Dianne Blane	Laboratory Supervisor	Newcastle
Matt Frost	Organic Instrument Chemist	Organics
Sarah Ashworth	Organic Chemist	Organics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

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

- **EG005T: Poor precision was obtained for Aluminium on sample ES1008369#1 due to sample heterogeneity.**
- **EG020T: Poor precision was obtained for Manganese on sample ES1008369 #011 due to sample heterogeneity. Results have been confirmed by re-extraction and reanalysis.**
- **EP131A+B: Poor matrix spike recoveries due to sample matrix interference.**



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W10 0-0.5	W9 0-0.5	W16 0-0.5	W16 0.5-1.0	W16 1.0-2.0
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00
				ES1008369-001	ES1008369-002	ES1008369-003	ES1008369-004	ES1008369-005
EA150: Particle Sizing								
+75µm	----	1	%	61	68	86	90	90
+150µm	----	1	%	59	64	83	87	88
+300µm	----	1	%	51	34	46	58	61
+425µm	----	1	%	46	27	27	33	41
+600µm	----	1	%	41	24	18	19	27
+1180µm	----	1	%	29	20	12	11	15
+2.36mm	----	1	%	14	15	7	6	7
+4.75mm	----	1	%	5	11	4	3	1
+9.5mm	----	1	%	1	5	<1	<1	<1
+19.0mm	----	1	%	<1	<1	<1	<1	<1
+37.5mm	----	1	%	<1	<1	<1	<1	<1
+75.0mm	----	1	%	<1	<1	<1	<1	<1
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	34.9	36.3	24.6	24.6	22.7
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	19	16	9	8	7
Silt (2-60 µm)	----	1	%	19	16	4	2	2
Sand (0.06-2.00 mm)	----	1	%	48	53	80	85	83
Gravel (>2mm)	----	1	%	14	15	7	5	8
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	10800	7890	3800	2320	2160
Iron	7439-89-6	50	mg/kg	31800	17600	12200	12300	11500
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	20.4	12.2	16.0	14.4	20.0
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	21.5	13.6	9.4	6.2	7.4
Copper	7440-50-8	1.0	mg/kg	11.5	9.8	6.0	3.3	3.5
Cobalt	7440-48-4	0.5	mg/kg	13.2	8.4	8.5	7.6	6.9
Lead	7439-92-1	1.0	mg/kg	6.9	4.7	2.6	2.1	2.1
Manganese	7439-96-5	10	mg/kg	204	166	460	1100	780
Nickel	7440-02-0	1.0	mg/kg	10.7	6.4	5.6	4.4	3.8
Selenium	7782-49-2	0.1	mg/kg	0.5	0.4	0.4	0.3	0.2
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	67.4	42.4	31.5	36.2	27.6
Zinc	7440-66-6	1.0	mg/kg	30.1	21.7	12.1	8.2	7.6



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				W10 0-0.5	W9 0-0.5	W16 0-0.5	W16 0.5-1.0	W16 1.0-2.0
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008369-001	ES1008369-002	ES1008369-003	ES1008369-004	ES1008369-005
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.01	0.01	<0.01	<0.01	<0.01
EK055: Ammonia as N								
Ammonia as N	7664-41-7	1	mg/kg	----	----	<1	<1	<1
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	----	0.1	mg/kg	----	----	<0.1	<0.1	<0.1
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N (Sol.)	----	0.1	mg/kg	----	----	<0.1	<0.1	<0.1
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	----	<0.1	<0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	----	110	60	<20
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	----	----	145	212	162
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.1	mg/kg	----	----	0.2	0.2	0.2
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.61	0.59	0.36	0.18	0.23
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	<3	<3	<3
C10 - C14 Fraction	----	3	mg/kg	----	----	<3	<3	<3
C15 - C28 Fraction	----	3	mg/kg	----	----	<3	<3	<3
C29 - C36 Fraction	----	5	mg/kg	----	----	<5	<5	<5
C10 - C36 Fraction (sum)	----	3	mg/kg	----	----	<3	<3	<3
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	----	----	<10	<10	<10
Carbophenothion	786-19-6	10	µg/kg	----	----	<10	<10	<10



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W10 0-0.5	W9 0-0.5	W16 0-0.5	W16 0.5-1.0	W16 1.0-2.0
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00
				ES1008369-001	ES1008369-002	ES1008369-003	ES1008369-004	ES1008369-005
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	----	----	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	470-90-8	10	µg/kg	----	----	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	----	----	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	----	----	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	----	----	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	----	----	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	----	----	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	----	----	<10	<10	<10
Ethion	563-12-2	10	µg/kg	----	----	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	----	----	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	----	----	<10	<10	<10
Malathion	121-75-5	10	µg/kg	----	----	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	----	----	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	----	----	<10	<10	<10
Parathion	56-38-2	10	µg/kg	----	----	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	----	----	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	----	----	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	----	----	<10	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
4,4'-DDD	72-54-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
4,4'-DDE	72-55-9	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
4,4'-DDT	50-29-3	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
^ DDT (total)	----	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	----	----	<0.50	<0.50	<0.50



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W10 0-0.5	W9 0-0.5	W16 0-0.5	W16 0.5-1.0	W16 1.0-2.0
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00
				ES1008369-001	ES1008369-002	ES1008369-003	ES1008369-004	ES1008369-005
EP131A: Organochlorine Pesticides - Continued								
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	----	----	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg	----	----	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg	----	----	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg	----	----	<0.25	<0.25	<0.25
Oxychlordane	27304-13-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1016	12974-11-2	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	6	<4	<4	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	4	<4	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				W10 0-0.5	W9 0-0.5	W16 0-0.5	W16 0.5-1.0	W16 1.0-2.0
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008369-001	ES1008369-002	ES1008369-003	ES1008369-004	ES1008369-005
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Sum of PAHs	----	4	µg/kg	<4	10	<4	<4	<4
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	103	106	115
Toluene-D8	2037-26-5	0.1	%	----	----	98.2	97.1	97.6
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	86.1	89.6	92.5
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	74.5	79.7	94.1	83.2	98.9
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	----	----	42.0	57.7	62.5
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	----	----	42.0	50.5	48.3
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	47.5	46.1	54.5
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	100	107	111	109	115
Anthracene-d10	1719-06-8	0.1	%	114	108	114	119	110
4-Terphenyl-d14	1718-51-0	0.1	%	98.7	115	104	74.4	97.3



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				W16 2.0-3.0	T18 0-0.5	T18 0.5-1.0	T18 1.0-2.0	W19 0-0.5
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008369-006	ES1008369-007	ES1008369-008	ES1008369-009	ES1008369-010
EA150: Particle Sizing								
+75µm	----	1	%	84	----	----	----	80
+150µm	----	1	%	78	----	----	----	77
+300µm	----	1	%	34	----	----	----	60
+425µm	----	1	%	23	----	----	----	40
+600µm	----	1	%	21	----	----	----	26
+1180µm	----	1	%	17	----	----	----	16
+2.36mm	----	1	%	12	----	----	----	11
+4.75mm	----	1	%	6	----	----	----	7
+9.5mm	----	1	%	<1	----	----	----	3
+19.0mm	----	1	%	<1	----	----	----	<1
+37.5mm	----	1	%	<1	----	----	----	<1
+75.0mm	----	1	%	<1	----	----	----	<1
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	22.1	24.9	22.7	27.9	27.4
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	9	----	----	----	11
Silt (2-60 µm)	----	1	%	7	----	----	----	9
Sand (0.06-2.00 mm)	----	1	%	73	----	----	----	69
Gravel (>2mm)	----	1	%	11	----	----	----	11
Cobbles (>6cm)	----	1	%	<1	----	----	----	<1
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	3260	3360	2300	2010	4280
Iron	7439-89-6	50	mg/kg	9970	10400	11100	9900	9850
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	12.2	9.51	13.5	13.9	6.90
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	7.7	6.8	5.0	5.2	8.3
Copper	7440-50-8	1.0	mg/kg	8.0	4.3	3.2	3.0	4.7
Cobalt	7440-48-4	0.5	mg/kg	10.9	7.0	8.2	7.2	5.9
Lead	7439-92-1	1.0	mg/kg	3.5	2.4	2.0	1.7	2.5
Manganese	7439-96-5	10	mg/kg	234	618	1260	1150	386
Nickel	7440-02-0	1.0	mg/kg	4.5	4.4	4.2	3.4	4.5
Selenium	7782-49-2	0.1	mg/kg	0.3	0.2	0.3	0.3	0.3
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	28.0	25.5	27.6	25.1	23.7
Zinc	7440-66-6	1.0	mg/kg	9.6	12.2	8.8	7.2	11.4



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				W16 2.0-3.0	T18 0-0.5	T18 0.5-1.0	T18 1.0-2.0	W19 0-0.5
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008369-006	ES1008369-007	ES1008369-008	ES1008369-009	ES1008369-010
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
EK055: Ammonia as N								
Ammonia as N	7664-41-7	1	mg/kg	<1	<1	<1	<1	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N (Sol.)	----	0.1	mg/kg	0.1	<0.1	<0.1	<0.1	----
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.1	<0.1	<0.1	<0.1	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	130	110	90	40	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	82	199	178	245	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.1	mg/kg	0.6	0.2	0.2	0.2	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.25	0.41	0.18	0.23	0.28
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	----
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	----
C15 - C28 Fraction	----	3	mg/kg	<3	<3	<3	<3	----
C29 - C36 Fraction	----	5	mg/kg	<5	<5	<5	<5	----
C10 - C36 Fraction (sum)	----	3	mg/kg	<3	<3	<3	<3	----
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	----
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	----
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	----
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10	<10	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W16 2.0-3.0	T18 0-0.5	T18 0.5-1.0	T18 1.0-2.0	W19 0-0.5
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00
				ES1008369-006	ES1008369-007	ES1008369-008	ES1008369-009	ES1008369-010
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	<10.0	<10.0	<10.0	----
Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	<10	<10	<10	----
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10	<10	----
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10	<10	----
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10	<10	----
Diazinon	333-41-5	10	µg/kg	<10	<10	<10	<10	----
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10	<10	----
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10	<10	----
Ethion	563-12-2	10	µg/kg	<10	<10	<10	<10	----
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10	<10	----
Fenthion	55-38-9	10	µg/kg	<10	<10	<10	<10	----
Malathion	121-75-5	10	µg/kg	<10	<10	<10	<10	----
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10	<10	----
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10	<10	----
Parathion	56-38-2	10	µg/kg	<10	<10	<10	<10	----
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10	<10	----
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10	<10	----
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10	<10	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
^ DDT (total)	----	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				W16 2.0-3.0	T18 0-0.5	T18 0.5-1.0	T18 1.0-2.0	W19 0-0.5
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008369-006	ES1008369-007	ES1008369-008	ES1008369-009	ES1008369-010
EP131A: Organochlorine Pesticides - Continued								
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	----
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	----
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	----
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	----
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	----
Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	----
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	----
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	----
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	----
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	----
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	----
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	5
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	5
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	<4	4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				W16 2.0-3.0	T18 0-0.5	T18 0.5-1.0	T18 1.0-2.0	W19 0-0.5
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES1008369-006	ES1008369-007	ES1008369-008	ES1008369-009	ES1008369-010
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Sum of PAHs	----	4	µg/kg	<4	<4	<4	<4	18
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	109	104	107	110	----
Toluene-D8	2037-26-5	0.1	%	96.9	91.9	97.4	96.1	----
4-Bromofluorobenzene	460-00-4	0.1	%	91.3	86.0	90.5	90.9	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	97.5	97.0	97.3	100	105
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	46.9	68.4	61.6	49.0	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	30.4	40.4	39.6	32.4	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	33.4	43.1	41.6	36.5	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	118	110	112	104	104
Anthracene-d10	1719-06-8	0.1	%	119	118	117	107	118
4-Terphenyl-d14	1718-51-0	0.1	%	103	97.2	103	87.4	72.3



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				W15 0.5-1.0	W15 1.0-2.0	W15 2.0-3.0	TRIP BLANK	----
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	----
Compound	CAS Number	LOR	Unit	ES1008369-011	ES1008369-012	ES1008369-013	ES1008369-014	----
EA150: Particle Sizing								
+75µm	----	1	%	89	93	----	----	----
+150µm	----	1	%	87	90	----	----	----
+300µm	----	1	%	68	58	----	----	----
+425µm	----	1	%	44	38	----	----	----
+600µm	----	1	%	30	28	----	----	----
+1180µm	----	1	%	19	20	----	----	----
+2.36mm	----	1	%	14	15	----	----	----
+4.75mm	----	1	%	11	12	----	----	----
+9.5mm	----	1	%	8	5	----	----	----
+19.0mm	----	1	%	<1	<1	----	----	----
+37.5mm	----	1	%	<1	<1	----	----	----
+75.0mm	----	1	%	<1	<1	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	20.4	17.0	25.2	----	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	7	5	----	----	----
Silt (2-60 µm)	----	1	%	3	2	----	----	----
Sand (0.06-2.00 mm)	----	1	%	76	78	----	----	----
Gravel (>2mm)	----	1	%	14	15	----	----	----
Cobbles (>6cm)	----	1	%	<1	<1	----	----	----
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	2440	1910	2040	----	----
Iron	7439-89-6	50	mg/kg	8240	7270	8930	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	----	----
Arsenic	7440-38-2	1.00	mg/kg	9.66	6.47	10.7	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
Chromium	7440-47-3	1.0	mg/kg	6.6	6.9	6.5	----	----
Copper	7440-50-8	1.0	mg/kg	3.4	2.6	3.2	----	----
Cobalt	7440-48-4	0.5	mg/kg	4.9	5.7	5.8	----	----
Lead	7439-92-1	1.0	mg/kg	2.4	2.2	3.2	----	----
Manganese	7439-96-5	10	mg/kg	1220	429	330	----	----
Nickel	7440-02-0	1.0	mg/kg	3.1	3.7	3.4	----	----
Selenium	7782-49-2	0.1	mg/kg	0.3	0.2	0.2	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
Vanadium	7440-62-2	2.0	mg/kg	20.4	19.8	18.9	----	----
Zinc	7440-66-6	1.0	mg/kg	7.2	6.8	7.8	----	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				W15 0.5-1.0	W15 1.0-2.0	W15 2.0-3.0	TRIP BLANK	----
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	----
Compound	CAS Number	LOR	Unit	ES1008369-011	ES1008369-012	ES1008369-013	ES1008369-014	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.21	0.31	0.42	----	----
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	----	<3	----
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	----	<0.2	----
Toluene	108-88-3	0.2	mg/kg	----	----	----	<0.2	----
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	----	<0.2	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	----	<0.2	----
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	----	<0.2	----
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	----	----
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	----	----
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	----	----
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	----	----
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	----	----
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	----	----
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	----	----
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	----	----
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	----	----
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	----	----
Perylene	198-55-0	4	µg/kg	<4	<4	<4	----	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	----	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	----	----
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	----	----
Coronene	191-07-1	5	µg/kg	<5	<5	<5	----	----
^ Sum of PAHs	----	4	µg/kg	<4	<4	<4	----	----
EP080-SD: TPH(V)/BTEX Surrogates								

Page : 16 of 17
 Work Order : ES1008369
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : NAGD - Asia Pacific LNG 301001-00448



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				W15 0.5-1.0	W15 1.0-2.0	W15 2.0-3.0	TRIP BLANK	----
				04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	04-MAY-2010 15:00	----
Compound	CAS Number	LOR	Unit	ES1008369-011	ES1008369-012	ES1008369-013	ES1008369-014	----
EP080-SD: TPH(V)/BTEX Surrogates - Continued								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	----	111	----
Toluene-D8	2037-26-5	0.1	%	----	----	----	100	----
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	----	93.6	----
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	98.6	108	97.7	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	114	115	98.6	----	----
Anthracene-d10	1719-06-8	0.1	%	119	114	103	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	94.2	122	81.7	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080-SD: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	67	137
Toluene-D8	2037-26-5	74	134
4-Bromofluorobenzene	460-00-4	73	137
EP090S: Organotin Surrogate			
Tripopyltin	----	34	108
EP130S: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	51.3	136.9
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	136
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	164
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	30	115
Anthracene-d10	1719-06-8	27	133
4-Terphenyl-d14	1718-51-0	18	137



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1008369	Page	: 1 of 17
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: NAGD - Asia Pacific LNG 301001-00448	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 06-MAY-2010
C-O-C number	: ----	Issue Date	: 21-MAY-2010
Sampler	: ----		
Order number	: ----		
Quote number	: BN/187/10	No. of samples received	: 14
		No. of samples analysed	: 14

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

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



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

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>
Alex Rossi	Organic Chemist	Organics
Ankit Joshi	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Dianne Blane	Laboratory Supervisor	Newcastle
Matt Frost	Organic Instrument Chemist	Organics
Sarah Ashworth	Organic Chemist	Organics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY



General Comments

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

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

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

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

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 1336030)									
ES1008356-012	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	19.7	18.9	4.0	0% - 50%
ES1008369-007	T18 0-0.5	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	24.9	26.8	7.5	0% - 20%
EG005-SD: Total Metals in Sediments by ICP-AES (QC Lot: 1338283)									
ES1008252-009	Anonymous	EG005-SD: Aluminium	7429-90-5	50	mg/kg	15900	18300	14.1	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	32700	35700	8.8	0% - 20%
ES1008369-001	W10 0-0.5	EG005-SD: Aluminium	7429-90-5	50	mg/kg	10800	8800	# 20.2	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	31800	27500	14.5	0% - 20%
EG005-SD: Total Metals in Sediments by ICP-AES (QC Lot: 1338286)									
ES1008369-011	W15 0.5-1.0	EG005-SD: Aluminium	7429-90-5	50	mg/kg	2440	2890	16.8	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	8240	9290	12.0	0% - 20%
ES1008494-007	Anonymous	EG005-SD: Aluminium	7429-90-5	50	mg/kg	26900	27900	3.5	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	36100	38300	5.8	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1338282)									
ES1008252-009	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	1.0	1.0	0.0	0% - 50%
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	14.9	15.5	4.3	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	24.1	27.1	11.6	0% - 20%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	28.3	32.5	13.9	0% - 20%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	9.4	10.2	8.4	0% - 50%
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	12.7	13.8	8.4	0% - 50%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	42.5	46.1	8.2	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	21.0	20.2	3.8	0% - 20%
		EG020-SD: Manganese	7439-96-5	10	mg/kg	308	302	2.2	0% - 20%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	60.4	63.6	5.1	0% - 20%
		ES1008369-001	W10 0-0.5	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1
EG020-SD: Selenium	7782-49-2			0.1	mg/kg	0.5	0.6	0.0	No Limit
EG020-SD: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG020-SD: Cobalt	7440-48-4			0.5	mg/kg	13.2	13.4	1.7	0% - 20%
EG020-SD: Antimony	7440-36-0			0.50	mg/kg	<0.50	<0.50	0.0	No Limit
EG020-SD: Chromium	7440-47-3			1.0	mg/kg	21.5	22.6	4.8	0% - 20%
EG020-SD: Copper	7440-50-8			1.0	mg/kg	11.5	9.6	17.5	No Limit
EG020-SD: Lead	7439-92-1			1.0	mg/kg	6.9	5.4	25.0	No Limit
	EG020-SD: Nickel	7440-02-0	1.0	mg/kg	10.7	9.5	11.6	No Limit	



Sub-Matrix: **SOIL**

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 (%)
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1338282) - continued									
ES1008369-001	W10 0-0.5	EG020-SD: Zinc	7440-66-6	1.0	mg/kg	30.1	27.2	10.0	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	20.4	19.5	4.5	0% - 50%
		EG020-SD: Manganese	7439-96-5	10	mg/kg	204	218	6.4	0% - 20%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	67.4	60.4	10.9	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1338285)									
ES1008369-011	W15 0.5-1.0	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.3	0.3	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	4.9	6.0	19.0	0% - 50%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	6.6	7.5	12.3	No Limit
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	3.4	3.9	14.7	No Limit
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	2.4	2.1	11.5	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	3.1	4.0	26.0	No Limit
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	7.2	8.8	19.8	No Limit
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	9.66	7.31	27.6	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	1220	811	# 40.5	0% - 20%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	20.4	22.5	10.0	0% - 50%
ES1008494-007	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.9	0.9	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	15.8	14.7	7.2	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	33.8	34.2	1.2	0% - 20%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	28.9	33.4	14.2	0% - 20%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	10.8	11.5	5.8	0% - 50%
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	19.0	18.6	2.3	0% - 50%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	60.0	64.2	6.7	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	10.2	7.65	28.5	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	175	175	0.0	0% - 50%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	74.7	79.7	6.5	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1338281)									
ES1008252-009	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.03	0.03	0.0	No Limit
ES1008369-001	W10 0-0.5	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.01	0.01	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1338284)									
ES1008369-011	W15 0.5-1.0	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
ES1008494-007	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.0	No Limit
EK055: Ammonia as N (QC Lot: 1342139)									
ES1008245-001	Anonymous	EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	<1	0.0	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 (%)
EK055: Ammonia as N (QC Lot: 1342139) - continued									
ES1008252-001	Anonymous	EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	4	4	0.0	No Limit
EK055: Ammonia as N (QC Lot: 1342140)									
ES1008369-007	T18 0-0.5	EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	<1	0.0	No Limit
ES1008688-008	Anonymous	EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	<1	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1341591)									
ES1008369-003	W16 0-0.5	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1008494-007	Anonymous	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EK059G: NOX as N by Discrete Analyser (QC Lot: 1341592)									
ES1008369-003	W16 0-0.5	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1008494-007	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1340062)									
ES1008369-003	W16 0-0.5	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	110	130	18.2	No Limit
ES1008624-013	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	1660	1480	11.6	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1340063)									
ES1008369-003	W16 0-0.5	EK067G: Total Phosphorus as P	----	2	mg/kg	145	144	0.0	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1341593)									
ES1008369-003	W16 0-0.5	EK071G: Reactive Phosphorus as P	----	0.1	mg/kg	0.2	0.6	86.2	No Limit
ES1008494-007	Anonymous	EK071G: Reactive Phosphorus as P	----	0.1	mg/kg	1.1	1.1	0.0	0% - 50%
EP005: Total Organic Carbon (TOC) (QC Lot: 1342776)									
ES1008369-001	W10 0-0.5	EP005: Total Organic Carbon	----	0.02	%	0.61	0.59	3.0	0% - 20%
ES1008369-011	W15 0.5-1.0	EP005: Total Organic Carbon	----	0.02	%	0.21	0.22	0.0	0% - 50%
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1335927)									
ES1008369-003	W16 0-0.5	EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1335959)									
ES1008369-003	W16 0-0.5	EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	<5	0.0	No Limit
EP080-SD: BTEX (QC Lot: 1335927)									
ES1008369-003	W16 0-0.5	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: ortho-Xylene	106-42-3 95-47-6	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP090: Organotin Compounds (QC Lot: 1342585)									
ES1008246-006	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
ES1008369-002	W9 0-0.5	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
EP090: Organotin Compounds (QC Lot: 1342587)									



Sub-Matrix: **SOIL**

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 (%)
EP090: Organotin Compounds (QC Lot: 1342587) - continued									
ES1008369-010	W19 0-0.5	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
ES1008494-007	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
EP130A: Organophosphorus Pesticides (Ultra-trace) (QC Lot: 1335961)									
ES1008369-003	W16 0-0.5	EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	<10.0	0.0	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 1335962)									
ES1008369-003	W16 0-0.5	EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: DDT (total)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	0.0	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 (%)
EP131A: Organochlorine Pesticides (QC Lot: 1335962) - continued									
ES1008369-003	W16 0-0.5	EP131A: Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1335963)									
ES1008369-003	W16 0-0.5	EP131B: Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1335958)									
ES1008369-003	W16 0-0.5	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenzo(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	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 (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1335958) - continued									
ES1008369-003	W16 0-0.5	EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit
ES1008369-011	W15 0.5-1.0	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit



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

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

Sub-Matrix: **SOIL**

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				
EG005-SD: Total Metals in Sediments by ICP-AES (QCLot: 1338283)								
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG005-SD: Total Metals in Sediments by ICP-AES (QCLot: 1338286)								
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1338282)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	112	70	130
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	95.2	70	130
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	96.2	70	130
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	96.4	70	130
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	98.6	70	130
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	90.8	70	130
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	90.9	70	130
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	103	70	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	109	70	130
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	50 mg/kg	101	70	130
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	95.8	70	130
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1338285)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	109	70	130
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	96.1	70	130
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	97.1	70	130
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	96.0	70	130
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	105	70	130
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	90.0	70	130
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	93.1	70	130
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	102	70	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	109	70	130
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	50 mg/kg	101	70	130
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	97.1	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1338281)								



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1338281) - continued								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	92.9	74.2	126
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1338284)								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	87.5	74.2	126
EK055: Ammonia as N (QCLot: 1342139)								
EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	25 mg/kg	87.4	70	130
EK055: Ammonia as N (QCLot: 1342140)								
EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	25 mg/kg	86.2	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1341591)								
EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	4.8 mg/kg	99.3	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1341592)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	4.8 mg/kg	117	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1340062)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	1000 mg/kg	78.2	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1340063)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	442 mg/kg	93.5	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1341593)								
EK071G: Reactive Phosphorus as P	----	0.1	mg/kg	<0.1	2.5 mg/kg	102	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1342776)								
EP005: Total Organic Carbon	----	0.02	%	<0.02	100 %	99.6	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1335927)								
EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	26 mg/kg	118	68.4	128
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1335959)								
EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	5 mg/kg	110	75.2	116
EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	5 mg/kg	106	75.3	113
EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	5 mg/kg	101	72.6	117
EP080-SD: BTEX (QCLot: 1335927)								
EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	124	67.5	125
EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	1 mg/kg	117	69	122
EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	1 mg/kg	124	65.3	126
EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	2 mg/kg	113	66.5	124
	106-42-3							
EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	1 mg/kg	114	66.7	123
EP090: Organotin Compounds (QCLot: 1342585)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	118	19.5	129
EP090: Organotin Compounds (QCLot: 1342587)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	98.0	19.5	129



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				
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 1335961)								
EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	50 µg/kg	94.9	36.9	142
EP130: Carbophenothion	786-19-6	10	µg/kg	<10	50 µg/kg	83.9	0.5	157
EP130: Chlorfenvinphos (E)	470-90-6	10	µg/kg	<10.0	5 µg/kg	116	50.3	137
EP130: Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	50 µg/kg	102	55.9	152
EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	50 µg/kg	94.0	49	140
EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	50 µg/kg	95.4	28.1	142
EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	50 µg/kg	109	36.6	172
EP130: Diazinon	333-41-5	10	µg/kg	<10	50 µg/kg	98.7	37.2	148
EP130: Dichlorvos	62-73-7	10	µg/kg	<10	50 µg/kg	49.6	32.7	153
EP130: Dimethoate	60-51-5	10	µg/kg	<10	50 µg/kg	100	33.2	150
EP130: Ethion	563-12-2	10	µg/kg	<10	50 µg/kg	97.5	44	146
EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	50 µg/kg	116	3.08	162
EP130: Fenthion	55-38-9	10	µg/kg	<10	50 µg/kg	93.1	10.6	157
EP130: Malathion	121-75-5	10	µg/kg	<10	50 µg/kg	101	38.1	143
EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	50 µg/kg	88.1	8.13	159
EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	50 µg/kg	129	19.7	176
EP130: Parathion	56-38-2	10	µg/kg	<10	50 µg/kg	106	39.2	145
EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	50 µg/kg	102	23.5	152
EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	50 µg/kg	94.4	47.1	141
EP130: Prothiofos	34643-46-4	10	µg/kg	<10	50 µg/kg	97.6	36.1	148
EP131A: Organochlorine Pesticides (QCLot: 1335962)								
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	74.5	31.7	140
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	64.0	24.5	150
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	62.7	36.9	139
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	90.3	38.2	137
EP131A: 4,4'-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	80.4	42.5	141
EP131A: 4,4'-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	94.0	34.8	140
EP131A: 4,4'-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	95.0	38	143
EP131A: DDT (total)	----	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	67.7	43.2	134
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	91.0	23.7	139
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	93.7	35.8	138
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	92.4	7.45	158
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	93.7	21.6	162
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	96.0	19.3	131
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	79.4	17.9	141
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	103	31	153
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	81.6	34.3	138



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				
EP131A: Organochlorine Pesticides (QCLot: 1335962) - continued								
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	66.0	18.6	146
EP131A: gamma-BHC	58-89-9	0.5	µg/kg	<0.50	5 µg/kg	74.9	30.7	145
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	122	15	157
EP131A: cis-Chlordane	5103-71-9	0.5	µg/kg	<0.50	5 µg/kg	74.4	22.3	145
EP131A: trans-Chlordane	5103-74-2	0.5	µg/kg	<0.50	5 µg/kg	71.5	42.4	139
EP131A: Total Chlordane (sum)	----	0.5	µg/kg	<0.50	----	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1335963)								
EP131B: Total Polychlorinated biphenyls	----	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1016	12974-11-2	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	50 µg/kg	98.8	61.3	121
EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1335958)								
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	82.0	----	----
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	78.2	----	----
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	94.7	----	----
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	91.0	----	----
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	78.1	----	----
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	110	----	----
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	92.8	----	----
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	76.1	----	----
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	79.9	----	----
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	102	----	----
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	95.5	----	----
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	102	----	----
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	79.0	----	----
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	94.5	----	----
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	81.2	----	----
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	89.4	----	----
EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	88.3	----	----
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	85.3	----	----
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----



Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1338282)							
ES1008252-010	Anonymous	EG020-SD: Arsenic	7440-38-2	50 mg/kg	90.9	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	95.7	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	90.8	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	84.0	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	85.7	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	94.2	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	90.6	70	130
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1338285)							
ES1008369-012	W15 1.0-2.0	EG020-SD: Arsenic	7440-38-2	50 mg/kg	104	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	98.0	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	96.8	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	87.2	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	86.4	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	100	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	92.7	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1338281)							
ES1008252-009	Anonymous	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	74.9	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1338284)							
ES1008369-011	W15 0.5-1.0	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	83.9	70	130
EK055: Ammonia as N (QCLot: 1342139)							
ES1008245-001	Anonymous	EK055-SD: Ammonia as N	7664-41-7	25 mg/kg	81.2	70	130
EK055: Ammonia as N (QCLot: 1342140)							
ES1008369-007	T18 0-0.5	EK055-SD: Ammonia as N	7664-41-7	25 mg/kg	83.4	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1341591)							
ES1008369-003	W16 0-0.5	EK057G: Nitrite as N (Sol.)	----	3.0 mg/kg	99.2	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1341592)							
ES1008369-003	W16 0-0.5	EK059G: Nitrite + Nitrate as N (Sol.)	----	3.0 mg/kg	111	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1340062)							
ES1008369-003	W16 0-0.5	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	99.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1340063)							
ES1008369-003	W16 0-0.5	EK067G: Total Phosphorus as P	----	100 mg/kg	105	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1341593)							
ES1008369-003	W16 0-0.5	EK071G: Reactive Phosphorus as P	----	2.5 mg/kg	100	70	130



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%) LowHigh		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number					
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1335927)								
ES1008369-003	W16 0-0.5	EP080-SD: C6 - C9 Fraction	----	26 mg/kg	106	70	130	
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1335959)								
ES1008369-003	W16 0-0.5	EP071-SD: C10 - C14 Fraction	----	19.75 mg/kg	73.2	70	130	
		EP071-SD: C15 - C28 Fraction	----	87.25 mg/kg	85.8	70	130	
		EP071-SD: C29 - C36 Fraction	----	60 mg/kg	102	70	130	
EP080-SD: BTEX (QCLot: 1335927)								
ES1008369-003	W16 0-0.5	EP080-SD: Benzene	71-43-2	2.5 mg/kg	74.2	70	130	
		EP080-SD: Toluene	108-88-3	2.5 mg/kg	81.1	70	130	
		EP080-SD: Ethylbenzene	100-41-4	2.5 mg/kg	88.7	70	130	
		EP080-SD: meta- & para-Xylene	108-38-3	2.5 mg/kg	88.8	70	130	
			106-42-3					
EP080-SD: ortho-Xylene	95-47-6	2.5 mg/kg	90.1	70	130			
EP090: Organotin Compounds (QCLot: 1342585)								
ES1008246-007	Anonymous	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	64.9	20	130	
EP090: Organotin Compounds (QCLot: 1342587)								
ES1008369-011	W15 0.5-1.0	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	108	20	130	
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 1335961)								
ES1008369-003	W16 0-0.5	EP130: Bromophos-ethyl	4824-78-6	50 µg/kg	66.2	36.9	142	
		EP130: Carbophenothion	786-19-6	50 µg/kg	72.3	0.5	157	
		EP130: Chlorfenvinphos (E)	470-90-6	5 µg/kg	68.4	50.3	137	
		EP130: Chlorfenvinphos (Z)	470-90-8	50 µg/kg	89.7	55.9	152	
		EP130: Chlorpyrifos	2921-88-2	50 µg/kg	78.7	49	140	
		EP130: Chlorpyrifos-methyl	5598-13-0	50 µg/kg	78.4	28.1	142	
		EP130: Demeton-S-methyl	919-86-8	50 µg/kg	99.3	36.6	172	
		EP130: Diazinon	333-41-5	50 µg/kg	68.2	37.2	148	
		EP130: Dichlorvos	62-73-7	50 µg/kg	68.2	32.7	153	
		EP130: Dimethoate	60-51-5	50 µg/kg	107	33.2	150	
		EP130: Ethion	563-12-2	50 µg/kg	61.7	44	146	
		EP130: Fenamiphos	22224-92-6	50 µg/kg	59.9	3.08	162	
		EP130: Fenthion	55-38-9	50 µg/kg	89.8	10.6	157	
		EP130: Malathion	121-75-5	50 µg/kg	105	38.1	143	
		EP130: Azinphos Methyl	86-50-0	50 µg/kg	116	8.13	159	
		EP130: Monocrotophos	6923-22-4	50 µg/kg	142	19.7	176	
		EP130: Parathion	56-38-2	50 µg/kg	101	39.2	145	
		EP130: Parathion-methyl	298-00-0	50 µg/kg	80.8	23.5	152	
		EP130: Pirimphos-ethyl	23505-41-1	50 µg/kg	80.1	47.1	141	
		EP130: Prothiofos	34643-46-4	50 µg/kg	74.1	36.1	148	



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EP131A: Organochlorine Pesticides (QCLot: 1335962)							
ES1008369-003	W16 0-0.5	EP131A: Aldrin	309-00-2	5 µg/kg	37.5	31.7	140
		EP131A: alpha-BHC	319-84-6	5 µg/kg	26.2	24.5	150
		EP131A: beta-BHC	319-85-7	5 µg/kg	# 32.5	36.9	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	# 32.5	38.2	137
		EP131A: 4,4`-DDD	72-54-8	5 µg/kg	# 20.3	42.5	141
		EP131A: 4,4`-DDE	72-55-9	5 µg/kg	36.2	34.8	140
		EP131A: 4,4`-DDT	50-29-3	5 µg/kg	# 31.0	38	143
		EP131A: Dieldrin	60-57-1	5 µg/kg	# 40.0	43.2	134
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	68.8	23.7	139
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	# 25.4	35.8	138
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	43.7	7.45	158
		EP131A: Endrin	72-20-8	5 µg/kg	30.9	21.6	162
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	25.9	19.3	131
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	29.5	17.9	141
		EP131A: Heptachlor	76-44-8	5 µg/kg	47.5	31	153
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	42.5	34.3	138
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	25.0	18.6	146
		EP131A: gamma-BHC	58-89-9	5 µg/kg	38.8	30.7	145
		EP131A: Methoxychlor	72-43-5	5 µg/kg	41.8	15	157
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	35.0	22.3	145
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	48.8	42.4	139
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1335963)							
ES1008369-003	W16 0-0.5	EP131B: Aroclor 1254	11097-69-1	50 µg/kg	# 56.8	61.3	121
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1335958)							
ES1008369-003	W16 0-0.5	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	107	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	101	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	93.4	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	89.7	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	72.2	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	79.5	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	89.4	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	108	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	115	70	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	106	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	98.5	70	130
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	96.6	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	91.7	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	113	70	130



Sub-Matrix: SOIL

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1335958) - continued							
ES1008369-003	W16 0-0.5	EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	89.2	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	110	70	130
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	99.5	70	130
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	25 µg/kg	75.9	70	130
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	25 µg/kg	76.6	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	96.1	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1008369	Page	: 1 of 12
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: NAGD - Asia Pacific LNG 301001-00448	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 06-MAY-2010
C-O-C number	: ----	Issue Date	: 21-MAY-2010
Sampler	: ----		
Order number	: ----		
Quote number	: BN/187/10	No. of samples received	: 14
		No. of samples analysed	: 14

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

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	04-MAY-2010	----	----	----	06-MAY-2010	11-MAY-2010	✔	
W10 - 0-0.5,								W9 - 0-0.5,
W16 - 0-0.5,								W16 - 0.5-1.0,
W16 - 1.0-2.0,								W16 - 2.0-3.0,
T18 - 0-0.5,								T18 - 0.5-1.0,
T18 - 1.0-2.0,								W19 - 0-0.5,
W15 - 0.5-1.0,								W15 - 1.0-2.0,
W15 - 2.0-3.0								
EA150: Particle Sizing								
Snap Lock Bag	04-MAY-2010	---	---	----	19-MAY-2010	31-OCT-2010	✔	
W10 - 0-0.5,								W9 - 0-0.5,
W16 - 0-0.5,								W16 - 0.5-1.0,
W16 - 1.0-2.0,								W16 - 2.0-3.0,
W19 - 0-0.5,								W15 - 0.5-1.0,
W15 - 1.0-2.0								
EA150: Soil Classification based on Particle Size								
Snap Lock Bag	04-MAY-2010	---	---	----	19-MAY-2010	31-OCT-2010	✔	
W10 - 0-0.5,								W9 - 0-0.5,
W16 - 0-0.5,								W16 - 0.5-1.0,
W16 - 1.0-2.0,								W16 - 2.0-3.0,
W19 - 0-0.5,								W15 - 0.5-1.0,
W15 - 1.0-2.0								



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
EG005-SD: Total Metals in Sediments by ICP-AES								
Soil Glass Jar - Unpreserved								
W10 - 0-0.5, W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0, W15 - 0.5-1.0, W15 - 2.0-3.0	W9 - 0-0.5, W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0, W19 - 0-0.5, W15 - 1.0-2.0,	04-MAY-2010	09-MAY-2010	01-JUN-2010	✓	10-MAY-2010	31-OCT-2010	✓
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved								
W10 - 0-0.5, W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0, W15 - 0.5-1.0, W15 - 2.0-3.0	W9 - 0-0.5, W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0, W19 - 0-0.5, W15 - 1.0-2.0,	04-MAY-2010	09-MAY-2010	01-JUN-2010	✓	10-MAY-2010	31-OCT-2010	✓
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved								
W10 - 0-0.5, W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0, W15 - 0.5-1.0, W15 - 2.0-3.0	W9 - 0-0.5, W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0, W19 - 0-0.5, W15 - 1.0-2.0,	04-MAY-2010	09-MAY-2010	01-JUN-2010	✓	11-MAY-2010	01-JUN-2010	✓
EK055: Ammonia as N								
Soil Glass Jar - Unpreserved								
W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0	W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0,	04-MAY-2010	----	----	----	12-MAY-2010	31-OCT-2010	✓
EK057G: Nitrite as N by Discrete Analyser								
Soil Glass Jar - Unpreserved								
W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0	W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0,	04-MAY-2010	12-MAY-2010	31-OCT-2010	✓	12-MAY-2010	31-OCT-2010	✓



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	
EK059G: NOx as N by Discrete Analyser								
Soil Glass Jar - Unpreserved W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0	W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0,	04-MAY-2010	12-MAY-2010	31-OCT-2010	✓	12-MAY-2010	31-OCT-2010	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Soil Glass Jar - Unpreserved W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0	W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0,	04-MAY-2010	11-MAY-2010	31-OCT-2010	✓	11-MAY-2010	31-OCT-2010	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Soil Glass Jar - Unpreserved W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0	W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0,	04-MAY-2010	11-MAY-2010	31-OCT-2010	✓	11-MAY-2010	31-OCT-2010	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Soil Glass Jar - Unpreserved W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0	W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0,	04-MAY-2010	12-MAY-2010	31-OCT-2010	✓	12-MAY-2010	31-OCT-2010	✓
EP005: Total Organic Carbon (TOC)								
Pulp Bag W10 - 0-0.5, W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0, W15 - 0.5-1.0,	W9 - 0-0.5, W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0, W19 - 0-0.5, W15 - 1.0-2.0	04-MAY-2010	12-MAY-2010	---	----	13-MAY-2010	01-JUN-2010	✓
Soil Glass Jar - Unpreserved W15 - 2.0-3.0		04-MAY-2010	12-MAY-2010	01-JUN-2010	✓	13-MAY-2010	01-JUN-2010	✓



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
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved								
W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0,	W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0, TRIP BLANK	04-MAY-2010	06-MAY-2010	18-MAY-2010	✓	11-MAY-2010	18-MAY-2010	✓
Soil Glass Jar - Unpreserved								
W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0	W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0,	04-MAY-2010	07-MAY-2010	18-MAY-2010	✓	10-MAY-2010	16-JUN-2010	✓
EP080-SD: BTEX								
Soil Glass Jar - Unpreserved								
W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0,	W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0, TRIP BLANK	04-MAY-2010	06-MAY-2010	18-MAY-2010	✓	11-MAY-2010	18-MAY-2010	✓
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved								
W10 - 0-0.5, W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0, W15 - 0.5-1.0, W15 - 2.0-3.0	W9 - 0-0.5, W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0, W19 - 0-0.5, W15 - 1.0-2.0,	04-MAY-2010	12-MAY-2010	18-MAY-2010	✓	14-MAY-2010	21-JUN-2010	✓
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Soil Glass Jar - Unpreserved								
W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0	W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0,	04-MAY-2010	07-MAY-2010	18-MAY-2010	✓	10-MAY-2010	16-JUN-2010	✓
EP131A: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved								
W16 - 0-0.5, W16 - 1.0-2.0, T18 - 0-0.5, T18 - 1.0-2.0	W16 - 0.5-1.0, W16 - 2.0-3.0, T18 - 0.5-1.0,	04-MAY-2010	07-MAY-2010	18-MAY-2010	✓	10-MAY-2010	16-JUN-2010	✓

Page : 6 of 12
 Work Order : ES1008369
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : NAGD - Asia Pacific LNG 301001-00448



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
EP131B: Polychlorinated Biphenyls (as Aroclors)								
Soil Glass Jar - Unpreserved		04-MAY-2010	07-MAY-2010	18-MAY-2010	✔	10-MAY-2010	16-JUN-2010	✔
W16 - 0-0.5,	W16 - 0.5-1.0,							
W16 - 1.0-2.0,	W16 - 2.0-3.0,							
T18 - 0-0.5,	T18 - 0.5-1.0,							
T18 - 1.0-2.0								
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved		04-MAY-2010	07-MAY-2010	18-MAY-2010	✔	11-MAY-2010	16-JUN-2010	✔
W10 - 0-0.5,	W9 - 0-0.5,							
W16 - 0-0.5,	W16 - 0.5-1.0,							
W16 - 1.0-2.0,	W16 - 2.0-3.0,							
T18 - 0-0.5,	T18 - 0.5-1.0,							
T18 - 1.0-2.0,	W19 - 0-0.5,							
W15 - 0.5-1.0,	W15 - 1.0-2.0,							
W15 - 2.0-3.0								



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	4	40	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	2	14	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	4	37	10.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	14	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	2	14	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	13	15.4	9.5	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	4	38	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	4	38	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	4	38	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	1	9	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	2	40	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	37	5.4	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	1	13	7.7	4.8	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	38	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	38	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	1	9	11.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



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 Control Samples (LCS) - Continued							
TPH - Semivolatile Fraction	EP071-SD	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	2	40	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	37	5.4	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	1	13	7.7	4.8	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	2	38	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	38	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	38	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	1	9	11.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	2	40	5.0	5.0	✓	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	18	5.6	5.0	✓	ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	14	7.1	5.0	✓	ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	7	14.3	5.0	✓	ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	7	14.3	5.0	✓	ALS QCS3 requirement
Organotin Analysis	EP090	2	37	5.4	5.0	✓	ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	7.1	5.0	✓	ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	7	14.3	5.0	✓	ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	14	7.1	5.0	✓	ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	1	13	7.7	4.8	✓	ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	38	5.3	5.0	✓	ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	38	5.3	5.0	✓	ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	1	9	11.1	5.0	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	7	14.3	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	8	12.5	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Particle Size Analysis (Sieving)	EA150	SOIL	Particle Size Analysis by Sieving according to AS1289.3.6.1 - 1995
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Total Fe and Al in Sediments by ICPAES	EG005-SD	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3). LORs per NODG
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 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 (1999) Schedule B(3)
Buchi Ammonia - Low-Level in Sediment	EK055-SD	SOIL	APHA 21st ed., 4500 NH ₃ +B&G, H Samples are steam distilled (Buchi) prior to analysis and quantified using titrimetric determination.
Nitrite as N - Soluble by Discrete Analyser	EK057G	SOIL	APHA 21st ed., 4500 NO ₃ - B. Nitrite in a water extract is determined by direct colourimetry by Discrete Analyser.
Nitrate as N - Soluble by Discrete Analyser	EK058G	SOIL	APHA 21st ed., 4500 NO ₃ --F. Nitrate in the 1:5 soil:water extract is reduced to nitrite by way of a cadmium reduction column followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results.
Nitrite and Nitrate as N (NO _x)- Soluble by Discrete Analyser	EK059G	SOIL	APHA 21st ed., 4500 NO ₃ - F. Combined oxidised Nitrogen (NO ₂ +NO ₃) in a water extract is determined by Cadmium Reduction, and direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	APHA 21st ed., 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Phosphorus By Discrete Analyser	EK067G	SOIL	APHA 21st ed., 4500 P-B&F This procedure involves sulfuric acid digestion and quantification using Discrete Analyser.
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	SOIL	APHA 21st ed., 4500 P-F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2



Analytical Methods	Method	Matrix	Method Descriptions
Total Organic Carbon	EP005	SOIL	In-house. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
TPH - Semivolatile Fraction	EP071-SD	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504)
TPH Volatiles/BTEX in Sediments	EP080-SD	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Organotin Analysis	EP090	SOIL	(USEPA SW 846 - 8270D) Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quantified against an established calibration curve.
Organophosphorus Pesticides (Ultra-trace)	EP130	SOIL	USEPA Method 3640 (GPC cleanup), 8141 (GC/FPD - Capillary Column) This technique is compliant with NEPM (1999) Schedule B(3) (Method 505)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	USEPA Method 3640 (GPC cleanup), 3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PCB's (Ultra-trace)	EP131B	SOIL	USEPA Method 3640 (GPC cleanup), 3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.
Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	SOIL	APHA 21st ed., 4500 Norg- D; APHA 21st ed., 4500 P - H. Macro Kjeldahl digestion.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. 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 (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids/ Sample Cleanup	ORG17A-UTP	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na ₂ SO ₄ and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.
Organotin Sample Preparation	ORG35	SOIL	In house. 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG005-SD: Total Metals in Sediments by ICP-AES	ES1008369-001	W10 0-0.5	Aluminium	7429-90-5	20.2 %	0-20%	RPD exceeds LOR based limits
EG020-SD: Total Metals in Sediments by ICPMS	ES1008369-011	W15 0.5-1.0	Manganese	7439-96-5	40.5 %	0-20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
EP131A: Organochlorine Pesticides	ES1008369-003	W16 0-0.5	beta-BHC	319-85-7	32.5 %	36.9-139%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008369-003	W16 0-0.5	delta-BHC	319-86-8	32.5 %	38.2-137%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008369-003	W16 0-0.5	4,4'-DDD	72-54-8	20.3 %	42.5-141%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008369-003	W16 0-0.5	4,4'-DDT	50-29-3	31.0 %	38-143%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008369-003	W16 0-0.5	Dieldrin	60-57-1	40.0 %	43.2-134%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008369-003	W16 0-0.5	beta-Endosulfan	33213-65-9	25.4 %	35.8-138%	Recovery less than lower data quality objective
EP131B: Polychlorinated Biphenyls (as Aroclors)	ES1008369-003	W16 0-0.5	Aroclor 1254	11097-69-1	56.8 %	61.3-121%	Recovery less than lower data quality objective

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP130S: Organophosphorus Pesticide Surrogate	ES1008369-003	W16 0-0.5	DEF	78-48-8	42.0 %	51.3-136.9 %	Recovery less than lower data quality objective
EP130S: Organophosphorus Pesticide Surrogate	ES1008369-009	T18 1.0-2.0	DEF	78-48-8	49.0 %	51.3-136.9 %	Recovery less than lower data quality objective
EP130S: Organophosphorus Pesticide Surrogate	ES1008369-006	W16 2.0-3.0	DEF	78-48-8	46.9 %	51.3-136.9 %	Recovery less than lower data quality objective
EP132T: Base/Neutral Extractable Surrogates	ES1008369-005	W16 1.0-2.0	2-Fluorobiphenyl	321-60-8	115 %	30-115 %	Recovery greater than upper data quality objective



Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted - Continued							
EP132T: Base/Neutral Extractable Surrogates	ES1008369-006	W16 2.0-3.0	2-Fluorobiphenyl	321-60-8	118 %	30-115 %	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1008497	Page	: 1 of 13
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: NAGD - Asia Pacific LNG 301001-00448	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 05-MAY-2010
C-O-C number	: ----	Issue Date	: 21-MAY-2010
Sampler	: VSK	No. of samples received	: 7
Site	: GLADSTONE-APLNG DOWNSTREAM	No. of samples analysed	: 7
Quote number	: BN/187/10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

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>
Alex Rossi	Organic Chemist	Organics
Ankit Joshi	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Dianne Blane	Laboratory Supervisor	Newcastle
Kim McCabe	Senior Inorganic Chemist	Stafford Minerals - AY
Pabi Subba	Senior Organic Chemist	Inorganics
Sarah Ashworth	Organic Chemist	Organics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

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

- **EG020T: Poor precision was obtained for Manganese on sample ES1008369 #011 due to sample heterogeneity. Results have been confirmed by re-extraction and reanalysis.**
- **EK067G Spike failed for ammonia due to matrix interference (confirmed by re-analysis)**



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				W14 0-0.5	W13 0-0.5	W12 0-0.5	W11 0-0.5	IB3 0-0.5
				05-MAY-2010 15:00	05-MAY-2010 15:00	05-MAY-2010 15:00	05-MAY-2010 15:00	04-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008497-001	ES1008497-002	ES1008497-003	ES1008497-004	ES1008497-005
EA150: Particle Sizing								
+75µm	----	1	%	56	66	69	91	----
+150µm	----	1	%	51	60	61	90	----
+300µm	----	1	%	48	52	50	86	----
+425µm	----	1	%	46	46	44	82	----
+600µm	----	1	%	45	42	40	79	----
+1180µm	----	1	%	42	36	35	75	----
+2.36mm	----	1	%	39	31	31	72	----
+4.75mm	----	1	%	36	27	27	70	----
+9.5mm	----	1	%	31	17	23	67	----
+19.0mm	----	1	%	13	5	21	64	----
+37.5mm	----	1	%	<1	<1	<1	<1	----
+75.0mm	----	1	%	<1	<1	<1	<1	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	51.7	34.5	35.2	34.8	26.6
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	20	17	17	5	----
Silt (2-60 µm)	----	1	%	21	15	13	4	----
Sand (0.06-2.00 mm)	----	1	%	19	36	39	19	----
Gravel (>2mm)	----	1	%	40	32	31	72	----
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	----
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	17100	10200	8280	5440	4110
Iron	7439-89-6	50	mg/kg	24300	24000	39200	31300	11000
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	11.6	11.4	27.3	21.6	8.84
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	25.6	19.0	23.7	19.3	7.8
Copper	7440-50-8	1.0	mg/kg	16.3	9.7	8.9	6.0	4.5
Cobalt	7440-48-4	0.5	mg/kg	14.0	18.8	16.0	17.8	7.3
Lead	7439-92-1	1.0	mg/kg	7.2	5.5	7.7	7.0	2.9
Manganese	7439-96-5	10	mg/kg	348	323	248	321	496
Nickel	7440-02-0	1.0	mg/kg	13.7	10.5	9.5	8.7	4.8
Selenium	7782-49-2	0.1	mg/kg	0.6	0.4	0.7	0.5	0.3
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	48.1	41.7	77.1	62.0	25.7
Zinc	7440-66-6	1.0	mg/kg	43.8	34.5	30.2	30.7	14.1



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				W14 0-0.5	W13 0-0.5	W12 0-0.5	W11 0-0.5	IB3 0-0.5
				05-MAY-2010 15:00	05-MAY-2010 15:00	05-MAY-2010 15:00	05-MAY-2010 15:00	04-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008497-001	ES1008497-002	ES1008497-003	ES1008497-004	ES1008497-005
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.02	<0.01	<0.01	<0.01	<0.01
EK055: Ammonia as N								
Ammonia as N	7664-41-7	1	mg/kg	<1	----	----	----	<1
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	----	----	----	<0.1
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	----	----	----	<0.1
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	----	----	----	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	610	----	----	----	370
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	280	----	----	----	170
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.1	mg/kg	0.8	----	----	----	0.2
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.65	0.50	0.35	0.32	0.35
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	----	----	----	<3
C10 - C14 Fraction	----	3	mg/kg	<3	----	----	----	<3
C15 - C28 Fraction	----	3	mg/kg	9	----	----	----	6
C29 - C36 Fraction	----	5	mg/kg	9	----	----	----	<5
^ C10 - C36 Fraction (sum)	----	3	mg/kg	18	----	----	----	6
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	<0.2
Toluene	108-88-3	0.2	mg/kg	<0.2	----	----	----	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	----	----	----	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	----	----	----	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	----	----	----	<0.2
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	----	----	----	<10
Carbophenothion	786-19-6	10	µg/kg	<10	----	----	----	<10



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				W14 0-0.5	W13 0-0.5	W12 0-0.5	W11 0-0.5	IB3 0-0.5
				05-MAY-2010 15:00	05-MAY-2010 15:00	05-MAY-2010 15:00	05-MAY-2010 15:00	04-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008497-001	ES1008497-002	ES1008497-003	ES1008497-004	ES1008497-005
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	----	----	----	<10.0
Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	----	----	----	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	----	----	----	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	----	----	----	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	----	----	----	<10
Diazinon	333-41-5	10	µg/kg	<10	----	----	----	<10
Dichlorvos	62-73-7	10	µg/kg	<10	----	----	----	<10
Dimethoate	60-51-5	10	µg/kg	<10	----	----	----	<10
Ethion	563-12-2	10	µg/kg	<10	----	----	----	<10
Fenamiphos	22224-92-6	10	µg/kg	<10	----	----	----	<10
Fenthion	55-38-9	10	µg/kg	<10	----	----	----	<10
Malathion	121-75-5	10	µg/kg	<10	----	----	----	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	----	----	----	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	----	----	----	<10
Parathion	56-38-2	10	µg/kg	<10	----	----	----	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	----	----	----	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	----	----	----	<10
Prothiofos	34643-46-4	10	µg/kg	<10	----	----	----	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	----	----	----	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	----	----	----	<0.50
beta-BHC	319-85-7	0.50	µg/kg	<0.50	----	----	----	<0.50
delta-BHC	319-86-8	0.50	µg/kg	<0.50	----	----	----	<0.50
4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	----	----	----	<0.50
4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	----	----	----	<0.50
4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	----	----	----	<0.50
^ DDT (total)	----	0.50	µg/kg	<0.50	----	----	----	<0.50
Dieldrin	60-57-1	0.50	µg/kg	<0.50	----	----	----	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	----	----	----	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	----	----	----	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	----	----	----	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	----	----	----	<0.50
Endrin	72-20-8	0.50	µg/kg	<0.50	----	----	----	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	----	----	----	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	----	----	----	<0.50
Heptachlor	76-44-8	0.50	µg/kg	<0.50	----	----	----	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	----	----	----	<0.50



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				W14 0-0.5	W13 0-0.5	W12 0-0.5	W11 0-0.5	IB3 0-0.5
				05-MAY-2010 15:00	05-MAY-2010 15:00	05-MAY-2010 15:00	05-MAY-2010 15:00	04-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008497-001	ES1008497-002	ES1008497-003	ES1008497-004	ES1008497-005
EP131A: Organochlorine Pesticides - Continued								
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	----	----	----	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	----	----	----	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	----	----	----	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	----	----	----	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	----	----	----	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	----	----	<0.25
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	----	----	----	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	----	----	----	<5.0
Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	----	----	----	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	----	----	----	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	----	----	----	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	----	----	----	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	----	----	----	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	----	----	----	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	----	----	----	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<5	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<5	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<5	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	8	5	5	5	<4
Anthracene	120-12-7	4	µg/kg	<5	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<5	<4	<4	<4	<4
Pyrene	129-00-0	4	µg/kg	<5	<4	<4	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<5	<4	<4	<4	5
Chrysene	218-01-9	4	µg/kg	6	<4	<4	4	5
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<5	<4	<4	<4	9
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<5	<4	<4	<4	8
Benzo(e)pyrene	192-97-2	4	µg/kg	<5	<4	<4	<4	7
Benzo(a)pyrene	50-32-8	4	µg/kg	<5	<4	<4	<4	10
Perylene	198-55-0	4	µg/kg	<5	<4	<4	<4	5
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<5	<4	<4	<4	8
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<5	<4	<4	<4	<4
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<5	<4	<4	<4	5
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				W14 0-0.5	W13 0-0.5	W12 0-0.5	W11 0-0.5	IB3 0-0.5
				05-MAY-2010 15:00	05-MAY-2010 15:00	05-MAY-2010 15:00	05-MAY-2010 15:00	04-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008497-001	ES1008497-002	ES1008497-003	ES1008497-004	ES1008497-005
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Sum of PAHs	----	4	µg/kg	14	5	5	9	62
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	109	----	----	----	108
Toluene-D8	2037-26-5	0.1	%	105	----	----	----	102
4-Bromofluorobenzene	460-00-4	0.1	%	106	----	----	----	103
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	84.2	85.2	53.7	96.1	69.3
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	67.8	----	----	----	61.4
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	62.9	----	----	----	64.9
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	53.7	----	----	----	55.2
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	108	112	108	119	110
Anthracene-d10	1719-06-8	0.1	%	118	114	114	103	118
4-Terphenyl-d14	1718-51-0	0.1	%	118	120	114	117	114



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

Sub-Matrix: SOIL				Client sample ID		IB3 0.5-1.0	IB3 1.0-1.2	----	----	----
Client sampling date / time				04-MAY-2010 15:00	04-MAY-2010 15:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1008497-006	ES1008497-007	----	----	----	----	----
EA055: Moisture Content										
^ Moisture Content (dried @ 103°C)	----	1.0	%	23.0	21.5	----	----	----	----	----
EG005-SD: Total Metals in Sediments by ICP-AES										
Aluminium	7429-90-5	50	mg/kg	2440	2190	----	----	----	----	----
Iron	7439-89-6	50	mg/kg	10400	11000	----	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS										
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	----	----	----	----	----
Arsenic	7440-38-2	1.00	mg/kg	12.5	14.1	----	----	----	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	----	----	----	----	----
Chromium	7440-47-3	1.0	mg/kg	5.3	6.0	----	----	----	----	----
Copper	7440-50-8	1.0	mg/kg	3.2	3.1	----	----	----	----	----
Cobalt	7440-48-4	0.5	mg/kg	9.1	7.2	----	----	----	----	----
Lead	7439-92-1	1.0	mg/kg	2.3	2.1	----	----	----	----	----
Manganese	7439-96-5	10	mg/kg	1040	692	----	----	----	----	----
Nickel	7440-02-0	1.0	mg/kg	5.0	3.8	----	----	----	----	----
Selenium	7782-49-2	0.1	mg/kg	0.2	0.3	----	----	----	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	----	----	----	----	----
Vanadium	7440-62-2	2.0	mg/kg	26.6	27.7	----	----	----	----	----
Zinc	7440-66-6	1.0	mg/kg	8.8	7.4	----	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS										
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	----	----	----	----	----
EK055: Ammonia as N										
Ammonia as N	7664-41-7	1	mg/kg	<1	<1	----	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser										
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser										
^ Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	----	----	----	----	----
EK059G: NOX as N by Discrete Analyser										
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	----	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser										
Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	20	----	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser										
Total Phosphorus as P	----	2	mg/kg	225	157	----	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser										
Reactive Phosphorus as P	----	0.1	mg/kg	0.2	0.3	----	----	----	----	----
EP005: Total Organic Carbon (TOC)										



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

Sub-Matrix: SOIL			Client sample ID	IB3 0.5-1.0	IB3 1.0-1.2	----	----	----
Client sampling date / time				04-MAY-2010 15:00	04-MAY-2010 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1008497-006	ES1008497-007	----	----	----
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	0.02	%	0.19	0.25	----	----	----
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	<3	----	----	----
C10 - C14 Fraction	----	3	mg/kg	<3	<3	----	----	----
C15 - C28 Fraction	----	3	mg/kg	3	<3	----	----	----
C29 - C36 Fraction	----	5	mg/kg	<5	<5	----	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	3	----	----	----	----
C10 - C36 Fraction (sum)	----	3	mg/kg	----	<3	----	----	----
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	----	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	----	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	----	----	----
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	----	----	----
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	----	----	----
Carbophenothion	786-19-6	10	µg/kg	<10	<10	----	----	----
Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	<10.0	----	----	----
Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	<10	----	----	----
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	----	----	----
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	----	----	----
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	----	----	----
Diazinon	333-41-5	10	µg/kg	<10	<10	----	----	----
Dichlorvos	62-73-7	10	µg/kg	<10	<10	----	----	----
Dimethoate	60-51-5	10	µg/kg	<10	<10	----	----	----
Ethion	563-12-2	10	µg/kg	<10	<10	----	----	----
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	----	----	----
Fenthion	55-38-9	10	µg/kg	<10	<10	----	----	----
Malathion	121-75-5	10	µg/kg	<10	<10	----	----	----
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	----	----	----
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	----	----	----
Parathion	56-38-2	10	µg/kg	<10	<10	----	----	----
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	----	----	----
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	----	----	----
Prothiofos	34643-46-4	10	µg/kg	<10	<10	----	----	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	IB3 0.5-1.0	IB3 1.0-1.2	----	----	----
				04-MAY-2010 15:00	04-MAY-2010 15:00	----	----	----
				ES1008497-006	ES1008497-007	----	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	----	----	----
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	----	----	----
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	----	----	----
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	----	----	----
4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	----	----	----
4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	----	----	----
4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	----	----	----
^ DDT (total)	----	0.50	µg/kg	<0.50	<0.50	----	----	----
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	----	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	----	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	----	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	----	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	----	----	----
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	----	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	----	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	----	----	----
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	----	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	----	----	----
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	----	----	----
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	----	----	----
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	----	----	----
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	----	----	----
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	----	----	----
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	----	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	----	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	----	----	----



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	IB3 0.5-1.0	IB3 1.0-1.2	----	----	----
				04-MAY-2010 15:00	04-MAY-2010 15:00	----	----	----
				ES1008497-006	ES1008497-007	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	----	----	----
Acenaphthene	83-32-9	4	µg/kg	<4	<4	----	----	----
Fluorene	86-73-7	4	µg/kg	<4	<4	----	----	----
Phenanthrene	85-01-8	4	µg/kg	<4	<4	----	----	----
Anthracene	120-12-7	4	µg/kg	<4	<4	----	----	----
Fluoranthene	206-44-0	4	µg/kg	<4	<4	----	----	----
Pyrene	129-00-0	4	µg/kg	<4	<4	----	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	----	----	----
Chrysene	218-01-9	4	µg/kg	<4	<4	----	----	----
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	----	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	----	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	----	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	----	----	----
Perylene	198-55-0	4	µg/kg	<4	<4	----	----	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	----	----	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	----	----	----
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	<4	----	----	----
Coronene	191-07-1	5	µg/kg	<5	<5	----	----	----
^ Sum of PAHs	----	4	µg/kg	<4	<4	----	----	----
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	108	112	----	----	----
Toluene-D8	2037-26-5	0.1	%	93.2	114	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	95.4	116	----	----	----
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	80.4	85.6	----	----	----
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	61.2	73.9	----	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	58.6	59.0	----	----	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	55.4	53.7	----	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	101	115	----	----	----
Anthracene-d10	1719-06-8	0.1	%	108	110	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	119	119	----	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080-SD: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	67	137
Toluene-D8	2037-26-5	74	134
4-Bromofluorobenzene	460-00-4	73	137
EP090S: Organotin Surrogate			
Tripopyltin	----	34	108
EP130S: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	51.3	136.9
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	136
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	164
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	30	115
Anthracene-d10	1719-06-8	27	133
4-Terphenyl-d14	1718-51-0	18	137



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1008497	Page	: 1 of 15
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: NAGD - Asia Pacific LNG 301001-00448	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: GLADSTONE-APLNG DOWNSTREAM		
C-O-C number	: ----	Date Samples Received	: 05-MAY-2010
Sampler	: VSK	Issue Date	: 21-MAY-2010
Order number	: ----		
Quote number	: BN/187/10	No. of samples received	: 7
		No. of samples analysed	: 7

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

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



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

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>
Alex Rossi	Organic Chemist	Organics
Ankit Joshi	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Dianne Blane	Laboratory Supervisor	Newcastle
Kim McCabe	Senior Inorganic Chemist	Stafford Minerals - AY
Pabi Subba	Senior Organic Chemist	Inorganics
Sarah Ashworth	Organic Chemist	Organics



General Comments

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

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

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

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

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 1337217)									
ES1008490-049	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	5.4	5.6	3.4	No Limit
EA055: Moisture Content (QC Lot: 1338578)									
EM1004791-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	28.7	29.0	0.9	0% - 20%
ES1008497-001	W14 0-0.5	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	51.7	50.5	2.5	0% - 20%
EG005-SD: Total Metals in Sediments by ICP-AES (QC Lot: 1338286)									
ES1008369-011	Anonymous	EG005-SD: Aluminium	7429-90-5	50	mg/kg	2440	2890	16.8	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	8240	9290	12.0	0% - 20%
ES1008494-007	Anonymous	EG005-SD: Aluminium	7429-90-5	50	mg/kg	26900	27900	3.5	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	36100	38300	5.8	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1338285)									
ES1008369-011	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.3	0.3	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	4.9	6.0	19.0	0% - 50%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	6.6	7.5	12.3	No Limit
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	3.4	3.9	14.7	No Limit
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	2.4	2.1	11.5	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	3.1	4.0	26.0	No Limit
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	7.2	8.8	19.8	No Limit
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	9.66	7.31	27.6	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	1220	811	# 40.5	0% - 20%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	20.4	22.5	10.0	0% - 50%
ES1008494-007	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.9	0.9	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	15.8	14.7	7.2	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	33.8	34.2	1.2	0% - 20%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	28.9	33.4	14.2	0% - 20%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	10.8	11.5	5.8	0% - 50%
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	19.0	18.6	2.3	0% - 50%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	60.0	64.2	6.7	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	10.2	7.65	28.5	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	175	175	0.0	0% - 50%

Page : 5 of 15
 Work Order : ES1008497
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : NAGD - Asia Pacific LNG 301001-00448



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 (%)
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1338285) - continued									
ES1008494-007	Anonymous	EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	74.7	79.7	6.5	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1338284)									
ES1008369-011	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
ES1008494-007	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.0	No Limit
EK055: Ammonia as N (QC Lot: 1342140)									
ES1008369-007	Anonymous	EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	<1	0.0	No Limit
ES1008688-008	Anonymous	EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	<1	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1341591)									
ES1008369-003	Anonymous	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1008494-007	Anonymous	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EK059G: NOX as N by Discrete Analyser (QC Lot: 1341592)									
ES1008369-003	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1008494-007	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1338782)									
ES1008494-005	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	1080	990	8.6	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1340062)									
ES1008369-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	110	130	18.2	No Limit
ES1008624-013	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	1660	1480	11.6	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1338781)									
ES1008494-005	Anonymous	EK067G: Total Phosphorus as P	----	2	mg/kg	448	439	2.0	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1340063)									
ES1008369-003	Anonymous	EK067G: Total Phosphorus as P	----	2	mg/kg	145	144	0.0	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1341593)									
ES1008369-003	Anonymous	EK071G: Reactive Phosphorus as P	----	0.1	mg/kg	0.2	0.6	86.2	No Limit
ES1008494-007	Anonymous	EK071G: Reactive Phosphorus as P	----	0.1	mg/kg	1.1	1.1	0.0	0% - 50%
EP005: Total Organic Carbon (TOC) (QC Lot: 1342780)									
ES1008497-001	W14 0-0.5	EP005: Total Organic Carbon	----	0.02	%	0.65	0.69	5.7	0% - 20%
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1337042)									
ES1008494-005	Anonymous	EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1337055)									
ES1008494-005	Anonymous	EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C15 - C28 Fraction	----	3	mg/kg	6	10	48.3	No Limit
		EP071-SD: C29 - C36 Fraction	----	5	mg/kg	8	9	0.0	No Limit
EP080-SD: BTEX (QC Lot: 1337042)									
ES1008494-005	Anonymous	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.0	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-SD: BTEX (QC Lot: 1337042) - continued									
ES1008494-005	Anonymous	EP080-SD: meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP090: Organotin Compounds (QC Lot: 1342587)									
ES1008369-010	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
ES1008494-007	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
EP130A: Organophosphorus Pesticides (Ultra-trace) (QC Lot: 1337049)									
ES1008494-005	Anonymous	EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	<10.0	0.0	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 1337050)									
ES1008494-005	Anonymous	EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit



Sub-Matrix: **SOIL**

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 (%)
EP131A: Organochlorine Pesticides (QC Lot: 1337050) - continued									
ES1008494-005	Anonymous	EP131A: DDT (total)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
EP131A: Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit		
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1337051)									
ES1008494-005	Anonymous	EP131B: Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1337054)									
ES1008494-005	Anonymous	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	11	13	17.1	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	10	9	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	11	9	21.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	5	7	30.7	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	6	6	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	7	8	17.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	5	<5	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<5	<5	0.0	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 (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1337054) - continued									
ES1008494-005	Anonymous	EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	55	52	5.6	0% - 50%
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit
ES1008497-004	W11 0-0.5	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	5	5	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	4	4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	9	9	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit



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

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

Sub-Matrix: **SOIL**

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				
EG005-SD: Total Metals in Sediments by ICP-AES (QCLot: 1338286)								
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1338285)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	109	70	130
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	96.1	70	130
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	97.1	70	130
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	96.0	70	130
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	105	70	130
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	90.0	70	130
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	93.1	70	130
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	102	70	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	109	70	130
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	50 mg/kg	101	70	130
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	97.1	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1338284)								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	87.5	74.2	126
EK055: Ammonia as N (QCLot: 1342140)								
EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	25 mg/kg	86.2	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1341591)								
EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	4.8 mg/kg	99.3	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1341592)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	4.8 mg/kg	117	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1338782)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	1000 mg/kg	119	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1340062)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	1000 mg/kg	78.2	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1338781)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	442 mg/kg	105	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1340063)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	442 mg/kg	93.5	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1341593)								



Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1341593) - continued								
EK071G: Reactive Phosphorus as P	----	0.1	mg/kg	<0.1	2.5 mg/kg	102	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1342780)								
EP005: Total Organic Carbon	----	0.02	%	<0.02	100 %	99.0	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1337042)								
EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	26 mg/kg	121	68.4	128
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1337055)								
EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	5 mg/kg	113	75.2	116
EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	5 mg/kg	86.0	75.3	113
EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	5 mg/kg	85.0	72.6	117
EP080-SD: BTEX (QCLot: 1337042)								
EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	81.2	67.5	125
EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	1 mg/kg	110	69	122
EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	1 mg/kg	112	65.3	126
EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	2 mg/kg	114	66.5	124
	106-42-3							
EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	1 mg/kg	98.6	66.7	123
EP090: Organotin Compounds (QCLot: 1342587)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	98.0	19.5	129
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 1337049)								
EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	50 µg/kg	93.8	36.9	142
EP130: Carbophenothion	786-19-6	10	µg/kg	<10	50 µg/kg	76.9	0.5	157
EP130: Chlorfenvinphos (E)	470-90-6	10	µg/kg	<10.0	5 µg/kg	102	50.3	137
EP130: Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	50 µg/kg	104	55.9	152
EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	50 µg/kg	93.7	49	140
EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	50 µg/kg	83.3	28.1	142
EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	50 µg/kg	93.1	36.6	172
EP130: Diazinon	333-41-5	10	µg/kg	<10	50 µg/kg	98.2	37.2	148
EP130: Dichlorvos	62-73-7	10	µg/kg	<10	50 µg/kg	100	32.7	153
EP130: Dimethoate	60-51-5	10	µg/kg	<10	50 µg/kg	97.8	33.2	150
EP130: Ethion	563-12-2	10	µg/kg	<10	50 µg/kg	108	44	146
EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	50 µg/kg	62.8	3.08	162
EP130: Fenthion	55-38-9	10	µg/kg	<10	50 µg/kg	90.4	10.6	157
EP130: Malathion	121-75-5	10	µg/kg	<10	50 µg/kg	114	38.1	143
EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	50 µg/kg	85.5	8.13	159
EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	50 µg/kg	137	19.7	176
EP130: Parathion	56-38-2	10	µg/kg	<10	50 µg/kg	103	39.2	145
EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	50 µg/kg	86.9	23.5	152
EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	50 µg/kg	93.3	47.1	141



Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 1337049) - continued								
EP130: Prothiofos	34643-46-4	10	µg/kg	<10	50 µg/kg	104	36.1	148
EP131A: Organochlorine Pesticides (QCLot: 1337050)								
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	73.5	31.7	140
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	87.0	24.5	150
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	102	36.9	139
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	121	38.2	137
EP131A: 4,4'-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	100	42.5	141
EP131A: 4,4'-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	96.2	34.8	140
EP131A: 4,4'-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	97.7	38	143
EP131A: DDT (total)	----	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	66.1	43.2	134
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	86.8	23.7	139
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	96.1	35.8	138
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	114	7.45	158
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	104	21.6	162
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	63.9	19.3	131
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	97.6	17.9	141
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	111	31	153
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	86.1	34.3	138
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	70.8	18.6	146
EP131A: gamma-BHC	58-89-9	0.5	µg/kg	<0.50	5 µg/kg	92.0	30.7	145
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	114	15	157
EP131A: cis-Chlordane	5103-71-9	0.5	µg/kg	<0.50	5 µg/kg	80.4	22.3	145
EP131A: trans-Chlordane	5103-74-2	0.5	µg/kg	<0.50	5 µg/kg	88.1	42.4	139
EP131A: Total Chlordane (sum)	----	0.5	µg/kg	<0.50	----	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1337051)								
EP131B: Total Polychlorinated biphenyls	----	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1016	12974-11-2	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	50 µg/kg	110	61.3	121
EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1337054)								
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	104	----	----
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	102	----	----
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	115	----	----

Page : 12 of 15
 Work Order : ES1008497
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : NAGD - Asia Pacific LNG 301001-00448



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				
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1337054) - continued								
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	97.1	----	----
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	118	----	----
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	93.2	----	----
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	94.7	----	----
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	116	----	----
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	104	----	----
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	110	----	----
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	109	----	----
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	107	----	----
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	101	----	----
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	87.6	----	----
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	114	----	----
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	90.8	----	----
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	84.6	----	----
EP132B-SD: Indeno(1,2,3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	81.1	----	----
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	73.0	----	----
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----



Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1338285)							
ES1008369-012	Anonymous	EG020-SD: Arsenic	7440-38-2	50 mg/kg	104	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	98.0	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	96.8	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	87.2	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	86.4	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	100	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	92.7	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1338284)							
ES1008369-011	Anonymous	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	83.9	70	130
EK055: Ammonia as N (QCLot: 1342140)							
ES1008369-007	Anonymous	EK055-SD: Ammonia as N	7664-41-7	25 mg/kg	83.4	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1341591)							
ES1008369-003	Anonymous	EK057G: Nitrite as N (Sol.)	----	3.0 mg/kg	99.2	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1341592)							
ES1008369-003	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	3.0 mg/kg	111	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1338782)							
ES1008494-005	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	89.4	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1340062)							
ES1008369-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	99.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1338781)							
ES1008494-005	Anonymous	EK067G: Total Phosphorus as P	----	100 mg/kg	# 48.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1340063)							
ES1008369-003	Anonymous	EK067G: Total Phosphorus as P	----	100 mg/kg	105	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1341593)							
ES1008369-003	Anonymous	EK071G: Reactive Phosphorus as P	----	2.5 mg/kg	100	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1337042)							
ES1008494-005	Anonymous	EP080-SD: C6 - C9 Fraction	----	26 mg/kg	116	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1337055)							
ES1008494-005	Anonymous	EP071-SD: C10 - C14 Fraction	----	19.75 mg/kg	76.2	70	130
		EP071-SD: C15 - C28 Fraction	----	87.25 mg/kg	75.4	70	130
		EP071-SD: C29 - C36 Fraction	----	60 mg/kg	103	70	130
EP080-SD: BTEX (QCLot: 1337042)							



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EP080-SD: BTEX (QCLot: 1337042) - continued							
ES1008494-005	Anonymous	EP080-SD: Benzene	71-43-2	2.5 mg/kg	110	70	130
		EP080-SD: Toluene	108-88-3	2.5 mg/kg	91.9	70	130
		EP080-SD: Ethylbenzene	100-41-4	2.5 mg/kg	103	70	130
		EP080-SD: meta- & para-Xylene	108-38-3	2.5 mg/kg	89.3	70	130
			106-42-3				
	EP080-SD: ortho-Xylene	95-47-6	2.5 mg/kg	91.4	70	130	
EP090: Organotin Compounds (QCLot: 1342587)							
ES1008369-011	Anonymous	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	108	20	130
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 1337049)							
ES1008494-005	Anonymous	EP130: Bromophos-ethyl	4824-78-6	50 µg/kg	40.2	36.9	142
		EP130: Carbophenothion	786-19-6	50 µg/kg	51.6	0.5	157
		EP130: Chlorfenvinphos (E)	470-90-6	5 µg/kg	56.0	50.3	137
		EP130: Chlorfenvinphos (Z)	470-90-8	50 µg/kg	72.9	55.9	152
		EP130: Chlorpyrifos	2921-88-2	50 µg/kg	# 42.0	49	140
		EP130: Chlorpyrifos-methyl	5598-13-0	50 µg/kg	43.2	28.1	142
		EP130: Demeton-S-methyl	919-86-8	50 µg/kg	52.2	36.6	172
		EP130: Diazinon	333-41-5	50 µg/kg	49.4	37.2	148
		EP130: Dichlorvos	62-73-7	50 µg/kg	50.0	32.7	153
		EP130: Dimethoate	60-51-5	50 µg/kg	64.2	33.2	150
		EP130: Ethion	563-12-2	50 µg/kg	# 39.4	44	146
		EP130: Fenamiphos	22224-92-6	50 µg/kg	44.1	3.08	162
		EP130: Fenthion	55-38-9	50 µg/kg	42.6	10.6	157
		EP130: Malathion	121-75-5	50 µg/kg	62.5	38.1	143
		EP130: Azinphos Methyl	86-50-0	50 µg/kg	51.4	8.13	159
		EP130: Monocrotophos	6923-22-4	50 µg/kg	63.5	19.7	176
		EP130: Parathion	56-38-2	50 µg/kg	42.5	39.2	145
		EP130: Parathion-methyl	298-00-0	50 µg/kg	40.8	23.5	152
		EP130: Pirimphos-ethyl	23505-41-1	50 µg/kg	# 36.4	47.1	141
			EP130: Prothiofos	34643-46-4	50 µg/kg	43.7	36.1
EP131A: Organochlorine Pesticides (QCLot: 1337050)							
ES1008494-005	Anonymous	EP131A: Aldrin	309-00-2	5 µg/kg	# 27.9	31.7	140
		EP131A: alpha-BHC	319-84-6	5 µg/kg	29.2	24.5	150
		EP131A: beta-BHC	319-85-7	5 µg/kg	# 30.2	36.9	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	# 37.6	38.2	137
		EP131A: 4,4`-DDD	72-54-8	5 µg/kg	# 36.8	42.5	141
		EP131A: 4,4`-DDE	72-55-9	5 µg/kg	44.9	34.8	140
		EP131A: 4,4`-DDT	50-29-3	5 µg/kg	# 36.7	38	143
		EP131A: Dieldrin	60-57-1	5 µg/kg	# 39.5	43.2	134



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EP131A: Organochlorine Pesticides (QCLot: 1337050) - continued							
ES1008494-005	Anonymous	EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	41.7	23.7	139
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	41.2	35.8	138
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	46.6	7.45	158
		EP131A: Endrin	72-20-8	5 µg/kg	45.7	21.6	162
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	43.2	19.3	131
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	48.2	17.9	141
		EP131A: Heptachlor	76-44-8	5 µg/kg	37.6	31	153
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	# 32.1	34.3	138
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	34.2	18.6	146
		EP131A: gamma-BHC	58-89-9	5 µg/kg	34.0	30.7	145
		EP131A: Methoxychlor	72-43-5	5 µg/kg	57.3	15	157
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	27.7	22.3	145
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	# 36.9	42.4	139
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1337051)							
ES1008494-005	Anonymous	EP131B: Aroclor 1254	11097-69-1	50 µg/kg	# 40.9	61.3	121
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1337054)							
ES1008494-005	Anonymous	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	89.0	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	105	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	98.8	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	92.6	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	84.6	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	# 65.4	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	106	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	82.6	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	76.0	70	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	92.9	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	82.8	70	130
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	91.3	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	81.5	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	71.2	70	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	91.7	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	100	70	130
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	95.9	70	130
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	25 µg/kg	93.5	70	130
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	25 µg/kg	87.9	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	108	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1008497	Page	: 1 of 11
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: NAGD - Asia Pacific LNG 301001-00448	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: GLADSTONE-APLNG DOWNSTREAM		
C-O-C number	: ----	Date Samples Received	: 05-MAY-2010
Sampler	: VSK	Issue Date	: 21-MAY-2010
Order number	: ----		
Quote number	: BN/187/10	No. of samples received	: 7
		No. of samples analysed	: 7

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

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 IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0,	04-MAY-2010	----	----	----	07-MAY-2010	11-MAY-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5, W12 - 0-0.5,	W13 - 0-0.5, W11 - 0-0.5	05-MAY-2010	----	----	----	10-MAY-2010	12-MAY-2010	✓
EA150: Particle Sizing								
Snap Lock Bag W14 - 0-0.5, W12 - 0-0.5,	W13 - 0-0.5, W11 - 0-0.5	05-MAY-2010	---	---	----	19-MAY-2010	01-NOV-2010	✓
EA150: Soil Classification based on Particle Size								
Snap Lock Bag W14 - 0-0.5, W12 - 0-0.5,	W13 - 0-0.5, W11 - 0-0.5	05-MAY-2010	---	---	----	19-MAY-2010	01-NOV-2010	✓
EG005-SD: Total Metals in Sediments by ICP-AES								
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0,	04-MAY-2010	09-MAY-2010	01-JUN-2010	✓	10-MAY-2010	31-OCT-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5, W12 - 0-0.5,	W13 - 0-0.5, W11 - 0-0.5	05-MAY-2010	09-MAY-2010	02-JUN-2010	✓	10-MAY-2010	01-NOV-2010	✓
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0,	04-MAY-2010	09-MAY-2010	01-JUN-2010	✓	10-MAY-2010	31-OCT-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5, W12 - 0-0.5,	W13 - 0-0.5, W11 - 0-0.5	05-MAY-2010	09-MAY-2010	02-JUN-2010	✓	10-MAY-2010	01-NOV-2010	✓



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
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0,	04-MAY-2010	09-MAY-2010	01-JUN-2010	✓	11-MAY-2010	01-JUN-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5, W12 - 0-0.5,	W13 - 0-0.5, W11 - 0-0.5	05-MAY-2010	09-MAY-2010	02-JUN-2010	✓	11-MAY-2010	02-JUN-2010	✓
EK055: Ammonia as N								
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0,	04-MAY-2010	----	----	----	12-MAY-2010	31-OCT-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5		05-MAY-2010	----	----	----	12-MAY-2010	01-NOV-2010	✓
EK057G: Nitrite as N by Discrete Analyser								
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0,	04-MAY-2010	12-MAY-2010	31-OCT-2010	✓	12-MAY-2010	31-OCT-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5		05-MAY-2010	12-MAY-2010	01-NOV-2010	✓	12-MAY-2010	01-NOV-2010	✓
EK059G: NOx as N by Discrete Analyser								
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0,	04-MAY-2010	12-MAY-2010	31-OCT-2010	✓	12-MAY-2010	31-OCT-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5		05-MAY-2010	12-MAY-2010	01-NOV-2010	✓	12-MAY-2010	01-NOV-2010	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Soil Glass Jar - Unpreserved IB3 - 0-0.5		04-MAY-2010	10-MAY-2010	31-OCT-2010	✓	10-MAY-2010	31-OCT-2010	✓
Soil Glass Jar - Unpreserved IB3 - 0.5-1.0,	IB3 - 1.0-1.2	04-MAY-2010	11-MAY-2010	31-OCT-2010	✓	11-MAY-2010	31-OCT-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5		05-MAY-2010	10-MAY-2010	01-NOV-2010	✓	10-MAY-2010	01-NOV-2010	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Soil Glass Jar - Unpreserved IB3 - 0-0.5		04-MAY-2010	10-MAY-2010	31-OCT-2010	✓	10-MAY-2010	31-OCT-2010	✓
Soil Glass Jar - Unpreserved IB3 - 0.5-1.0,	IB3 - 1.0-1.2	04-MAY-2010	11-MAY-2010	31-OCT-2010	✓	11-MAY-2010	31-OCT-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5		05-MAY-2010	10-MAY-2010	01-NOV-2010	✓	10-MAY-2010	01-NOV-2010	✓



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
EK071G: Reactive Phosphorus as P by discrete analyser							
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0, 04-MAY-2010	12-MAY-2010	31-OCT-2010	✓	12-MAY-2010	31-OCT-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5	05-MAY-2010	12-MAY-2010	01-NOV-2010	✓	12-MAY-2010	01-NOV-2010	✓
EP005: Total Organic Carbon (TOC)							
Pulp Bag IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0, 04-MAY-2010	12-MAY-2010	---	----	17-MAY-2010	01-JUN-2010	✓
Pulp Bag W14 - 0-0.5, W12 - 0-0.5,	W13 - 0-0.5, W11 - 0-0.5, 05-MAY-2010	12-MAY-2010	---	----	17-MAY-2010	02-JUN-2010	✓
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0, 04-MAY-2010	07-MAY-2010	18-MAY-2010	✓	08-MAY-2010	18-MAY-2010	✓
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0, 04-MAY-2010	07-MAY-2010	18-MAY-2010	✓	11-MAY-2010	16-JUN-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5	05-MAY-2010	07-MAY-2010	19-MAY-2010	✓	08-MAY-2010	19-MAY-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5	05-MAY-2010	07-MAY-2010	19-MAY-2010	✓	11-MAY-2010	16-JUN-2010	✓
EP080-SD: BTEX							
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0, 04-MAY-2010	07-MAY-2010	18-MAY-2010	✓	08-MAY-2010	18-MAY-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5	05-MAY-2010	07-MAY-2010	19-MAY-2010	✓	08-MAY-2010	19-MAY-2010	✓
EP090: Organotin Compounds							
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0, 04-MAY-2010	12-MAY-2010	18-MAY-2010	✓	14-MAY-2010	21-JUN-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5, W12 - 0-0.5,	W13 - 0-0.5, W11 - 0-0.5, 05-MAY-2010	12-MAY-2010	19-MAY-2010	✓	14-MAY-2010	21-JUN-2010	✓



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	
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0,	04-MAY-2010	07-MAY-2010	18-MAY-2010	✓	12-MAY-2010	16-JUN-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5		05-MAY-2010	07-MAY-2010	19-MAY-2010	✓	12-MAY-2010	16-JUN-2010	✓
EP131A: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0,	04-MAY-2010	07-MAY-2010	18-MAY-2010	✓	12-MAY-2010	16-JUN-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5		05-MAY-2010	07-MAY-2010	19-MAY-2010	✓	12-MAY-2010	16-JUN-2010	✓
EP131B: Polychlorinated Biphenyls (as Aroclors)								
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0,	04-MAY-2010	07-MAY-2010	18-MAY-2010	✓	12-MAY-2010	16-JUN-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5		05-MAY-2010	07-MAY-2010	19-MAY-2010	✓	12-MAY-2010	16-JUN-2010	✓
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved IB3 - 0-0.5, IB3 - 1.0-1.2	IB3 - 0.5-1.0,	04-MAY-2010	07-MAY-2010	18-MAY-2010	✓	13-MAY-2010	16-JUN-2010	✓
Soil Glass Jar - Unpreserved W14 - 0-0.5, W12 - 0-0.5,	W13 - 0-0.5, W11 - 0-0.5	05-MAY-2010	07-MAY-2010	19-MAY-2010	✓	13-MAY-2010	16-JUN-2010	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	3	28	10.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	2	14	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	14	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	2	14	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	3	17	17.6	9.5	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	2	14	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	17	11.8	4.8	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	2	14	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



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 Control Samples (LCS) - Continued							
TPH - Semivolatile Fraction	EP071-SD	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	17	11.8	4.8	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	2	14	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	1	20	5.0	5.0	✓	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	18	5.6	5.0	✓	ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	14	7.1	5.0	✓	ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	7	14.3	5.0	✓	ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	7	14.3	5.0	✓	ALS QCS3 requirement
Organotin Analysis	EP090	1	18	5.6	5.0	✓	ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	14	7.1	5.0	✓	ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	7	14.3	5.0	✓	ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	14	7.1	5.0	✓	ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	17	11.8	4.8	✓	ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	18	5.6	5.0	✓	ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	18	5.6	5.0	✓	ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	2	14	14.3	5.0	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	7	14.3	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	8	12.5	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Particle Size Analysis (Sieving)	EA150	SOIL	Particle Size Analysis by Sieving according to AS1289.3.6.1 - 1995
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Total Fe and Al in Sediments by ICPAES	EG005-SD	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3). LORs per NODG
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 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 (1999) Schedule B(3)
Buchi Ammonia - Low-Level in Sediment	EK055-SD	SOIL	APHA 21st ed., 4500 NH ₃ +B&G, H Samples are steam distilled (Buchi) prior to analysis and quantified using titrimetric determination.
Nitrite as N - Soluble by Discrete Analyser	EK057G	SOIL	APHA 21st ed., 4500 NO ₃ - B. Nitrite in a water extract is determined by direct colourimetry by Discrete Analyser.
Nitrate as N - Soluble by Discrete Analyser	EK058G	SOIL	APHA 21st ed., 4500 NO ₃ --F. Nitrate in the 1:5 soil:water extract is reduced to nitrite by way of a cadmium reduction column followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results.
Nitrite and Nitrate as N (NO _x)- Soluble by Discrete Analyser	EK059G	SOIL	APHA 21st ed., 4500 NO ₃ - F. Combined oxidised Nitrogen (NO ₂ +NO ₃) in a water extract is determined by Cadmium Reduction, and direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	APHA 21st ed., 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Phosphorus By Discrete Analyser	EK067G	SOIL	APHA 21st ed., 4500 P-B&F This procedure involves sulfuric acid digestion and quantification using Discrete Analyser.
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	SOIL	APHA 21st ed., 4500 P-F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2



Analytical Methods	Method	Matrix	Method Descriptions
Total Organic Carbon	EP005	SOIL	In-house. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
TPH - Semivolatile Fraction	EP071-SD	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504)
TPH Volatiles/BTEX in Sediments	EP080-SD	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Organotin Analysis	EP090	SOIL	(USEPA SW 846 - 8270D) Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quantified against an established calibration curve.
Organophosphorus Pesticides (Ultra-trace)	EP130	SOIL	USEPA Method 3640 (GPC cleanup), 8141 (GC/FPD - Capillary Column) This technique is compliant with NEPM (1999) Schedule B(3) (Method 505)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	USEPA Method 3640 (GPC cleanup), 3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PCB's (Ultra-trace)	EP131B	SOIL	USEPA Method 3640 (GPC cleanup), 3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.
Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	SOIL	APHA 21st ed., 4500 Norg- D; APHA 21st ed., 4500 P - H. Macro Kjeldahl digestion.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. 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 (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids/ Sample Cleanup	ORG17A-UTP	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na ₂ SO ₄ and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.
Organotin Sample Preparation	ORG35	SOIL	In house. 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG020-SD: Total Metals in Sediments by ICPMS	ES1008369-011	Anonymous	Manganese	7439-96-5	40.5 %	0-20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
EK067G: Total Phosphorus as P by Discrete Analyser	ES1008494-005	Anonymous	Total Phosphorus as P	----	48.0 %	70-130%	Recovery less than lower data quality objective
EP130A: Organophosphorus Pesticides (Ultra-trace)	ES1008494-005	Anonymous	Chlorpyrifos	2921-88-2	42.0 %	49-140%	Recovery less than lower data quality objective
EP130A: Organophosphorus Pesticides (Ultra-trace)	ES1008494-005	Anonymous	Ethion	563-12-2	39.4 %	44-146%	Recovery less than lower data quality objective
EP130A: Organophosphorus Pesticides (Ultra-trace)	ES1008494-005	Anonymous	Pirimphos-ethyl	23505-41-1	36.4 %	47.1-141%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008494-005	Anonymous	Aldrin	309-00-2	27.9 %	31.7-140%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008494-005	Anonymous	beta-BHC	319-85-7	30.2 %	36.9-139%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008494-005	Anonymous	delta-BHC	319-86-8	37.6 %	38.2-137%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008494-005	Anonymous	4,4'-DDD	72-54-8	36.8 %	42.5-141%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008494-005	Anonymous	4,4'-DDT	50-29-3	36.7 %	38-143%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008494-005	Anonymous	Dieldrin	60-57-1	39.5 %	43.2-134%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008494-005	Anonymous	Heptachlor epoxide	1024-57-3	32.1 %	34.3-138%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1008494-005	Anonymous	trans-Chlordane	5103-74-2	36.9 %	42.4-139%	Recovery less than lower data quality objective
EP131B: Polychlorinated Biphenyls (as Aroclors)	ES1008494-005	Anonymous	Aroclor 1254	11097-69-1	40.9 %	61.3-121%	Recovery less than lower data quality objective
EP132B: Polynuclear Aromatic Hydrocarbons	ES1008494-005	Anonymous	Phenanthrene	85-01-8	65.4 %	70-130%	Recovery less than lower data quality objective

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Laboratory Control outliers occur.



Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP132T: Base/Neutral Extractable Surrogates	ES1008497-004	W11 0-0.5	2-Fluorobiphenyl	321-60-8	119 %	30-115 %	Recovery greater than upper data quality objective
EP132T: Base/Neutral Extractable Surrogates	ES1008497-007	IB3 1.0-1.2	2-Fluorobiphenyl	321-60-8	115 %	30-115 %	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

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

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

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



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1008682	Page	: 1 of 8
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: 301001-00448	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 11-MAY-2010
C-O-C number	: ----	Issue Date	: 26-MAY-2010
Sampler	: ----	No. of samples received	: 10
Site	: ----	No. of samples analysed	: 10
Quote number	: BN/187/10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

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>
Alex Rossi	Organic Chemist	Organics
Ankit Joshi	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Dianne Blane	Laboratory Supervisor	Newcastle
Kim McCabe	Senior Inorganic Chemist	Stafford Minerals - AY
Sarah Ashworth	Organic Chemist	Organics
Victor Kedicioglu	Business Manager - NSW	Inorganics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

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

- **EG005SD: Poor precision was obtained for Iron on sample ES1008688 #11 due to sample heterogeneity**
- **EG020: LCS recovery for Silver falls outside ALS Dynamic Control Limit. However, it is within the acceptance criteria based on ALS DQO. No further action is required.**



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W6 0-0.5	W6 0.5-1.0	W6 1.0-2.0	W6 2.0-3.0	IB4 0-0.5
				06-MAY-2010 15:00	06-MAY-2010 15:00	06-MAY-2010 15:00	06-MAY-2010 15:00	06-MAY-2010 15:00
				ES1008682-001	ES1008682-002	ES1008682-003	ES1008682-004	ES1008682-005
EA150: Particle Sizing								
+75µm	----	1	%	42	36	35	14	----
+150µm	----	1	%	36	30	29	12	----
+300µm	----	1	%	30	18	22	10	----
+425µm	----	1	%	29	16	20	8	----
+600µm	----	1	%	28	14	18	6	----
+1180µm	----	1	%	25	11	15	4	----
+2.36mm	----	1	%	21	7	12	2	----
+4.75mm	----	1	%	18	4	10	<1	----
+9.5mm	----	1	%	16	2	6	<1	----
+19.0mm	----	1	%	15	<1	<1	<1	----
+37.5mm	----	1	%	<1	<1	<1	<1	----
+75.0mm	----	1	%	<1	<1	<1	<1	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	38.1	24.1	36.4	36.0	41.3
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	25	25	29	41	----
Silt (2-60 µm)	----	1	%	28	36	32	42	----
Sand (0.06-2.00 mm)	----	1	%	25	32	27	15	----
Gravel (>2mm)	----	1	%	22	7	12	2	----
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	----
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	11400	8960	12000	12000	12500
Iron	7439-89-6	50	mg/kg	21200	18700	25100	21100	28200
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	14.6	12.0	16.8	12.7	19.5
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	21.5	16.9	23.6	19.9	23.3
Copper	7440-50-8	1.0	mg/kg	16.1	13.8	19.5	17.6	16.8
Cobalt	7440-48-4	0.5	mg/kg	11.5	9.5	13.0	11.7	12.2
Lead	7439-92-1	1.0	mg/kg	7.7	6.5	8.5	7.7	8.7
Manganese	7439-96-5	10	mg/kg	233	212	305	276	163
Nickel	7440-02-0	1.0	mg/kg	10.5	8.0	10.6	9.5	11.7
Selenium	7782-49-2	0.1	mg/kg	0.5	0.5	0.6	0.6	0.6
Silver	7440-22-4	0.1	mg/kg	0.4	0.3	0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	45.2	33.2	51.6	38.1	68.3
Zinc	7440-66-6	1.0	mg/kg	30.8	24.2	33.0	30.1	32.0



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W6 0-0.5	W6 0.5-1.0	W6 1.0-2.0	W6 2.0-3.0	IB4 0-0.5
				06-MAY-2010 15:00	06-MAY-2010 15:00	06-MAY-2010 15:00	06-MAY-2010 15:00	06-MAY-2010 15:00
				ES1008682-001	ES1008682-002	ES1008682-003	ES1008682-004	ES1008682-005
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.02	0.01	0.02	0.01	0.01
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	1.05	1.14	1.49	0.66	0.89
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	5	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	5	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4
Perylene	198-55-0	4	µg/kg	<4	<4	5	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5
^ Sum of PAHs	----	4	µg/kg	<4	<4	15	<4	<4
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	97.6	76.8	93.9	74.8	86.2
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	80.6	106	101	72.0	100
Anthracene-d10	1719-06-8	0.1	%	114	89.6	98.9	114	115
4-Terphenyl-d14	1718-51-0	0.1	%	123	83.6	118	120	115



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W7 0-0.5	W7 0.5-1.0	W7 1.0-2.0	W8 0.0-0.5	W8 0.5-1.0
				06-MAY-2010 15:00	06-MAY-2010 15:00	06-MAY-2010 15:00	06-MAY-2010 15:00	06-MAY-2010 15:00
				ES1008682-006	ES1008682-007	ES1008682-008	ES1008682-009	ES1008682-010
EA150: Particle Sizing								
+75µm	----	1	%	48	41	41	44	54
+150µm	----	1	%	41	37	38	39	47
+300µm	----	1	%	36	25	30	21	33
+425µm	----	1	%	34	20	26	17	30
+600µm	----	1	%	32	17	23	15	28
+1180µm	----	1	%	29	14	18	12	23
+2.36mm	----	1	%	24	10	13	8	18
+4.75mm	----	1	%	20	6	6	5	13
+9.5mm	----	1	%	13	<1	<1	2	8
+19.0mm	----	1	%	13	<1	<1	2	8
+37.5mm	----	1	%	<1	<1	<1	<1	<1
+75.0mm	----	1	%	<1	<1	<1	<1	<1
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	34.8	35.2	33.1	41.9	34.9
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	24	31	27	25	28
Silt (2-60 µm)	----	1	%	22	26	31	30	16
Sand (0.06-2.00 mm)	----	1	%	30	33	29	38	39
Gravel (>2mm)	----	1	%	24	10	13	7	17
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	9070	10100	10800	10600	10500
Iron	7439-89-6	50	mg/kg	18000	23500	19200	23100	20600
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	15.1	19.1	14.2	17.1	14.1
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	17.2	20.7	19.8	22.8	19.8
Copper	7440-50-8	1.0	mg/kg	12.2	14.7	15.3	15.0	15.0
Cobalt	7440-48-4	0.5	mg/kg	10.0	12.0	16.7	11.2	11.0
Lead	7439-92-1	1.0	mg/kg	6.2	7.3	6.7	7.3	6.9
Manganese	7439-96-5	10	mg/kg	235	352	294	218	199
Nickel	7440-02-0	1.0	mg/kg	8.9	10.3	9.4	10.4	10.2
Selenium	7782-49-2	0.1	mg/kg	0.6	0.7	0.5	0.7	0.6
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	35.7	53.5	37.9	58.7	45.6
Zinc	7440-66-6	1.0	mg/kg	26.0	28.9	25.9	29.0	28.1



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W7 0-0.5	W7 0.5-1.0	W7 1.0-2.0	W8 0.0-0.5	W8 0.5-1.0
				06-MAY-2010 15:00	06-MAY-2010 15:00	06-MAY-2010 15:00	06-MAY-2010 15:00	06-MAY-2010 15:00
				ES1008682-006	ES1008682-007	ES1008682-008	ES1008682-009	ES1008682-010
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.01	0.02	0.01	0.02	0.01
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.96	1.01	0.82	1.41	1.18
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	4	<4	<4	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	6	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5
^ Sum of PAHs	----	4	µg/kg	4	<4	<4	6	<4
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	99.1	84.9	89.3	83.1	79.8
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	107	108	102	97.5	97.8
Anthracene-d10	1719-06-8	0.1	%	92.5	111	123	118	115
4-Terphenyl-d14	1718-51-0	0.1	%	81.1	118	84.5	117	104



Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP090S: Organotin Surrogate			
Tripropyltin	----	34	108
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	30	115
Anthracene-d10	1719-06-8	27	133
4-Terphenyl-d14	1718-51-0	18	137



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1008682	Page	: 1 of 9
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: 301001-00448	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 11-MAY-2010
C-O-C number	: ----	Issue Date	: 26-MAY-2010
Sampler	: ----		
Order number	: ----		
Quote number	: BN/187/10	No. of samples received	: 10
		No. of samples analysed	: 10

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

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



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

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>
Alex Rossi	Organic Chemist	Organics
Ankit Joshi	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Dianne Blane	Laboratory Supervisor	Newcastle
Kim McCabe	Senior Inorganic Chemist	Stafford Minerals - AY
Sarah Ashworth	Organic Chemist	Organics
Victor Kedicioglu	Business Manager - NSW	Inorganics



General Comments

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

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

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

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

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 1341911)									
ES1008627-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	7.5	6.5	14.9	No Limit
ES1008652-005	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	2.6	2.9	10.8	No Limit
EA055: Moisture Content (QC Lot: 1341912)									
ES1008682-010	W8 0.5-1.0	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	34.9	38.2	9.1	0% - 20%
ES1008787-014	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	13.4	13.0	2.7	0% - 50%
EG005-SD: Total Metals in Sediments by ICP-AES (QC Lot: 1346677)									
ES1008682-001	W6 0-0.5	EG005-SD: Aluminium	7429-90-5	50	mg/kg	11400	11500	0.8	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	21200	21700	2.3	0% - 20%
ES1008688-001	Anonymous	EG005-SD: Aluminium	7429-90-5	50	mg/kg	10700	12200	12.7	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	19500	23100	17.1	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1346676)									
ES1008682-001	W6 0-0.5	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.5	0.7	34.3	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	0.4	0.1	96.3	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	11.5	12.2	5.4	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	21.5	21.3	0.9	0% - 20%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	16.1	16.0	0.6	0% - 50%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	7.7	7.5	2.4	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	10.5	10.8	2.0	0% - 50%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	30.8	32.0	3.7	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	14.6	15.3	4.5	0% - 50%
		EG020-SD: Manganese	7439-96-5	10	mg/kg	233	233	0.0	0% - 20%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	45.2	41.0	9.8	0% - 20%
ES1008688-001	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.6	0.6	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	11.0	12.6	14.1	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	19.2	22.0	13.7	0% - 20%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	14.1	16.6	16.3	0% - 50%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	6.7	8.0	16.9	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	9.4	11.1	17.1	0% - 50%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	28.1	34.0	19.2	0% - 20%
EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	14.0	17.5	22.3	0% - 50%		



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 (%)
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1346676) - continued									
ES1008688-001	Anonymous	EG020-SD: Manganese	7439-96-5	10	mg/kg	318	262	19.4	0% - 20%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	36.4	44.3	19.6	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1346675)									
ES1008682-001	W6 0-0.5	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.0	No Limit
ES1008688-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.0	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 1345494)									
ES1008682-001	W6 0-0.5	EP005: Total Organic Carbon	----	0.02	%	1.05	1.08	2.2	0% - 20%
EP090: Organotin Compounds (QC Lot: 1345349)									
ES1008682-001	W6 0-0.5	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
ES1008688-001	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1340729)									
ES1008688-008	Anonymous	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenzo(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
ES1008688-001	Anonymous	EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit

Page : 6 of 9
 Work Order : ES1008682
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : 301001-00448



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 (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1340729) - continued									
ES1008688-001	Anonymous	EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenzo(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit



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

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

Sub-Matrix: **SOIL**

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				
EG005-SD: Total Metals in Sediments by ICP-AES (QCLot: 1346677)								
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1346676)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	110	70	130
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	103	70	130
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	111	70	130
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	105	70	130
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	109	70	130
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	94.8	70	130
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	100	70	130
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	110	70	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	123	70	130
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	50 mg/kg	102	70	130
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	105	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1346675)								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	89.2	74.2	126
EP005: Total Organic Carbon (TOC) (QCLot: 1345494)								
EP005: Total Organic Carbon	----	0.02	%	<0.02	100 %	100	70	130
EP090: Organotin Compounds (QCLot: 1345349)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	117	19.5	129
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1340729)								
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	117	----	----
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	113	----	----
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	114	----	----
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	99.8	----	----
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	103	----	----
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	99.0	----	----
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	105	----	----
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	118	----	----
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	116	----	----
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	110	----	----



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				
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1340729) - continued								
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	90.3	----	----
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	107	----	----
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	79.7	----	----
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	108	----	----
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	97.5	----	----
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	93.8	----	----
EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	91.4	----	----
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	118	----	----
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----



Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number		MS	Low	High
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1346676)							
ES1008682-002	W6 0.5-1.0	EG020-SD: Arsenic	7440-38-2	50 mg/kg	107	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	102	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	106	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	91.0	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	90.6	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	104	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	97.8	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1346675)							
ES1008682-001	W6 0-0.5	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	78.4	70	130
EP090: Organotin Compounds (QCLot: 1345349)							
ES1008682-002	W6 0.5-1.0	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	83.1	20	130
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1340729)							
ES1008688-008	Anonymous	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	100	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	98.6	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	119	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	111	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	115	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	116	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	114	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	100	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	85.7	70	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	102	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	91.5	70	130
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	110	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	109	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	86.5	70	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	110	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	118	70	130
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	98.6	70	130
		EP132B-SD: Dibenzo(a,h)anthracene	53-70-3	25 µg/kg	92.8	70	130
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	25 µg/kg	76.0	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	97.2	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1008682	Page	: 1 of 6
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: 301001-00448	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 11-MAY-2010
C-O-C number	: ----	Issue Date	: 26-MAY-2010
Sampler	: ----		
Order number	: ----	No. of samples received	: 10
Quote number	: BN/187/10	No. of samples analysed	: 10

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

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	06-MAY-2010	----	----	----	12-MAY-2010	13-MAY-2010	✔	
W6 - 0-0.5,								W6 - 0.5-1.0,
W6 - 1.0-2.0,								W6 - 2.0-3.0,
IB4 - 0-0.5,								W7 - 0-0.5,
W7 - 0.5-1.0,								W7 - 1.0-2.0,
W8 - 0.0-0.5,								W8 - 0.5-1.0
EA150: Particle Sizing								
Snap Lock Bag	06-MAY-2010	---	---	----	25-MAY-2010	02-NOV-2010	✔	
W6 - 0-0.5,								W6 - 0.5-1.0,
W6 - 1.0-2.0,								W6 - 2.0-3.0,
W7 - 0-0.5,								W7 - 0.5-1.0,
W7 - 1.0-2.0,								W8 - 0.0-0.5,
W8 - 0.5-1.0								
EA150: Soil Classification based on Particle Size								
Snap Lock Bag	06-MAY-2010	---	---	----	25-MAY-2010	02-NOV-2010	✔	
W6 - 0-0.5,								W6 - 0.5-1.0,
W6 - 1.0-2.0,								W6 - 2.0-3.0,
W7 - 0-0.5,								W7 - 0.5-1.0,
W7 - 1.0-2.0,								W8 - 0.0-0.5,
W8 - 0.5-1.0								
EG005-SD: Total Metals in Sediments by ICP-AES								
Soil Glass Jar - Unpreserved	06-MAY-2010	15-MAY-2010	03-JUN-2010	✔	17-MAY-2010	02-NOV-2010	✔	
W6 - 0-0.5,								W6 - 0.5-1.0,
W6 - 1.0-2.0,								W6 - 2.0-3.0,
IB4 - 0-0.5,								W7 - 0-0.5,
W7 - 0.5-1.0,								W7 - 1.0-2.0,
W8 - 0.0-0.5,								W8 - 0.5-1.0



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
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved								
W6 - 0-0.5,	W6 - 0.5-1.0,	06-MAY-2010	15-MAY-2010	03-JUN-2010	✓	17-MAY-2010	02-NOV-2010	✓
W6 - 1.0-2.0,	W6 - 2.0-3.0,							
IB4 - 0-0.5,	W7 - 0-0.5,							
W7 - 0.5-1.0,	W7 - 1.0-2.0,							
W8 - 0.0-0.5,	W8 - 0.5-1.0							
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved								
W6 - 0-0.5,	W6 - 0.5-1.0,	06-MAY-2010	15-MAY-2010	03-JUN-2010	✓	24-MAY-2010	03-JUN-2010	✓
W6 - 1.0-2.0,	W6 - 2.0-3.0,							
IB4 - 0-0.5,	W7 - 0-0.5,							
W7 - 0.5-1.0,	W7 - 1.0-2.0,							
W8 - 0.0-0.5,	W8 - 0.5-1.0							
EP005: Total Organic Carbon (TOC)								
Pulp Bag								
W6 - 0-0.5,	W6 - 0.5-1.0,	06-MAY-2010	14-MAY-2010	---	----	17-MAY-2010	03-JUN-2010	✓
W6 - 1.0-2.0,	W6 - 2.0-3.0,							
IB4 - 0-0.5,	W7 - 0-0.5,							
W7 - 0.5-1.0,	W7 - 1.0-2.0,							
W8 - 0.0-0.5,	W8 - 0.5-1.0							
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved								
W6 - 0-0.5,	W6 - 0.5-1.0,	06-MAY-2010	14-MAY-2010	20-MAY-2010	✓	17-MAY-2010	23-JUN-2010	✓
W6 - 1.0-2.0,	W6 - 2.0-3.0,							
IB4 - 0-0.5,	W7 - 0-0.5,							
W7 - 0.5-1.0,	W7 - 1.0-2.0,							
W8 - 0.0-0.5,	W8 - 0.5-1.0							
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved								
W6 - 0-0.5,	W6 - 0.5-1.0,	06-MAY-2010	12-MAY-2010	20-MAY-2010	✓	16-MAY-2010	21-JUN-2010	✓
W6 - 1.0-2.0,	W6 - 2.0-3.0,							
IB4 - 0-0.5,	W7 - 0-0.5,							
W7 - 0.5-1.0,	W7 - 1.0-2.0,							
W8 - 0.0-0.5,	W8 - 0.5-1.0							



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	4	31	12.9	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	19	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	10	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organotin Analysis	EP090	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organotin Analysis	EP090	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organotin Analysis	EP090	1	19	5.3	5.0	✓	ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	20	5.0	5.0	✓	ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	20	5.0	5.0	✓	ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	20	5.0	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Particle Size Analysis (Sieving)	EA150	SOIL	Particle Size Analysis by Sieving according to AS1289.3.6.1 - 1995
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Total Fe and Al in Sediments by ICPAES	EG005-SD	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3). LORs per NODG
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 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 (1999) Schedule B(3)
Total Organic Carbon	EP005	SOIL	In-house. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
Organotin Analysis	EP090	SOIL	(USEPA SW 846 - 8270D) Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quantified against an established calibration curve.
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.
Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. 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 (1999) Schedule B(3) (Method 202)
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.
Organotin Sample Preparation	ORG35	SOIL	In house. 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1008688	Page	: 1 of 24
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: 301001-00448	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 11-MAY-2010
C-O-C number	: ----	Issue Date	: 26-MAY-2010
Sampler	: ----	No. of samples received	: 22
Site	: ----	No. of samples analysed	: 22
Quote number	: BN/187/10		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

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>
Alex Rossi	Organic Chemist	Organics
Ankit Joshi	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Dianne Blane	Laboratory Supervisor	Newcastle
Kim McCabe	Senior Inorganic Chemist	Stafford Minerals - AY
Matt Frost	Organic Instrument Chemist	Organics
Sarah Ashworth	Organic Chemist	Organics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

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

- **EG005SD: Poor precision was obtained for Iron on sample ES1008688 #11 due to sample heterogeneity**
- **EG020: LCS recovery for Silver falls outside ALS Dynamic Control Limit. However, it is within the acceptance criteria based on ALS DQO. No further action is required.**
- **EK057G LOR raised for Nitrite due to matrix interference.**
- **EK059G LOR raised for NoX due to matrix interference.**
- **EK071G: LOR raised for RP analysis on sample ID(W5 1.0-2.0, W5 2.0-3.0 & T17 1.0-2.0) due to sample matrix.**
- **EP080-SD: Sample Trip Blank 6 not received in a suitable timeframe to conduct the EP080-SD analysis within the recommended holding time.**



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	IB5 0-0.5	IB5 0.5-1.0	IB5 1.0-2.0	W17 0-0.5	W17 0.5-1.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
				ES1008688-001	ES1008688-002	ES1008688-003	ES1008688-004	ES1008688-005
EA150: Particle Sizing								
+75µm	----	1	%	----	----	----	82	57
+150µm	----	1	%	----	----	----	79	56
+300µm	----	1	%	----	----	----	47	44
+425µm	----	1	%	----	----	----	32	31
+600µm	----	1	%	----	----	----	24	22
+1180µm	----	1	%	----	----	----	17	14
+2.36mm	----	1	%	----	----	----	12	8
+4.75mm	----	1	%	----	----	----	7	4
+9.5mm	----	1	%	----	----	----	3	1
+19.0mm	----	1	%	----	----	----	<1	<1
+37.5mm	----	1	%	----	----	----	<1	<1
+75.0mm	----	1	%	----	----	----	<1	<1
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	39.3	30.2	36.4	30.9	24.0
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	----	----	13	25
Silt (2-60 µm)	----	1	%	----	----	----	4	17
Sand (0.06-2.00 mm)	----	1	%	----	----	----	71	50
Gravel (>2mm)	----	1	%	----	----	----	12	8
Cobbles (>6cm)	----	1	%	----	----	----	<1	<1
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	10700	12500	12700	4360	4930
Iron	7439-89-6	50	mg/kg	19500	21000	24300	11000	12600
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	14.0	14.8	15.4	12.1	15.2
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	19.2	21.9	23.3	8.6	10.9
Copper	7440-50-8	1.0	mg/kg	14.1	17.3	17.8	6.2	10.3
Cobalt	7440-48-4	0.5	mg/kg	11.0	14.7	12.2	9.0	10.0
Lead	7439-92-1	1.0	mg/kg	6.7	8.1	8.2	3.4	4.3
Manganese	7439-96-5	10	mg/kg	318	200	287	924	905
Nickel	7440-02-0	1.0	mg/kg	9.4	11.3	10.6	6.1	6.6
Selenium	7782-49-2	0.1	mg/kg	0.6	0.6	0.5	0.4	0.4
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	36.4	50.9	58.1	31.4	40.2
Zinc	7440-66-6	1.0	mg/kg	28.1	33.3	33.2	15.7	15.2



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	IB5 0-0.5	IB5 0.5-1.0	IB5 1.0-2.0	W17 0-0.5	W17 0.5-1.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
				ES1008688-001	ES1008688-002	ES1008688-003	ES1008688-004	ES1008688-005
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.02	<0.01	<0.01
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	1.11	1.07	1.16	0.49	0.20
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	9	<4	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4
Perylene	198-55-0	4	µg/kg	<4	4	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5
^ Sum of PAHs	----	4	µg/kg	<4	13	<4	<4	<4
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	73.2	72.1	55.8	74.0	67.8
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	107	114	82.0	104	87.9
Anthracene-d10	1719-06-8	0.1	%	112	118	96.8	115	115
4-Terphenyl-d14	1718-51-0	0.1	%	102	75.4	114	112	106



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W18 0-0.5	W18 0.5-1.0	W5 0-0.5	W5 0.5-1.0	W5 1.0-2.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
				ES1008688-006	ES1008688-007	ES1008688-008	ES1008688-009	ES1008688-010
EA150: Particle Sizing								
+75µm	----	1	%	78	73	40	30	7
+150µm	----	1	%	75	70	30	22	6
+300µm	----	1	%	41	37	24	18	4
+425µm	----	1	%	20	16	22	16	3
+600µm	----	1	%	12	8	20	14	2
+1180µm	----	1	%	6	3	17	12	<1
+2.36mm	----	1	%	3	2	12	9	<1
+4.75mm	----	1	%	2	<1	9	6	<1
+9.5mm	----	1	%	<1	<1	3	<1	<1
+19.0mm	----	1	%	<1	<1	<1	<1	<1
+37.5mm	----	1	%	<1	<1	<1	<1	<1
+75.0mm	----	1	%	<1	<1	<1	<1	<1
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	27.8	27.5	40.7	42.0	44.5
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	16	19	22	31	48
Silt (2-60 µm)	----	1	%	6	7	33	37	42
Sand (0.06-2.00 mm)	----	1	%	75	72	32	24	10
Gravel (>2mm)	----	1	%	3	2	13	8	<1
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	4830	5550	11500	14100	17000
Iron	7439-89-6	50	mg/kg	12400	12300	22900	25600	23700
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	13.9	16.2	16.2	16.7	8.94
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	10.1	10.7	22.1	24.6	23.9
Copper	7440-50-8	1.0	mg/kg	6.1	6.8	16.8	20.1	30.1
Cobalt	7440-48-4	0.5	mg/kg	10.1	9.7	14.8	13.8	12.2
Lead	7439-92-1	1.0	mg/kg	3.6	3.8	7.7	8.9	9.7
Manganese	7439-96-5	10	mg/kg	871	674	254	220	238
Nickel	7440-02-0	1.0	mg/kg	6.8	7.1	10.7	11.5	11.8
Selenium	7782-49-2	0.1	mg/kg	0.3	0.4	0.7	0.7	0.6
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	32.3	30.1	42.8	48.2	53.0
Zinc	7440-66-6	1.0	mg/kg	15.4	16.4	36.6	37.6	40.1



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W18 0-0.5	W18 0.5-1.0	W5 0-0.5	W5 0.5-1.0	W5 1.0-2.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
				ES1008688-006	ES1008688-007	ES1008688-008	ES1008688-009	ES1008688-010
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.02	0.02	0.02
EK055: Ammonia as N								
Ammonia as N	7664-41-7	1	mg/kg	----	----	<1	3	6
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	----	0.1	mg/kg	----	----	<0.1	<0.1	<0.1
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N (Sol.)	----	0.1	mg/kg	----	----	<0.1	<0.1	0.7
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	----	<0.1	<0.1	0.7
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	----	690	650	640
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	----	----	206	240	183
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.1	mg/kg	----	----	0.9	1.7	<10.0
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.55	0.26	1.05	1.16	1.39
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	<3	<3	<3
C10 - C14 Fraction	----	3	mg/kg	----	----	<3	<3	<3
C15 - C28 Fraction	----	3	mg/kg	----	----	5	5	6
C29 - C36 Fraction	----	5	mg/kg	----	----	6	6	11
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	----	11	11	17
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	----	----	<10	<10	<10
Carbophenothion	786-19-6	10	µg/kg	----	----	<10	<10	<10



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W18 0-0.5	W18 0.5-1.0	W5 0-0.5	W5 0.5-1.0	W5 1.0-2.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
				ES1008688-006	ES1008688-007	ES1008688-008	ES1008688-009	ES1008688-010
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	----	----	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	470-90-8	10	µg/kg	----	----	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	----	----	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	----	----	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	----	----	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	----	----	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	----	----	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	----	----	<10	<10	<10
Ethion	563-12-2	10	µg/kg	----	----	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	----	----	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	----	----	<10	<10	<10
Malathion	121-75-5	10	µg/kg	----	----	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	----	----	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	----	----	<10	<10	<10
Parathion	56-38-2	10	µg/kg	----	----	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	----	----	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	----	----	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	----	----	<10	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
4,4'-DDD	72-54-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
4,4'-DDE	72-55-9	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
4,4'-DDT	50-29-3	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
^ DDT (total)	----	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	----	----	<0.50	<0.50	<0.50



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W18 0-0.5	W18 0.5-1.0	W5 0-0.5	W5 0.5-1.0	W5 1.0-2.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
				ES1008688-006	ES1008688-007	ES1008688-008	ES1008688-009	ES1008688-010
EP131A: Organochlorine Pesticides - Continued								
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	----	----	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg	----	----	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg	----	----	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg	----	----	<0.25	<0.25	<0.25
Oxychlordane	27304-13-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1016	12974-11-2	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				W18 0-0.5	W18 0.5-1.0	W5 0-0.5	W5 0.5-1.0	W5 1.0-2.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008688-006	ES1008688-007	ES1008688-008	ES1008688-009	ES1008688-010
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Sum of PAHs	----	4	µg/kg	<4	<4	<4	<4	<4
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	88.0	88.8	88.3
Toluene-D8	2037-26-5	0.1	%	----	----	98.1	82.8	89.8
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	119	85.1	86.0
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	62.3	62.2	66.5	66.9	51.4
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	----	----	79.0	71.1	66.8
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	----	----	75.7	81.2	65.0
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	75.0	64.4	57.8
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	103	103	114	88.1	79.8
Anthracene-d10	1719-06-8	0.1	%	118	110	91.5	110	111
4-Terphenyl-d14	1718-51-0	0.1	%	104	96.3	92.1	100	92.6



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W5 2.0-3.0	T20 0-0.5	T20 0.5-1.0	T21 0-0.5	T21 0.5-1.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
				ES1008688-011	ES1008688-012	ES1008688-013	ES1008688-014	ES1008688-015
EA150: Particle Sizing								
+75µm	----	1	%	4	----	----	----	----
+150µm	----	1	%	3	----	----	----	----
+300µm	----	1	%	2	----	----	----	----
+425µm	----	1	%	2	----	----	----	----
+600µm	----	1	%	2	----	----	----	----
+1180µm	----	1	%	1	----	----	----	----
+2.36mm	----	1	%	<1	----	----	----	----
+4.75mm	----	1	%	<1	----	----	----	----
+9.5mm	----	1	%	<1	----	----	----	----
+19.0mm	----	1	%	<1	----	----	----	----
+37.5mm	----	1	%	<1	----	----	----	----
+75.0mm	----	1	%	<1	----	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	43.7	28.6	26.4	28.7	27.7
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	58	----	----	----	----
Silt (2-60 µm)	----	1	%	36	----	----	----	----
Sand (0.06-2.00 mm)	----	1	%	6	----	----	----	----
Gravel (>2mm)	----	1	%	<1	----	----	----	----
Cobbles (>6cm)	----	1	%	<1	----	----	----	----
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	16400	5360	5000	5360	5550
Iron	7439-89-6	50	mg/kg	22100	11700	22400	13500	13200
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	5.35	12.7	20.0	16.1	11.5
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	17.0	10.2	14.3	10.4	10.5
Copper	7440-50-8	1.0	mg/kg	43.9	6.5	7.1	6.7	7.6
Cobalt	7440-48-4	0.5	mg/kg	11.0	9.8	9.6	10.3	8.8
Lead	7439-92-1	1.0	mg/kg	9.6	3.5	8.6	3.7	3.9
Manganese	7439-96-5	10	mg/kg	198	581	719	969	541
Nickel	7440-02-0	1.0	mg/kg	11.2	7.1	6.8	7.5	6.9
Selenium	7782-49-2	0.1	mg/kg	0.9	0.3	0.6	0.4	0.3
Silver	7440-22-4	0.1	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	64.5	30.4	69.4	34.2	35.9
Zinc	7440-66-6	1.0	mg/kg	30.9	17.2	17.4	16.5	15.9



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				W5 2.0-3.0	T20 0-0.5	T20 0.5-1.0	T21 0-0.5	T21 0.5-1.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008688-011	ES1008688-012	ES1008688-013	ES1008688-014	ES1008688-015
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.02	<0.01	<0.01	<0.01	<0.01
EK055: Ammonia as N								
Ammonia as N	7664-41-7	1	mg/kg	7	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	----	----	----	----
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	1150	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	157	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.1	mg/kg	<5.0	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	2.21	0.34	0.23	0.32	0.24
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	----	----	----	----
C10 - C14 Fraction	----	3	mg/kg	<3	----	----	----	----
C15 - C28 Fraction	----	3	mg/kg	3	----	----	----	----
C29 - C36 Fraction	----	5	mg/kg	6	----	----	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	9	----	----	----	----
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	----	----	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	----	----	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	----	----	----	----
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	----	----	----	----
Carbophenothion	786-19-6	10	µg/kg	<10	----	----	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				W5 2.0-3.0	T20 0-0.5	T20 0.5-1.0	T21 0-0.5	T21 0.5-1.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES1008688-011	ES1008688-012	ES1008688-013	ES1008688-014	ES1008688-015
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	----	----	----	----
Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	----	----	----	----
Chlorpyrifos	2921-88-2	10	µg/kg	<10	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	----	----	----	----
Demeton-S-methyl	919-86-8	10	µg/kg	<10	----	----	----	----
Diazinon	333-41-5	10	µg/kg	<10	----	----	----	----
Dichlorvos	62-73-7	10	µg/kg	<10	----	----	----	----
Dimethoate	60-51-5	10	µg/kg	<10	----	----	----	----
Ethion	563-12-2	10	µg/kg	<10	----	----	----	----
Fenamiphos	22224-92-6	10	µg/kg	<10	----	----	----	----
Fenthion	55-38-9	10	µg/kg	<10	----	----	----	----
Malathion	121-75-5	10	µg/kg	<10	----	----	----	----
Azinphos Methyl	86-50-0	10	µg/kg	<10	----	----	----	----
Monocrotophos	6923-22-4	10	µg/kg	<10	----	----	----	----
Parathion	56-38-2	10	µg/kg	<10	----	----	----	----
Parathion-methyl	298-00-0	10	µg/kg	<10	----	----	----	----
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	----	----	----	----
Prothiofos	34643-46-4	10	µg/kg	<10	----	----	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	----	----	----	----
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	----	----	----	----
beta-BHC	319-85-7	0.50	µg/kg	<0.50	----	----	----	----
delta-BHC	319-86-8	0.50	µg/kg	<0.50	----	----	----	----
4.4`-DDD	72-54-8	0.50	µg/kg	<0.50	----	----	----	----
4.4`-DDE	72-55-9	0.50	µg/kg	<0.50	----	----	----	----
4.4`-DDT	50-29-3	0.50	µg/kg	<0.50	----	----	----	----
^ DDT (total)	----	0.50	µg/kg	<0.50	----	----	----	----
Dieldrin	60-57-1	0.50	µg/kg	<0.50	----	----	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	----	----	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	----	----	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	----	----	----	----
Endrin	72-20-8	0.50	µg/kg	<0.50	----	----	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	----	----	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	----	----	----	----
Heptachlor	76-44-8	0.50	µg/kg	<0.50	----	----	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	----	----	----	----



Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	W5 2.0-3.0	T20 0-0.5	T20 0.5-1.0	T21 0-0.5	T21 0.5-1.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
				ES1008688-011	ES1008688-012	ES1008688-013	ES1008688-014	ES1008688-015
EP131A: Organochlorine Pesticides - Continued								
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	----	----	----	----
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	----	----	----	----
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	----	----	----	----
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	----	----	----	----
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	----	----	----	----
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	----	----	----
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	----	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4
Perylene	198-55-0	4	µg/kg	<4	8	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				W5 2.0-3.0	T20 0-0.5	T20 0.5-1.0	T21 0-0.5	T21 0.5-1.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
Compound	CAS Number	LOR	Unit	ES1008688-011	ES1008688-012	ES1008688-013	ES1008688-014	ES1008688-015
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Sum of PAHs	----	4	µg/kg	<4	8	<4	<4	<4
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	105	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	107	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	115	----	----	----	----
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	66.4	44.1	41.8	72.8	47.6
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	63.8	----	----	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	60.7	----	----	----	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	52.2	----	----	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	100	83.0	115	104	99.7
Anthracene-d10	1719-06-8	0.1	%	119	109	112	112	112
4-Terphenyl-d14	1718-51-0	0.1	%	106	115	109	115	115



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	T16 0-0.5	T16 0.5-1.0	T16 1.0-2.0	T17 0-0.5	T17 0.5-1.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
				ES1008688-016	ES1008688-017	ES1008688-018	ES1008688-019	ES1008688-020
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	35.4	38.6	43.9	40.1	39.4
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	10800	14100	16500	9830	13800
Iron	7439-89-6	50	mg/kg	21900	31800	25300	21700	22400
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	14.4	18.1	10.9	15.0	14.4
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	20.2	29.9	25.5	19.1	24.8
Copper	7440-50-8	1.0	mg/kg	13.6	21.4	27.5	12.6	19.8
Cobalt	7440-48-4	0.5	mg/kg	15.7	13.5	14.7	15.7	12.9
Lead	7439-92-1	1.0	mg/kg	6.5	11.0	9.2	5.9	8.8
Manganese	7439-96-5	10	mg/kg	285	298	237	242	229
Nickel	7440-02-0	1.0	mg/kg	9.9	11.6	12.5	9.4	11.2
Selenium	7782-49-2	0.1	mg/kg	0.6	0.6	0.6	0.5	0.6
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	34.7	75.7	55.0	35.9	43.8
Zinc	7440-66-6	1.0	mg/kg	36.3	37.1	40.0	35.9	36.4
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.02	0.02	0.02
EK055: Ammonia as N								
Ammonia as N	7664-41-7	1	mg/kg	2	<1	<1	4	4
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	1.3	1.6
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	1.3	1.6
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	440	500	600	480	560
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	158	189	194	186	172
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.1	mg/kg	1.3	1.9	2.1	0.7	1.5
EP005: Total Organic Carbon (TOC)								



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	T16 0-0.5	T16 0.5-1.0	T16 1.0-2.0	T17 0-0.5	T17 0.5-1.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
				ES1008688-016	ES1008688-017	ES1008688-018	ES1008688-019	ES1008688-020
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	0.02	%	0.90	1.10	0.81	0.89	0.97
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	<3
C15 - C28 Fraction	----	3	mg/kg	<3	6	<3	8	7
C29 - C36 Fraction	----	5	mg/kg	6	8	9	10	12
^ C10 - C36 Fraction (sum)	----	3	mg/kg	6	14	9	18	19
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	<0.5	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	<10	<10	<10
Carbophenothion	786-19-6	10	µg/kg	<10	<10	<10	<10	<10
Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	<10.0	<10.0	<10.0	<10.0
Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	<10	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	<10	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	<10	<10	<10
Diazinon	333-41-5	10	µg/kg	<10	<10	<10	<10	<10
Dichlorvos	62-73-7	10	µg/kg	<10	<10	<10	<10	<10
Dimethoate	60-51-5	10	µg/kg	<10	<10	<10	<10	<10
Ethion	563-12-2	10	µg/kg	<10	<10	<10	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	<10	<10	<10	<10	<10
Fenthion	55-38-9	10	µg/kg	<10	<10	<10	<10	<10
Malathion	121-75-5	10	µg/kg	<10	<10	<10	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	<10	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	<10	<10	<10	<10
Parathion	56-38-2	10	µg/kg	<10	<10	<10	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	<10	<10	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	<10	<10	<10
Prothiofos	34643-46-4	10	µg/kg	<10	<10	<10	<10	<10



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	T16 0-0.5	T16 0.5-1.0	T16 1.0-2.0	T17 0-0.5	T17 0.5-1.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
				ES1008688-016	ES1008688-017	ES1008688-018	ES1008688-019	ES1008688-020
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ DDT (total)	----	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	<0.25	<0.25	<0.25
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	T16 0-0.5	T16 0.5-1.0	T16 1.0-2.0	T17 0-0.5	T17 0.5-1.0
				07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00	07-MAY-2010 15:00
				ES1008688-016	ES1008688-017	ES1008688-018	ES1008688-019	ES1008688-020
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5
^ Sum of PAHs	----	4	µg/kg	<4	<4	<4	<4	<4
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	98.5	96.0	90.3	108	98.0
Toluene-D8	2037-26-5	0.1	%	101	99.0	86.6	107	120
4-Bromofluorobenzene	460-00-4	0.1	%	98.6	97.1	89.8	118	122
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	69.9	41.8	34.1	52.8	49.6
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	81.3	64.8	79.7	64.9	59.5
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	56.0	65.9	54.7	66.5	63.5
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	50.0	58.9	46.8	58.2	54.6
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	81.3	89.2	72.7	87.0	101
Anthracene-d10	1719-06-8	0.1	%	100	108	116	118	107
4-Terphenyl-d14	1718-51-0	0.1	%	116	102	116	88.6	119



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				T17 1.0-2.0	TRIP BLANK 6	----	----	----
				07-MAY-2010 15:00	23-APR-2010 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1008688-021	ES1008688-022	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	41.3	----	----	----	----
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	17800	----	----	----	----
Iron	7439-89-6	50	mg/kg	26800	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	----	----	----	----
Arsenic	7440-38-2	1.00	mg/kg	10.4	----	----	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	----	----	----
Chromium	7440-47-3	1.0	mg/kg	27.5	----	----	----	----
Copper	7440-50-8	1.0	mg/kg	27.7	----	----	----	----
Cobalt	7440-48-4	0.5	mg/kg	14.2	----	----	----	----
Lead	7439-92-1	1.0	mg/kg	9.6	----	----	----	----
Manganese	7439-96-5	10	mg/kg	368	----	----	----	----
Nickel	7440-02-0	1.0	mg/kg	13.3	----	----	----	----
Selenium	7782-49-2	0.1	mg/kg	0.6	----	----	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	----	----	----	----
Vanadium	7440-62-2	2.0	mg/kg	59.5	----	----	----	----
Zinc	7440-66-6	1.0	mg/kg	42.8	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.02	----	----	----	----
EK055: Ammonia as N								
Ammonia as N	7664-41-7	1	mg/kg	3	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
^ Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	----	----	----	----
EK059G: NOX as N by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	700	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	175	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.1	mg/kg	<5.0	----	----	----	----
EP005: Total Organic Carbon (TOC)								



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				T17 1.0-2.0	TRIP BLANK 6	----	----	----
				07-MAY-2010 15:00	23-APR-2010 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1008688-021	ES1008688-022	----	----	----
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	0.02	%	1.19	----	----	----	----
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	<3	----	----	----
C10 - C14 Fraction	----	3	mg/kg	<3	----	----	----	----
C15 - C28 Fraction	----	3	mg/kg	5	----	----	----	----
C29 - C36 Fraction	----	5	mg/kg	13	----	----	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	18	----	----	----	----
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	----	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	----	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	----	----	----
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	----	----	----	----
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	----	----	----	----
Carbophenothion	786-19-6	10	µg/kg	<10	----	----	----	----
Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	----	----	----	----
Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	----	----	----	----
Chlorpyrifos	2921-88-2	10	µg/kg	<10	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	----	----	----	----
Demeton-S-methyl	919-86-8	10	µg/kg	<10	----	----	----	----
Diazinon	333-41-5	10	µg/kg	<10	----	----	----	----
Dichlorvos	62-73-7	10	µg/kg	<10	----	----	----	----
Dimethoate	60-51-5	10	µg/kg	<10	----	----	----	----
Ethion	563-12-2	10	µg/kg	<10	----	----	----	----
Fenamiphos	22224-92-6	10	µg/kg	<10	----	----	----	----
Fenthion	55-38-9	10	µg/kg	<10	----	----	----	----
Malathion	121-75-5	10	µg/kg	<10	----	----	----	----
Azinphos Methyl	86-50-0	10	µg/kg	<10	----	----	----	----
Monocrotophos	6923-22-4	10	µg/kg	<10	----	----	----	----
Parathion	56-38-2	10	µg/kg	<10	----	----	----	----
Parathion-methyl	298-00-0	10	µg/kg	<10	----	----	----	----
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	----	----	----	----
Prothiofos	34643-46-4	10	µg/kg	<10	----	----	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				T17 1.0-2.0	TRIP BLANK 6	----	----	----
				07-MAY-2010 15:00	23-APR-2010 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1008688-021	ES1008688-022	----	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	----	----	----	----
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	----	----	----	----
beta-BHC	319-85-7	0.50	µg/kg	<0.50	----	----	----	----
delta-BHC	319-86-8	0.50	µg/kg	<0.50	----	----	----	----
4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	----	----	----	----
4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	----	----	----	----
4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	----	----	----	----
^ DDT (total)	----	0.50	µg/kg	<0.50	----	----	----	----
Dieldrin	60-57-1	0.50	µg/kg	<0.50	----	----	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	----	----	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	----	----	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	----	----	----	----
Endrin	72-20-8	0.50	µg/kg	<0.50	----	----	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	----	----	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	----	----	----	----
Heptachlor	76-44-8	0.50	µg/kg	<0.50	----	----	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	----	----	----	----
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	----	----	----	----
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	----	----	----	----
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	----	----	----	----
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	----	----	----	----
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	----	----	----
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	----	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	----	----	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	----	----	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				T17 1.0-2.0	TRIP BLANK 6	----	----	----
				07-MAY-2010 15:00	23-APR-2010 15:00	----	----	----
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES1008688-021	ES1008688-022	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Acenaphthylene	208-96-8	4	µg/kg	<4	----	----	----	----
Acenaphthene	83-32-9	4	µg/kg	<4	----	----	----	----
Fluorene	86-73-7	4	µg/kg	<4	----	----	----	----
Phenanthrene	85-01-8	4	µg/kg	<4	----	----	----	----
Anthracene	120-12-7	4	µg/kg	<4	----	----	----	----
Fluoranthene	206-44-0	4	µg/kg	<4	----	----	----	----
Pyrene	129-00-0	4	µg/kg	<4	----	----	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	<4	----	----	----	----
Chrysene	218-01-9	4	µg/kg	<4	----	----	----	----
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	----	----	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	----	----	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	----	----	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	----	----	----	----
Perylene	198-55-0	4	µg/kg	<4	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	----	----	----	----
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	----	----	----	----
Coronene	191-07-1	5	µg/kg	<5	----	----	----	----
^ Sum of PAHs	----	4	µg/kg	<4	----	----	----	----
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	71.4	105	----	----	----
Toluene-D8	2037-26-5	0.1	%	86.0	100	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	96.9	106	----	----	----
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	63.4	----	----	----	----
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	80.2	----	----	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	79.9	----	----	----	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	62.7	----	----	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	96.5	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	110	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	109	----	----	----	----



Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080-SD: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	67	137
Toluene-D8	2037-26-5	74	134
4-Bromofluorobenzene	460-00-4	73	137
EP090S: Organotin Surrogate			
Tripopyltin	----	34	108
EP130S: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	51.3	136.9
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	136
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	164
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	30	115
Anthracene-d10	1719-06-8	27	133
4-Terphenyl-d14	1718-51-0	18	137



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1008688	Page	: 1 of 21
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: 301001-00448	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 11-MAY-2010
C-O-C number	: ----	Issue Date	: 26-MAY-2010
Sampler	: ----		
Order number	: ----		
Quote number	: BN/187/10	No. of samples received	: 22
		No. of samples analysed	: 22

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

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



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

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>
Alex Rossi	Organic Chemist	Organics
Ankit Joshi	Inorganic Chemist	Inorganics
Celine Conceicao	Spectroscopist	Inorganics
Dianne Blane	Laboratory Supervisor	Newcastle
Kim McCabe	Senior Inorganic Chemist	Stafford Minerals - AY
Matt Frost	Organic Instrument Chemist	Organics
Sarah Ashworth	Organic Chemist	Organics



General Comments

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

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

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

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

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



Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

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: 1343702)									
ES1008652-016	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	17.0	16.8	1.2	0% - 50%
ES1008688-006	W18 0-0.5	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	27.8	29.1	4.5	0% - 20%
EA055: Moisture Content (QC Lot: 1343704)									
ES1008688-017	T16 0.5-1.0	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	38.6	37.6	2.4	0% - 20%
EG005-SD: Total Metals in Sediments by ICP-AES (QC Lot: 1346677)									
ES1008682-001	Anonymous	EG005-SD: Aluminium	7429-90-5	50	mg/kg	11400	11500	0.8	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	21200	21700	2.3	0% - 20%
ES1008688-001	IB5 0-0.5	EG005-SD: Aluminium	7429-90-5	50	mg/kg	10700	12200	12.7	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	19500	23100	17.1	0% - 20%
EG005-SD: Total Metals in Sediments by ICP-AES (QC Lot: 1346680)									
ES1008688-011	W5 2.0-3.0	EG005-SD: Aluminium	7429-90-5	50	mg/kg	16400	17000	3.8	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	22100	17700	# 22.3	0% - 20%
ES1008688-021	T17 1.0-2.0	EG005-SD: Aluminium	7429-90-5	50	mg/kg	17800	17600	1.0	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	26800	25900	3.2	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1346676)									
ES1008682-001	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.5	0.7	34.3	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	0.4	0.1	96.3	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	11.5	12.2	5.4	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	21.5	21.3	0.9	0% - 20%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	16.1	16.0	0.6	0% - 50%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	7.7	7.5	2.4	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	10.5	10.8	2.0	0% - 50%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	30.8	32.0	3.7	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	14.6	15.3	4.5	0% - 50%
		EG020-SD: Manganese	7439-96-5	10	mg/kg	233	233	0.0	0% - 20%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	45.2	41.0	9.8	0% - 20%
		ES1008688-001	IB5 0-0.5	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1
EG020-SD: Selenium	7782-49-2			0.1	mg/kg	0.6	0.6	0.0	No Limit
EG020-SD: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG020-SD: Cobalt	7440-48-4			0.5	mg/kg	11.0	12.6	14.1	0% - 20%
EG020-SD: Antimony	7440-36-0			0.50	mg/kg	<0.50	<0.50	0.0	No Limit
EG020-SD: Chromium	7440-47-3			1.0	mg/kg	19.2	22.0	13.7	0% - 20%
EG020-SD: Copper	7440-50-8			1.0	mg/kg	14.1	16.6	16.3	0% - 50%



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 (%)
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1346676) - continued									
ES1008688-001	IB5 0-0.5	EG020-SD: Lead	7439-92-1	1.0	mg/kg	6.7	8.0	16.9	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	9.4	11.1	17.1	0% - 50%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	28.1	34.0	19.2	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	14.0	17.5	22.3	0% - 50%
		EG020-SD: Manganese	7439-96-5	10	mg/kg	318	262	19.4	0% - 20%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	36.4	44.3	19.6	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1346679)									
ES1008688-011	W5 2.0-3.0	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.9	1.1	14.9	0% - 50%
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	0.2	0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	11.0	9.2	17.8	0% - 50%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	17.0	15.0	12.1	0% - 50%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	43.9	53.0	18.8	0% - 20%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	9.6	11.3	16.6	0% - 50%
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	11.2	10.3	8.4	0% - 50%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	30.9	33.5	8.0	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	5.35	3.88	31.8	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	198	189	4.6	0% - 50%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	64.5	60.5	6.4	0% - 20%
ES1008688-021	T17 1.0-2.0	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.6	0.7	16.1	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	14.2	13.7	3.7	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	27.5	27.9	1.4	0% - 20%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	27.7	27.8	0.4	0% - 20%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	9.6	9.9	2.8	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	13.3	13.0	2.6	0% - 50%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	42.8	42.4	1.0	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	10.4	10.6	1.6	0% - 50%
		EG020-SD: Manganese	7439-96-5	10	mg/kg	368	361	1.9	0% - 20%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	59.5	58.1	2.4	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1346675)									
ES1008682-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.0	No Limit
ES1008688-001	IB5 0-0.5	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1346678)									
ES1008688-011	W5 2.0-3.0	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.02	0.01	0.0	No Limit
ES1008688-021	T17 1.0-2.0	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.0	No Limit

Page : 6 of 21
 Work Order : ES1008688
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : 301001-00448



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 (%)
EK055: Ammonia as N (QC Lot: 1342140)									
ES1008369-007	Anonymous	EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	<1	0.0	No Limit
ES1008688-008	W5 0-0.5	EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	<1	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1346963)									
ES1008688-008	W5 0-0.5	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1008688-021	T17 1.0-2.0	EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<1.0	<0.1	164	No Limit
EK059G: NOX as N by Discrete Analyser (QC Lot: 1346964)									
ES1008688-008	W5 0-0.5	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
ES1008691-002	Anonymous	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1351690)									
ES1008688-008	W5 0-0.5	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	690	690	0.0	0% - 20%
ES1008688-021	T17 1.0-2.0	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	700	830	16.7	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1351691)									
ES1008688-008	W5 0-0.5	EK067G: Total Phosphorus as P	----	2	mg/kg	206	222	7.6	0% - 20%
ES1008688-021	T17 1.0-2.0	EK067G: Total Phosphorus as P	----	2	mg/kg	175	178	1.5	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1346965)									
ES1008688-008	W5 0-0.5	EK071G: Reactive Phosphorus as P	----	0.1	mg/kg	0.9	0.9	0.0	No Limit
ES1008688-020	T17 0.5-1.0	EK071G: Reactive Phosphorus as P	----	0.1	mg/kg	1.5	1.6	0.0	0% - 50%
EP005: Total Organic Carbon (TOC) (QC Lot: 1347529)									
ES1008688-001	IB5 0-0.5	EP005: Total Organic Carbon	----	0.02	%	1.11	1.12	0.9	0% - 20%
ES1008688-011	W5 2.0-3.0	EP005: Total Organic Carbon	----	0.02	%	2.21	2.25	1.8	0% - 20%
EP005: Total Organic Carbon (TOC) (QC Lot: 1347530)									
ES1008688-021	T17 1.0-2.0	EP005: Total Organic Carbon	----	0.02	%	1.19	1.21	1.8	0% - 20%
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1340369)									
ES1008688-008	W5 0-0.5	EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
ES1008691-002	Anonymous	EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1340730)									
ES1008688-008	W5 0-0.5	EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C15 - C28 Fraction	----	3	mg/kg	5	5	0.0	No Limit
		EP071-SD: C29 - C36 Fraction	----	5	mg/kg	6	6	0.0	No Limit
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1340733)									
ES1008688-011	W5 2.0-3.0	EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C15 - C28 Fraction	----	3	mg/kg	3	4	0.0	No Limit
		EP071-SD: C29 - C36 Fraction	----	5	mg/kg	6	<5	0.0	No Limit
EP080-SD: BTEX (QC Lot: 1340369)									
ES1008688-008	W5 0-0.5	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.0	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-SD: BTEX (QC Lot: 1340369) - continued									
ES1008688-008	W5 0-0.5	EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
			106-42-3						
ES1008691-002	Anonymous	EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
			106-42-3						
		EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP090: Organotin Compounds (QC Lot: 1345349)									
ES1008682-001	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
ES1008688-001	IB5 0-0.5	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
EP090: Organotin Compounds (QC Lot: 1347388)									
ES1008688-002	IB5 0.5-1.0	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
ES1008688-012	T20 0-0.5	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
EP090: Organotin Compounds (QC Lot: 1347393)									
EB1008472-001	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	3.0	4.2	33.3	No Limit
EP130A: Organophosphorus Pesticides (Ultra-trace) (QC Lot: 1340739)									
ES1008688-008	W5 0-0.5	EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	<10.0	0.0	No Limit
		ES1008691-002	Anonymous	EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10



Sub-Matrix: **SOIL**

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 (%)
EP130A: Organophosphorus Pesticides (Ultra-trace) (QC Lot: 1340739) - continued									
ES1008691-002	Anonymous	EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (E)	470-90-6	10.0	µg/kg	<10.0	<10.0	0.0	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 1340740)									
ES1008688-008	W5 0-0.5	EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: DDT (total)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	0.0	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 (%)
EP131A: Organochlorine Pesticides (QC Lot: 1340740) - continued									
ES1008688-008	W5 0-0.5	EP131A: Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
ES1008691-002	Anonymous	EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: DDT (total)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1340741)									
ES1008688-008	W5 0-0.5	EP131B: Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
ES1008691-002	Anonymous	EP131B: Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	0.0	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 (%)
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1340741) - continued									
ES1008691-002	Anonymous	EP131B: Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1340729)									
ES1008688-008	W5 0-0.5	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit
ES1008688-001	IB5 0-0.5	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	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 (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1340729) - continued									
ES1008688-001	IB5 0-0.5	EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit		
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1340732)									
ES1008688-011	W5 2.0-3.0	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit
ES1008688-021	T17 1.0-2.0	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit

Page : 12 of 21
 Work Order : ES1008688
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : 301001-00448



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 (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1340732) - continued									
ES1008688-021	T17 1.0-2.0	EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit



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

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

Sub-Matrix: **SOIL**

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				
EG005-SD: Total Metals in Sediments by ICP-AES (QCLot: 1346677)								
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG005-SD: Total Metals in Sediments by ICP-AES (QCLot: 1346680)								
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1346676)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	110	70	130
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	103	70	130
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	111	70	130
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	105	70	130
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	109	70	130
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	94.8	70	130
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	100	70	130
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	110	70	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	123	70	130
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	50 mg/kg	102	70	130
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	105	70	130
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1346679)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	104	70	130
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	99.4	70	130
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	105	70	130
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	102	70	130
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	106	70	130
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	93.7	70	130
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	99.1	70	130
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	104	70	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	123	70	130
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	50 mg/kg	99.3	70	130
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	101	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1346675)								



Sub-Matrix: **SOIL**

Method: Compound				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
							Low	High
CAS Number	LOR	Unit	Result					
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1346675) - continued								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	89.2	74.2	126
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1346678)								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	86.5	74.2	126
EK055: Ammonia as N (QCLot: 1342140)								
EK055-SD: Ammonia as N	7664-41-7	1	mg/kg	<1	25 mg/kg	86.2	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1346963)								
EK057G: Nitrite as N (Sol.)	----	0.1	mg/kg	<0.1	4.8 mg/kg	106	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1346964)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	4.8 mg/kg	115	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1351690)								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	1000 mg/kg	102	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1351691)								
EK067G: Total Phosphorus as P	----	2	mg/kg	<2	442 mg/kg	101	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1346965)								
EK071G: Reactive Phosphorus as P	----	0.1	mg/kg	<0.1	2.5 mg/kg	102	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1347529)								
EP005: Total Organic Carbon	----	0.02	%	<0.02	100 %	100	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 1347530)								
EP005: Total Organic Carbon	----	0.02	%	<0.02	100 %	99.9	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1340369)								
EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	26 mg/kg	104	68.4	128
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1340730)								
EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	5 mg/kg	86.0	75.2	116
EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	5 mg/kg	107	75.3	113
EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	5 mg/kg	95.0	72.6	117
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1340733)								
EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	5 mg/kg	83.0	75.2	116
EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	5 mg/kg	95.0	75.3	113
EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	5 mg/kg	85.0	72.6	117
EP080-SD: BTEX (QCLot: 1340369)								
EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	101	67.5	125
EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	1 mg/kg	99.6	69	122
EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	1 mg/kg	98.0	65.3	126
EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	2 mg/kg	98.8	66.5	124
	106-42-3							
EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	1 mg/kg	103	66.7	123
EP090: Organotin Compounds (QCLot: 1345349)								



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) LowHigh	
Method: Compound	CAS Number	LOR	Unit	Result				
EP090: Organotin Compounds (QCLot: 1345349) - continued								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	117	19.5	129
EP090: Organotin Compounds (QCLot: 1347388)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	87.2	19.5	129
EP090: Organotin Compounds (QCLot: 1347393)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	92.5	19.5	129
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 1340739)								
EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	50 µg/kg	79.2	36.9	142
EP130: Carbophenothion	786-19-6	10	µg/kg	<10	50 µg/kg	19.2	0.5	157
EP130: Chlorfenvinphos (E)	470-90-6	10	µg/kg	<10.0	5 µg/kg	101	50.3	137
EP130: Chlorfenvinphos (Z)	470-90-8	10	µg/kg	<10	50 µg/kg	106	55.9	152
EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	50 µg/kg	75.3	49	140
EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	50 µg/kg	93.3	28.1	142
EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	50 µg/kg	44.9	36.6	172
EP130: Diazinon	333-41-5	10	µg/kg	<10	50 µg/kg	70.3	37.2	148
EP130: Dichlorvos	62-73-7	10	µg/kg	<10	50 µg/kg	65.7	32.7	153
EP130: Dimethoate	60-51-5	10	µg/kg	<10	50 µg/kg	83.5	33.2	150
EP130: Ethion	563-12-2	10	µg/kg	<10	50 µg/kg	59.7	44	146
EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	50 µg/kg	85.4	3.08	162
EP130: Fenthion	55-38-9	10	µg/kg	<10	50 µg/kg	80.4	10.6	157
EP130: Malathion	121-75-5	10	µg/kg	<10	50 µg/kg	113	38.1	143
EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	50 µg/kg	64.2	8.13	159
EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	50 µg/kg	118	19.7	176
EP130: Parathion	56-38-2	10	µg/kg	<10	50 µg/kg	88.8	39.2	145
EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	50 µg/kg	117	23.5	152
EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	50 µg/kg	66.1	47.1	141
EP130: Prothiofos	34643-46-4	10	µg/kg	<10	50 µg/kg	81.9	36.1	148
EP131A: Organochlorine Pesticides (QCLot: 1340740)								
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	63.4	31.7	140
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	77.9	24.5	150
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	78.3	36.9	139
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	88.5	38.2	137
EP131A: 4,4'-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	73.7	42.5	141
EP131A: 4,4'-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	83.3	34.8	140
EP131A: 4,4'-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	63.7	38	143
EP131A: DDT (total)	----	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	58.6	43.2	134
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	74.8	23.7	139
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	68.1	35.8	138
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	86.6	7.45	158



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
Method: Compound	CAS Number	LOR	Unit	Result				
EP131A: Organochlorine Pesticides (QCLot: 1340740) - continued								
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	85.1	21.6	162
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	74.1	19.3	131
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	86.0	17.9	141
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	63.1	31	153
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	68.0	34.3	138
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	67.4	18.6	146
EP131A: gamma-BHC	58-89-9	0.5	µg/kg	<0.50	5 µg/kg	70.6	30.7	145
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	87.7	15	157
EP131A: cis-Chlordane	5103-71-9	0.5	µg/kg	<0.50	5 µg/kg	56.3	22.3	145
EP131A: trans-Chlordane	5103-74-2	0.5	µg/kg	<0.50	5 µg/kg	70.5	42.4	139
EP131A: Total Chlordane (sum)	----	0.5	µg/kg	<0.50	----	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1340741)								
EP131B: Total Polychlorinated biphenyls	----	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1016	12974-11-2	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	50 µg/kg	81.6	61.3	121
EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1340729)								
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	117	----	----
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	113	----	----
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	114	----	----
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	99.8	----	----
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	103	----	----
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	99.0	----	----
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	105	----	----
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	118	----	----
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	116	----	----
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	110	----	----
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	90.3	----	----
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	107	----	----
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	79.7	----	----
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	108	----	----
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	97.5	----	----



Sub-Matrix: **SOIL**

Method: Compound				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
CAS Number	LOR	Unit	Result					
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1340729) - continued								
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	93.8	----	----
EP132B-SD: Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	91.4	----	----
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	118	----	----
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1340732)								
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	108	----	----
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	113	----	----
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	113	----	----
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	121	----	----
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	115	----	----
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	111	----	----
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	113	----	----
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	110	----	----
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	108	----	----
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	91.0	----	----
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	113	----	----
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	96.4	----	----
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	116	----	----
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	119	----	----
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	112	----	----
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	114	----	----
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	111	----	----
EP132B-SD: Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	108	----	----
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	83.4	----	----
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----



Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%) LowHigh	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1346676)							
ES1008682-002	Anonymous	EG020-SD: Arsenic	7440-38-2	50 mg/kg	107	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	102	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	106	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	91.0	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	90.6	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	104	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	97.8	70	130
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1346679)							
ES1008688-012	T20 0-0.5	EG020-SD: Arsenic	7440-38-2	50 mg/kg	104	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	100	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	106	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	91.4	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	91.9	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	105	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	99.3	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1346675)							
ES1008682-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	78.4	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1346678)							
ES1008688-011	W5 2.0-3.0	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	79.8	70	130
EK055: Ammonia as N (QCLot: 1342140)							
ES1008369-007	Anonymous	EK055-SD: Ammonia as N	7664-41-7	25 mg/kg	83.4	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1346963)							
ES1008688-008	W5 0-0.5	EK057G: Nitrite as N (Sol.)	----	3.0 mg/kg	104	70	130
EK059G: NOX as N by Discrete Analyser (QCLot: 1346964)							
ES1008688-008	W5 0-0.5	EK059G: Nitrite + Nitrate as N (Sol.)	----	3.0 mg/kg	91.8	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1351690)							
ES1008688-008	W5 0-0.5	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	98.4	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1351691)							
ES1008688-008	W5 0-0.5	EK067G: Total Phosphorus as P	----	100 mg/kg	118	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1346965)							
ES1008688-008	W5 0-0.5	EK071G: Reactive Phosphorus as P	----	2.5 mg/kg	99.4	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1340369)							
ES1008688-008	W5 0-0.5	EP080-SD: C6 - C9 Fraction	----	25 mg/kg	81.4	70	130

Page : 19 of 21
 Work Order : ES1008688
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : 301001-00448



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1340730)							
ES1008688-008	W5 0-0.5	EP071-SD: C10 - C14 Fraction	----	19.75 mg/kg	97.5	70	130
		EP071-SD: C15 - C28 Fraction	----	87.25 mg/kg	73.7	70	130
		EP071-SD: C29 - C36 Fraction	----	60 mg/kg	107	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1340733)							
ES1008688-011	W5 2.0-3.0	EP071-SD: C10 - C14 Fraction	----	19.75 mg/kg	75.9	70	130
		EP071-SD: C15 - C28 Fraction	----	87.25 mg/kg	86.8	70	130
		EP071-SD: C29 - C36 Fraction	----	60 mg/kg	100	70	130
EP080-SD: BTEX (QCLot: 1340369)							
ES1008688-008	W5 0-0.5	EP080-SD: Benzene	71-43-2	2.5 mg/kg	78.0	70	130
		EP080-SD: Toluene	108-88-3	2.5 mg/kg	83.6	70	130
		EP080-SD: Ethylbenzene	100-41-4	2.5 mg/kg	85.8	70	130
		EP080-SD: meta- & para-Xylene	108-38-3	2.5 mg/kg	83.7	70	130
		EP080-SD: ortho-Xylene	106-42-3	2.5 mg/kg	90.3	70	130
EP090: Organotin Compounds (QCLot: 1345349)							
ES1008682-002	Anonymous	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	83.1	20	130
EP090: Organotin Compounds (QCLot: 1347388)							
ES1008688-003	IB5 1.0-2.0	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	69.1	20	130
EP090: Organotin Compounds (QCLot: 1347393)							
EB1008472-002	Anonymous	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	# Not Determined	20	130
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 1340739)							
ES1008688-008	W5 0-0.5	EP130: Bromophos-ethyl	4824-78-6	50 µg/kg	48.1	36.9	142
		EP130: Carbophenothion	786-19-6	50 µg/kg	50.4	0.5	157
		EP130: Chlorfenvinphos (E)	470-90-6	5 µg/kg	51.4	50.3	137
		EP130: Chlorfenvinphos (Z)	470-90-8	50 µg/kg	# 50.8	55.9	152
		EP130: Chlorpyrifos	2921-88-2	50 µg/kg	# 45.5	49	140
		EP130: Chlorpyrifos-methyl	5598-13-0	50 µg/kg	45.5	28.1	142
		EP130: Demeton-S-methyl	919-86-8	50 µg/kg	38.1	36.6	172
		EP130: Diazinon	333-41-5	50 µg/kg	42.2	37.2	148
		EP130: Dichlorvos	62-73-7	50 µg/kg	43.1	32.7	153
		EP130: Dimethoate	60-51-5	50 µg/kg	38.9	33.2	150
		EP130: Ethion	563-12-2	50 µg/kg	54.3	44	146
		EP130: Fenamiphos	22224-92-6	50 µg/kg	59.4	3.08	162
		EP130: Fenthion	55-38-9	50 µg/kg	40.9	10.6	157
		EP130: Malathion	121-75-5	50 µg/kg	56.4	38.1	143
		EP130: Azinphos Methyl	86-50-0	50 µg/kg	54.8	8.13	159
		EP130: Monocrotophos	6923-22-4	50 µg/kg	46.3	19.7	176

Page : 20 of 21
 Work Order : ES1008688
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : 301001-00448



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 1340739) - continued							
ES1008688-008	W5 0-0.5	EP130: Parathion	56-38-2	50 µg/kg	46.0	39.2	145
		EP130: Parathion-methyl	298-00-0	50 µg/kg	45.3	23.5	152
		EP130: Pirimphos-ethyl	23505-41-1	50 µg/kg	# 40.1	47.1	141
		EP130: Prothiofos	34643-46-4	50 µg/kg	50.2	36.1	148
EP131A: Organochlorine Pesticides (QCLot: 1340740)							
ES1008688-008	W5 0-0.5	EP131A: Aldrin	309-00-2	5 µg/kg	46.8	31.7	140
		EP131A: alpha-BHC	319-84-6	5 µg/kg	44.0	24.5	150
		EP131A: beta-BHC	319-85-7	5 µg/kg	50.8	36.9	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	41.1	38.2	137
		EP131A: 4,4`-DDD	72-54-8	5 µg/kg	70.3	42.5	141
		EP131A: 4,4`-DDE	72-55-9	5 µg/kg	84.0	34.8	140
		EP131A: 4,4`-DDT	50-29-3	5 µg/kg	50.2	38	143
		EP131A: Dieldrin	60-57-1	5 µg/kg	79.4	43.2	134
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	83.1	23.7	139
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	70.1	35.8	138
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	70.2	7.45	158
		EP131A: Endrin	72-20-8	5 µg/kg	79.8	21.6	162
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	66.4	19.3	131
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	69.3	17.9	141
		EP131A: Heptachlor	76-44-8	5 µg/kg	47.7	31	153
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	105	34.3	138
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	59.9	18.6	146
		EP131A: gamma-BHC	58-89-9	5 µg/kg	57.4	30.7	145
		EP131A: Methoxychlor	72-43-5	5 µg/kg	89.6	15	157
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	77.4	22.3	145
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	58.8	42.4	139
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1340741)							
ES1008688-008	W5 0-0.5	EP131B: Aroclor 1254	11097-69-1	50 µg/kg	81.7	61.3	121
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1340729)							
ES1008688-008	W5 0-0.5	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	100	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	98.6	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	119	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	111	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	115	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	116	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	114	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	100	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	85.7	70	130

Page : 21 of 21
 Work Order : ES1008688
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : 301001-00448



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1340729) - continued							
ES1008688-008	W5 0-0.5	EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	102	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	91.5	70	130
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	110	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	109	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	86.5	70	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	110	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	118	70	130
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	98.6	70	130
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	25 µg/kg	92.8	70	130
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	25 µg/kg	76.0	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	97.2	70	130
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1340732)							
ES1008688-011	W5 2.0-3.0	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	90.8	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	107	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	112	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	111	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	111	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	95.3	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	101	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	102	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	102	70	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	110	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	102	70	130
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	83.2	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	84.0	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	81.6	70	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	87.1	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	104	70	130
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	77.6	70	130
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	25 µg/kg	90.9	70	130
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	25 µg/kg	82.7	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	81.2	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1008688	Page	: 1 of 13
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS VIVIAN SETO	Contact	: Charlie Pierce
Address	: LEVEL 3, 60 ALBERT STREET PO BOX 15081 CITY EAST BRISBANE QLD, AUSTRALIA 4000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: vivian.seto@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 07 3319 3982	Telephone	: +61-2-8784 8555
Facsimile	: +61 07 3319 7791	Facsimile	: +61-2-8784 8500
Project	: 301001-00448	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 11-MAY-2010
C-O-C number	: ----	Issue Date	: 26-MAY-2010
Sampler	: ----		
Order number	: ----		
Quote number	: BN/187/10	No. of samples received	: 22
		No. of samples analysed	: 22

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

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	07-MAY-2010	----	----	----	13-MAY-2010	14-MAY-2010	✔	
IB5 - 0-0.5,								IB5 - 0.5-1.0,
IB5 - 1.0-2.0,								W17 - 0-0.5,
W17 - 0.5-1.0,								W18 - 0-0.5,
W18 - 0.5-1.0,								W5 - 0-0.5,
W5 - 0.5-1.0,								W5 - 1.0-2.0,
W5 - 2.0-3.0,								T20 - 0-0.5,
T20 - 0.5-1.0,								T21 - 0-0.5,
T21 - 0.5-1.0,								T16 - 0-0.5,
T16 - 0.5-1.0,								T16 - 1.0-2.0,
T17 - 0-0.5,								T17 - 0.5-1.0,
T17 - 1.0-2.0								
EA150: Particle Sizing								
Snap Lock Bag	07-MAY-2010	---	---	----	24-MAY-2010	03-NOV-2010	✔	
W17 - 0-0.5,								W17 - 0.5-1.0,
W18 - 0-0.5,								W18 - 0.5-1.0,
W5 - 0-0.5,								W5 - 0.5-1.0,
W5 - 1.0-2.0,								W5 - 2.0-3.0
EA150: Soil Classification based on Particle Size								
Snap Lock Bag	07-MAY-2010	---	---	----	24-MAY-2010	03-NOV-2010	✔	
W17 - 0-0.5,								W17 - 0.5-1.0,
W18 - 0-0.5,								W18 - 0.5-1.0,
W5 - 0-0.5,								W5 - 0.5-1.0,
W5 - 1.0-2.0,								W5 - 2.0-3.0



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
EG005-SD: Total Metals in Sediments by ICP-AES								
Soil Glass Jar - Unpreserved								
IB5 - 0-0.5, IB5 - 1.0-2.0, W17 - 0.5-1.0, W18 - 0.5-1.0, W5 - 0.5-1.0, W5 - 2.0-3.0, T20 - 0.5-1.0, T21 - 0.5-1.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	IB5 - 0.5-1.0, W17 - 0-0.5, W18 - 0-0.5, W5 - 0-0.5, W5 - 1.0-2.0, T20 - 0-0.5, T21 - 0-0.5, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	07-MAY-2010	15-MAY-2010	04-JUN-2010	✓	17-MAY-2010	03-NOV-2010	✓
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved								
IB5 - 0-0.5, IB5 - 1.0-2.0, W17 - 0.5-1.0, W18 - 0.5-1.0, W5 - 0.5-1.0, W5 - 2.0-3.0, T20 - 0.5-1.0, T21 - 0.5-1.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	IB5 - 0.5-1.0, W17 - 0-0.5, W18 - 0-0.5, W5 - 0-0.5, W5 - 1.0-2.0, T20 - 0-0.5, T21 - 0-0.5, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	07-MAY-2010	15-MAY-2010	04-JUN-2010	✓	17-MAY-2010	03-NOV-2010	✓
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved								
IB5 - 0-0.5, IB5 - 1.0-2.0, W17 - 0.5-1.0, W18 - 0.5-1.0, W5 - 0.5-1.0, W5 - 2.0-3.0, T20 - 0.5-1.0, T21 - 0.5-1.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	IB5 - 0.5-1.0, W17 - 0-0.5, W18 - 0-0.5, W5 - 0-0.5, W5 - 1.0-2.0, T20 - 0-0.5, T21 - 0-0.5, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	07-MAY-2010	15-MAY-2010	04-JUN-2010	✓	24-MAY-2010	04-JUN-2010	✓



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	
EK055: Ammonia as N								
Soil Glass Jar - Unpreserved W5 - 0-0.5, W5 - 1.0-2.0, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	W5 - 0.5-1.0, W5 - 2.0-3.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	07-MAY-2010	----	----	----	12-MAY-2010	03-NOV-2010	✓
EK057G: Nitrite as N by Discrete Analyser								
Soil Glass Jar - Unpreserved W5 - 0-0.5, W5 - 1.0-2.0, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	W5 - 0.5-1.0, W5 - 2.0-3.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	07-MAY-2010	17-MAY-2010	03-NOV-2010	✓	17-MAY-2010	03-NOV-2010	✓
EK059G: NOX as N by Discrete Analyser								
Soil Glass Jar - Unpreserved W5 - 0-0.5, W5 - 1.0-2.0, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	W5 - 0.5-1.0, W5 - 2.0-3.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	07-MAY-2010	17-MAY-2010	03-NOV-2010	✓	17-MAY-2010	03-NOV-2010	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Soil Glass Jar - Unpreserved W5 - 0-0.5, W5 - 1.0-2.0, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	W5 - 0.5-1.0, W5 - 2.0-3.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	07-MAY-2010	20-MAY-2010	03-NOV-2010	✓	20-MAY-2010	03-NOV-2010	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Soil Glass Jar - Unpreserved W5 - 0-0.5, W5 - 1.0-2.0, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	W5 - 0.5-1.0, W5 - 2.0-3.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	07-MAY-2010	20-MAY-2010	03-NOV-2010	✓	20-MAY-2010	03-NOV-2010	✓



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	
EK071G: Reactive Phosphorus as P by discrete analyser								
Soil Glass Jar - Unpreserved W5 - 0-0.5, W5 - 1.0-2.0, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	W5 - 0.5-1.0, W5 - 2.0-3.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	07-MAY-2010	17-MAY-2010	03-NOV-2010	✔	17-MAY-2010	03-NOV-2010	✔
EP005: Total Organic Carbon (TOC)								
Pulp Bag IB5 - 0-0.5, IB5 - 1.0-2.0, W17 - 0.5-1.0, W18 - 0.5-1.0, W5 - 0.5-1.0, W5 - 2.0-3.0, T20 - 0.5-1.0, T21 - 0.5-1.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	IB5 - 0.5-1.0, W17 - 0-0.5, W18 - 0-0.5, W5 - 0-0.5, W5 - 1.0-2.0, T20 - 0-0.5, T21 - 0-0.5, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	07-MAY-2010	17-MAY-2010	---	----	17-MAY-2010	04-JUN-2010	✔
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved W5 - 0-0.5, W5 - 1.0-2.0, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	W5 - 0.5-1.0, W5 - 2.0-3.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	07-MAY-2010	11-MAY-2010	21-MAY-2010	✔	11-MAY-2010	21-MAY-2010	✔
Soil Glass Jar - Unpreserved W5 - 0-0.5, W5 - 1.0-2.0, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	W5 - 0.5-1.0, W5 - 2.0-3.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	07-MAY-2010	12-MAY-2010	21-MAY-2010	✔	14-MAY-2010	21-JUN-2010	✔
Soil Glass Jar - Unpreserved TRIP BLANK 6		23-APR-2010	11-MAY-2010	07-MAY-2010	✖	11-MAY-2010	07-MAY-2010	✖



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
EP080-SD: BTEX								
Soil Glass Jar - Unpreserved								
W5 - 0-0.5, W5 - 1.0-2.0, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	W5 - 0.5-1.0, W5 - 2.0-3.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	07-MAY-2010	11-MAY-2010	21-MAY-2010	✓	11-MAY-2010	21-MAY-2010	✓
Soil Glass Jar - Unpreserved								
TRIP BLANK 6		23-APR-2010	11-MAY-2010	07-MAY-2010	✗	11-MAY-2010	07-MAY-2010	✗
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved								
IB5 - 0-0.5		07-MAY-2010	14-MAY-2010	21-MAY-2010	✓	17-MAY-2010	23-JUN-2010	✓
Soil Glass Jar - Unpreserved								
IB5 - 0.5-1.0, W17 - 0-0.5, W18 - 0-0.5, W5 - 0-0.5, W5 - 1.0-2.0, T20 - 0-0.5, T21 - 0-0.5, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0	IB5 - 1.0-2.0, W17 - 0.5-1.0, W18 - 0.5-1.0, W5 - 0.5-1.0, W5 - 2.0-3.0, T20 - 0.5-1.0, T21 - 0.5-1.0, T16 - 0.5-1.0, T17 - 0-0.5,	07-MAY-2010	17-MAY-2010	21-MAY-2010	✓	19-MAY-2010	26-JUN-2010	✓
Soil Glass Jar - Unpreserved								
T17 - 1.0-2.0		07-MAY-2010	17-MAY-2010	21-MAY-2010	✓	20-MAY-2010	26-JUN-2010	✓
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Soil Glass Jar - Unpreserved								
W5 - 0-0.5, W5 - 1.0-2.0, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	W5 - 0.5-1.0, W5 - 2.0-3.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	07-MAY-2010	12-MAY-2010	21-MAY-2010	✓	14-MAY-2010	21-JUN-2010	✓
EP131A: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved								
W5 - 0-0.5, W5 - 1.0-2.0, T16 - 0-0.5, T16 - 1.0-2.0, T17 - 0.5-1.0,	W5 - 0.5-1.0, W5 - 2.0-3.0, T16 - 0.5-1.0, T17 - 0-0.5, T17 - 1.0-2.0	07-MAY-2010	12-MAY-2010	21-MAY-2010	✓	14-MAY-2010	21-JUN-2010	✓



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	
EP131B: Polychlorinated Biphenyls (as Aroclors)								
Soil Glass Jar - Unpreserved	07-MAY-2010	12-MAY-2010	21-MAY-2010	✔	14-MAY-2010	21-JUN-2010	✔	
W5 - 0-0.5,								W5 - 0.5-1.0,
W5 - 1.0-2.0,								W5 - 2.0-3.0,
T16 - 0-0.5,								T16 - 0.5-1.0,
T16 - 1.0-2.0,								T17 - 0-0.5,
T17 - 0.5-1.0,	T17 - 1.0-2.0							
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved	07-MAY-2010	12-MAY-2010	21-MAY-2010	✔	14-MAY-2010	21-JUN-2010	✔	
W5 - 2.0-3.0,								T20 - 0-0.5,
T20 - 0.5-1.0,								T21 - 0-0.5,
T21 - 0.5-1.0,								T16 - 0-0.5,
T16 - 0.5-1.0,								T16 - 1.0-2.0,
T17 - 0-0.5,	T17 - 0.5-1.0,							
T17 - 1.0-2.0								
Soil Glass Jar - Unpreserved	07-MAY-2010	12-MAY-2010	21-MAY-2010	✔	16-MAY-2010	21-JUN-2010	✔	
IB5 - 0-0.5,								IB5 - 0.5-1.0,
IB5 - 1.0-2.0,								W17 - 0-0.5,
W17 - 0.5-1.0,								W18 - 0-0.5,
W18 - 0.5-1.0,								W5 - 0-0.5,
W5 - 0.5-1.0,	W5 - 1.0-2.0							



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

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

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	3	29	10.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	5	32	15.6	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	4	39	10.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	21	9.5	9.5	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	4	39	10.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	4	39	10.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	4	39	10.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	3	21	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	2	14	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	3	32	9.4	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	39	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	1	21	4.8	4.8	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	39	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	39	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	21	9.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



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 Control Samples (LCS) - Continued							
TPH - Semivolatile Fraction	EP071-SD	2	13	15.4	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	3	32	9.4	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	39	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	1	21	4.8	4.8	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	2	39	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	39	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	39	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	21	9.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	2	13	15.4	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	14	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Buchi Ammonia - Low-Level in Sediment	EK055-SD	1	20	5.0	5.0	✓	ALS QCS3 requirement
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	20	5.0	5.0	✓	ALS QCS3 requirement
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	13	7.7	5.0	✓	ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	13	7.7	5.0	✓	ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	13	7.7	5.0	✓	ALS QCS3 requirement
Organotin Analysis	EP090	3	32	9.4	5.0	✓	ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	39	5.1	5.0	✓	ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	13	7.7	5.0	✓	ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	13	7.7	5.0	✓	ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	1	21	4.8	4.8	✓	ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	39	5.1	5.0	✓	ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	39	5.1	5.0	✓	ALS QCS3 requirement
Total Phosphorus By Discrete Analyser	EK067G	1	20	5.0	5.0	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	2	13	15.4	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	14	7.1	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Particle Size Analysis (Sieving)	EA150	SOIL	Particle Size Analysis by Sieving according to AS1289.3.6.1 - 1995
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Total Fe and Al in Sediments by ICPAES	EG005-SD	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3). LORs per NODG
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 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 (1999) Schedule B(3)
Buchi Ammonia - Low-Level in Sediment	EK055-SD	SOIL	APHA 21st ed., 4500 NH ₃ +B&G, H Samples are steam distilled (Buchi) prior to analysis and quantified using titrimetric determination.
Nitrite as N - Soluble by Discrete Analyser	EK057G	SOIL	APHA 21st ed., 4500 NO ₃ - B. Nitrite in a water extract is determined by direct colourimetry by Discrete Analyser.
Nitrate as N - Soluble by Discrete Analyser	EK058G	SOIL	APHA 21st ed., 4500 NO ₃ --F. Nitrate in the 1:5 soil:water extract is reduced to nitrite by way of a cadmium reduction column followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results.
Nitrite and Nitrate as N (NO _x)- Soluble by Discrete Analyser	EK059G	SOIL	APHA 21st ed., 4500 NO ₃ - F. Combined oxidised Nitrogen (NO ₂ +NO ₃) in a water extract is determined by Cadmium Reduction, and direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	APHA 21st ed., 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Phosphorus By Discrete Analyser	EK067G	SOIL	APHA 21st ed., 4500 P-B&F This procedure involves sulfuric acid digestion and quantification using Discrete Analyser.
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	SOIL	APHA 21st ed., 4500 P-F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2



Analytical Methods	Method	Matrix	Method Descriptions
Total Organic Carbon	EP005	SOIL	In-house. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
TPH - Semivolatile Fraction	EP071-SD	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504)
TPH Volatiles/BTEX in Sediments	EP080-SD	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Organotin Analysis	EP090	SOIL	(USEPA SW 846 - 8270D) Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quantified against an established calibration curve.
Organophosphorus Pesticides (Ultra-trace)	EP130	SOIL	USEPA Method 3640 (GPC cleanup), 8141 (GC/FPD - Capillary Column) This technique is compliant with NEPM (1999) Schedule B(3) (Method 505)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	USEPA Method 3640 (GPC cleanup), 3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PCB's (Ultra-trace)	EP131B	SOIL	USEPA Method 3640 (GPC cleanup), 3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.
Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	SOIL	APHA 21st ed., 4500 Norg- D; APHA 21st ed., 4500 P - H. Macro Kjeldahl digestion.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. 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 (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids/ Sample Cleanup	ORG17A-UTP	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na ₂ SO ₄ and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.
Organotin Sample Preparation	ORG35	SOIL	In house. 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG005-SD: Total Metals in Sediments by ICP-AES	ES1008688-011	W5 2.0-3.0	Iron	7439-89-6	22.3 %	0-20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
EP090: Organotin Compounds	EB1008472-002	Anonymous	Tributyltin	56573-85-4	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP130A: Organophosphorus Pesticides (Ultra-trace)	ES1008688-008	W5 0-0.5	Chlorfenvinphos (Z)	470-90-8	50.8 %	55.9-152%	Recovery less than lower data quality objective
EP130A: Organophosphorus Pesticides (Ultra-trace)	ES1008688-008	W5 0-0.5	Chlorpyrifos	2921-88-2	45.5 %	49-140%	Recovery less than lower data quality objective
EP130A: Organophosphorus Pesticides (Ultra-trace)	ES1008688-008	W5 0-0.5	Pirimphos-ethyl	23505-41-1	40.1 %	47.1-141%	Recovery less than lower data quality objective

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons						
Soil Glass Jar - Unpreserved TRIP BLANK 6	11-MAY-2010	07-MAY-2010	4	11-MAY-2010	07-MAY-2010	4
EP080-SD: BTEX						
Soil Glass Jar - Unpreserved TRIP BLANK 6	11-MAY-2010	07-MAY-2010	4	11-MAY-2010	07-MAY-2010	4

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.



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

Appendix 4 Secondary Laboratory Reports (AAA)



REPORT OF ANALYSIS

Laboratory Reference: A10/1568

Client: WorleyParsons Services Pty Ltd
Level 3, 60 Albert Street
Brisbane QLD 4000

Contact: Tom Koskela

Order No:
Project: Proj 31001-00448 APLNG Upstream
Sample Type: Sediment
No. of Samples: 1
Date Received: 6/05/2010
Date Completed: 28/05/2010

Laboratory Contact Details:

Client Services Manager: Lilian Wong
Technical Enquiries: Andrew Bradbury
Telephone: +61 7 3268 1228
Fax: +61 7 3268 1238
Email: brisbane@advancedanalytical.com.au
andrew.bradbury@advancedanalytical.com.au

Attached Results Approved By:

Ian Eckhard
Technical Director

Comments:

All samples tested as submitted by client. All attached results have been checked and approved for release. This is the Final Report and supersedes any reports previously issued with this batch number. This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Issue Date: 28 May 2010

Advanced Analytical Australia Pty Ltd
ABN 20 105 644 979
11 Julius Avenue,
North Ryde NSW 2113 Australia

Page 1 of 16

Ph: + 61 2 9888 9077
Fax: + 61 2 9888 9577
contact@advancedanalytical.com.au
www.advancedanalytical.com.au



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

Laboratory Reference:	-	-	/1
Client Reference:	-	-	T19 0-0.5m
Date Sampled:	-	-	4/05/2010
Analysis Description	Method	Units	
Moisture Content			
Moisture Content	04-004	%	24.1
Trace Elements			
Silver	04-001	mg/kg	<0.1
Arsenic	04-001	mg/kg	10
Cadmium	04-001	mg/kg	<0.1
Chromium	04-001	mg/kg	7.9
Copper	04-001	mg/kg	5.3
Iron	04-001	mg/kg	11,000
Mercury	04-002	mg/kg	<0.01
Manganese	04-001	mg/kg	430
Nickel	04-001	mg/kg	4.8
Phosphorus	04-001	mg/kg	170
Lead	04-001	mg/kg	2.1
Antimony	04-001	mg/kg	<0.5
Vanadium	04-001	mg/kg	27
Zinc	04-001	mg/kg	12
BTEX			
Benzene	04-021	mg/kg	<0.20
Toluene	04-021	mg/kg	<0.20
Ethyl Benzene	04-021	mg/kg	<0.20
m+p xylenes	04-021	mg/kg	<0.40
o-xylene	04-021	mg/kg	<0.20
Total BTEX	04-021	mg/kg	<1.2
Surrogate 1 Recovery	04-021	%	81
Surrogate 2 Recovery	04-021	%	80
Surrogate 3 Recovery	04-021	%	94
Date Extracted	04-021	-	10/05/2010
Date Analysed	04-021	-	11/05/2010
Total Petroleum Hydrocarbons			
TPH C6-C9	04-021	mg/kg	<10
TPH C10-14	04-020	mg/kg	<10

Issue Date: 28 May 2010

Page 2 of 16

Advanced Analytical Australia Pty Ltd
ABN 20 105 644 979
11 Julius Avenue,
North Ryde NSW 2113 Australia

Ph: + 61 2 9888 9077
Fax: + 61 2 9888 9577
contact@advancedanalytical.com.au
www.advancedanalytical.com.au



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

Laboratory Reference:	-	-	/1
Client Reference:	-	-	T19 0-0.5m
Date Sampled:	-	-	4/05/2010
Analysis Description	Method	Units	
TPH C15-28	04-020	mg/kg	<50
TPH C29-36	04-020	mg/kg	<50
Surrogate Recovery	04-020	%	94
Date Extracted	04-020	-	11/05/2010
Date Analysed	04-020	-	11/05/2010
Poly Aromatic Hydrocarbons			
Naphthalene	04-022	µg/kg	<5
1-Methylnaphthalene	04-022	µg/kg	<5
2-Methylnaphthalene	04-022	µg/kg	<5
Acenaphthylene	04-022	µg/kg	<5
Acenaphthene	04-022	µg/kg	<5
Fluorene	04-022	µg/kg	<5
Phenanthrene	04-022	µg/kg	<5
Anthracene	04-022	µg/kg	<5
Fluoranthene	04-022	µg/kg	<5
Pyrene	04-022	µg/kg	<5
Benz(a)anthracene	04-022	µg/kg	<5
Chrysene	04-022	µg/kg	<5
Benzo(b)&(k)fluoranthene	04-022	µg/kg	<10
Benzo(a)pyrene	04-022	µg/kg	<5
Indeno(1,2,3-cd)pyrene	04-022	µg/kg	<5
Dibenz(a,h)anthracene	04-022	µg/kg	<5
Benzo(g,h,i)perylene	04-022	µg/kg	<5
Coronene	04-022	µg/kg	<10
Benzo(e)pyrene	04-022	µg/kg	<5
Perylene	04-022	µg/kg	<5
Total PAHs (as above)	04-022	µg/kg	<100
Surrogate 1 Recovery	04-022	%	85
Surrogate 2 Recovery	04-022	%	88
Surrogate 3 Recovery	04-022	%	97
Date Extracted	04-022	-	12/05/2010
Date Analysed	04-022	-	12/05/2010
Organochlorine Pesticides			

Issue Date: 28 May 2010

Advanced Analytical Australia Pty Ltd
ABN 20 105 644 979
11 Julius Avenue,
North Ryde NSW 2113 Australia

Page 3 of 16

Ph: + 61 2 9888 9077
Fax: + 61 2 9888 9577
contact@advancedanalytical.com.au
www.advancedanalytical.com.au



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

Laboratory Reference:	-	-	/1
Client Reference:	-	-	T19 0-0.5m
Date Sampled:	-	-	4/05/2010
Analysis Description	Method	Units	
Aldrin	04-023	µg/kg	<1.0
<i>alpha</i> -BHC	04-023	µg/kg	<1.0
<i>beta</i> -BHC	04-023	µg/kg	<1.0
<i>gamma</i> -BHC (Lindane)	04-023	µg/kg	<1.0
<i>delta</i> -BHC	04-023	µg/kg	<1.0
<i>cis</i> -Chlordane	04-023	µg/kg	<1.0
<i>trans</i> -Chlordane	04-023	µg/kg	<1.0
<i>p,p'</i> -DDD	04-023	µg/kg	<1.0
<i>p,p'</i> -DDE	04-023	µg/kg	<1.0
<i>p,p'</i> -DDT	04-023	µg/kg	<1.0
Dieldrin	04-023	µg/kg	<1.0
<i>alpha</i> -Endosulfan	04-023	µg/kg	<1.0
<i>beta</i> -Endosulfan	04-023	µg/kg	<1.0
Endosulfan Sulphate	04-023	µg/kg	<1.0
Endrin	04-023	µg/kg	<1.0
Endrin ketone	04-023	µg/kg	<1.0
Endrin aldehyde	04-023	µg/kg	<1.0
Heptachlor	04-023	µg/kg	<1.0
Heptachlor epoxide	04-023	µg/kg	<1.0
Hexachlorobenzene	04-023	µg/kg	<1.0
Methoxychlor	04-023	µg/kg	<1.0
Oxychlordane	04-023	µg/kg	<1.0
Surrogate Recovery	04-023	%	78
Date Extracted	04-023	-	12/05/2010
Date Analysed	04-023	-	12/05/2010
Organophosphate Pesticides			
Dichlorvos	04-024	µg/kg	<20
Demeton-S-methyl	04-024	µg/kg	<20
Dimethoate	04-024	µg/kg	<20
Diazinon	04-024	µg/kg	<20
Chlorpyrifos-methyl	04-024	µg/kg	<20
Parathion-methyl	04-024	µg/kg	<20
Pirimiphos-methyl	04-024	µg/kg	<20

Issue Date: 28 May 2010

Page 4 of 16

Advanced Analytical Australia Pty Ltd
ABN 20 105 644 979
11 Julius Avenue,
North Ryde NSW 2113 Australia

Ph: + 61 2 9888 9077
Fax: + 61 2 9888 9577
contact@advancedanalytical.com.au
www.advancedanalytical.com.au



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

Laboratory Reference:	-	-	/1
Client Reference:	-	-	T19 0-0.5m
Date Sampled:	-	-	4/05/2010
Analysis Description	Method	Units	
Fenitrothion	04-024	µg/kg	<20
Malathion	04-024	µg/kg	<20
Chlorpyrifos	04-024	µg/kg	<20
Fenthion	04-024	µg/kg	<20
Parathion	04-024	µg/kg	<20
Chlorfenvinphos	04-024	µg/kg	<20
Bromophos-ethyl	04-024	µg/kg	<20
Methidathion	04-024	µg/kg	<20
Fenamiphos	04-024	µg/kg	<20
Prothiofos	04-024	µg/kg	<20
Ethion	04-024	µg/kg	<20
Carbophenothion	04-024	µg/kg	<20
Phosalone	04-024	µg/kg	<20
Azinphos-methyl	04-024	µg/kg	<20
Surrogate Recovery	04-024	%	89
Date Extracted	04-024	-	12/05/2010
Date Analysed	04-024	-	14/05/2010
Polychlorinated Biphenyls			
Mono-PCB congeners	04-029	µg/kg	<5.0
Di-PCB congeners	04-029	µg/kg	<5.0
Tri-PCB congeners	04-029	µg/kg	<5.0
Tetra-PCB congeners	04-029	µg/kg	<5.0
Penta-PCB congeners	04-029	µg/kg	<5.0
Hexa-PCB congeners	04-029	µg/kg	<5.0
Hepta-PCB congeners	04-029	µg/kg	<5.0
Octa-PCB congeners	04-029	µg/kg	<5.0
Nona-PCB congeners	04-029	µg/kg	<5.0
Deca-PCB congeners	04-029	µg/kg	<5.0
Total PCB congeners	04-029	µg/kg	<5.0
Surrogate 1 Recovery	04-029	%	104
Surrogate 2 Recovery	04-029	%	102
Date Extracted	04-029	-	12/05/2010
Date Analysed	04-029	-	12/05/2010

Issue Date: 28 May 2010

Page 5 of 16

Advanced Analytical Australia Pty Ltd
ABN 20 105 644 979
11 Julius Avenue,
North Ryde NSW 2113 Australia

Ph: + 61 2 9888 9077
Fax: + 61 2 9888 9577
contact@advancedanalytical.com.au
www.advancedanalytical.com.au



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

Laboratory Reference:	-	-	/1
Client Reference:	-	-	T19 0-0.5m
Date Sampled:	-	-	4/05/2010
Analysis Description	Method	Units	
Organotins			
Monobutyl tin	04-026	µgSn/kg	<0.50
Dibutyl tin	04-026	µgSn/kg	<0.50
Tributyl tin	04-026	µgSn/kg	<0.50
Surrogate 1 Recovery	04-026	%	90
Date Extracted	04-026	-	13/05/2010
Date Analysed	04-026	-	13/05/2010
Subcontract Analysis			
Total Organic Carbon	SUB	%	0.36
Nitrate as N	SUB	mg/kg	<0.1
Nitrite as N	SUB	mg/kg	<0.1
Total Kjeldahl Nitrogen	SUB	mg/kg	<20
Total Nitrogen	SUB	mg/kg	<20
Phosphate as P	SUB	mg/kg	<0.1
Total Ammonia as N	SUB	mg/kg	6.5

Method	Method Description
04-004	Moisture by gravimetric, %
04-001	Metals by ICP-OES, mg/kg
04-002	Mercury by CVAAS, mg/kg
04-021	TPH C6-9 & BTEX by P&T GCMS, mg/kg
04-020	TPH by GC-FID, mg/kg
04-022	Low level PAHs & Phenols by GCMS, µg/kg
04-023	Low level OC Pesticides by GCMS, µg/kg
04-024	OP Pesticides by GCMS, µg/kg
04-029	PCBS (as congeners) by GCMS, µg/kg
04-026	Organotins by GCMS, µgSn/kg
SUB	Subcontracted Analyses

Result Comments

[<] Less than

[INS] Insufficient sample for this test

[NA] Test not required

Solid sample results are reported on a dry weight basis.

Subcontracted analysis was performed by Sydney Analytical Laboratories (NATA Number 1884); reference SAL report number SAL22819B.

- Spike recovery for Fe could not be accurately determined due to a significant background analyte concentration.

Monobutyltin spike recovery could not be determined due to matrix interferences.



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

QUALITY ASSURANCE REPORT

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Silver	mg/kg	<0.1	A10/1568-1	<0.1 <0.1	A10/1430/01	100%
Arsenic	mg/kg	<0.4	A10/1568-1	10 10 RPD: 0	A10/1430/01	102%
Cadmium	mg/kg	<0.1	A10/1568-1	<0.1 <0.1	A10/1430/01	103%
Chromium	mg/kg	<0.1	A10/1568-1	7.9 7.5 RPD: 5	A10/1430/01	101%
Copper	mg/kg	<0.1	A10/1568-1	5.3 5.1 RPD: 4	A10/1430/01	98%
Iron	mg/kg	<5	A10/1568-1	11000 12000 RPD: 9	A10/1430/01	#
Mercury	mg/kg	<0.01	A10/1568-1	<0.01 <0.01	A10/1430/01	99%
Manganese	mg/kg	<0.5	A10/1568-1	430 480 RPD: 11	A10/1430/01	106%
Nickel	mg/kg	<0.1	A10/1568-1	4.8 4.8 RPD: 0	A10/1430/01	96%
Phosphorus	mg/kg	<1	A10/1568-1	170 190 RPD: 11	A10/1430/01	105%
Lead	mg/kg	<0.5	A10/1568-1	2.1 2.1 RPD: 0	A10/1430/01	94%
Antimony	mg/kg	<0.5	A10/1568-1	<0.5 <0.5	A10/1430/01	93%
Vanadium	mg/kg	<0.1	A10/1568-1	27 28 RPD: 4	A10/1430/01	103%
Zinc	mg/kg	<0.5	A10/1568-1	12 12 RPD: 0	A10/1430/01	99%

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Benzene	mg/kg	<0.20	A10/1568-1	<0.20 <0.20	A10/1568-1	83%
Toluene	mg/kg	<0.20	A10/1568-1	<0.20 <0.20	A10/1568-1	84%
Ethyl Benzene	mg/kg	<0.20	A10/1568-1	<0.20 <0.20	A10/1568-1	82%
m+p xylenes	mg/kg	<0.40	A10/1568-1	<0.40 <0.40	A10/1568-1	81%
o-xylene	mg/kg	<0.20	A10/1568-1	<0.20 <0.20	A10/1568-1	85%
Total BTEX	mg/kg	<1.2	A10/1568-1	<1.2 <1.2	A10/1568-1	N/A
Surrogate 1 Recovery	%	99	A10/1568-1	81 79 RPD: 2	A10/1568-1	83%
Surrogate 2 Recovery	%	98	A10/1568-1	80 79 RPD: 1	A10/1568-1	80%
Surrogate 3 Recovery	%	100	A10/1568-1	94 89 RPD: 5	A10/1568-1	85%

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
TPH C6-C9	mg/kg	<10	A10/1568-1	<10 <10	A10/1568-1	83%
TPH C10-14	mg/kg	<10	A10/1568-1	<10 <10	A10/1568-1	81%
TPH C15-28	mg/kg	<50	A10/1568-1	<50 <50	A10/1568-1	87%
TPH C29-36	mg/kg	<50	A10/1568-1	<50 <50	A10/1568-1	87%
Surrogate Recovery	%	101	A10/1568-1	94 101 RPD: 7	A10/1568-1	91%



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Naphthalene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	90%
1-Methylnaphthalene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	92%
2-Methylnaphthalene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	90%
Acenaphthylene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	102%
Acenaphthene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	103%
Fluorene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	103%
Phenanthrene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	103%
Anthracene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	96%
Fluoranthene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	103%
Pyrene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	103%
Benz(a)anthracene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	111%
Chrysene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	100%
Benzo(b)&(k)fluoranthene	µg/kg	<10	A10/1568-1	<10 <10	A10/1568-1	108%
Benzo(a)pyrene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	103%
Indeno(1,2,3-cd)pyrene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	130%
Dibenz(a,h)anthracene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	125%
Benzo(g,h,i)perylene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	106%
Coronene	µg/kg	<10	A10/1568-1	<10 <10	A10/1568-1	121%
Benzo(e)pyrene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	110%
Perylene	µg/kg	<5	A10/1568-1	<5 <5	A10/1568-1	97%
Total PAHs (as above)	µg/kg	<100	A10/1568-1	<100 <100	A10/1568-1	N/A
Surrogate 1 Recovery	%	82	A10/1568-1	85 88 RPD: 3	A10/1568-1	97%
Surrogate 2 Recovery	%	96	A10/1568-1	88 96 RPD: 9	A10/1568-1	95%
Surrogate 3 Recovery	%	113	A10/1568-1	97 107 RPD: 10	A10/1568-1	96%



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Aldrin	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	86%
<i>alpha</i> -BHC	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	88%
<i>beta</i> -BHC	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	87%
<i>gamma</i> -BHC (Lindane)	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	83%
<i>delta</i> -BHC	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	87%
<i>cis</i> -Chlordane	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	97%
<i>trans</i> -Chlordane	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	91%
<i>p,p'</i> -DDD	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	88%
<i>p,p'</i> -DDE	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	92%
<i>p,p'</i> -DDT	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	89%
Dieldrin	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	90%
<i>alpha</i> -Endosulfan	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	88%
<i>beta</i> -Endosulfan	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	87%
Endosulfan Sulphate	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	97%
Endrin	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	89%
Endrin ketone	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	25%
Endrin aldehyde	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	90%
Heptachlor	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	76%
Heptachlor epoxide	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	82%
Hexachlorobenzene	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	94%
Methoxychlor	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	90%
Oxychlordane	µg/kg	<1.0	A10/1568-1	<1.0 <1.0	A10/1568-1	90%
Surrogate Recovery	%	99	A10/1568-1	78 87 RPD: 11	A10/1568-1	83%



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Dichlorvos	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	85%
Demeton-S-methyl	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	96%
Dimethoate	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	97%
Diazinon	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	90%
Chlorpyrifos-methyl	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	90%
Parathion-methyl	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	96%
Pirimiphos-methyl	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	91%
Fenitrothion	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	92%
Malathion	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	96%
Chlorpyrifos	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	89%
Fenthion	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	88%
Parathion	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	94%
Chlorfenvinphos	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	103%
Bromophos-ethyl	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	91%
Methidathion	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	95%
Fenamiphos	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	119%
Prothiofos	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	96%
Ethion	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	115%
Carbophenothion	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	100%
Phosalone	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	102%
Azinphos-methyl	µg/kg	<20	A10/1568-1	<20 <20	A10/1568-1	103%
Surrogate Recovery	%	108	A10/1568-1	89 98 RPD: 10	A10/1568-1	91%



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Mono-PCB congeners	µg/kg	<5.0	A10/1568-1	<5.0 <5.0	A10/1568-1	111%
Di-PCB congeners	µg/kg	<5.0	A10/1568-1	<5.0 <5.0	A10/1568-1	114%
Tri-PCB congeners	µg/kg	<5.0	A10/1568-1	<5.0 <5.0	A10/1568-1	104%
Tetra-PCB congeners	µg/kg	<5.0	A10/1568-1	<5.0 <5.0	A10/1568-1	102%
Penta-PCB congeners	µg/kg	<5.0	A10/1568-1	<5.0 <5.0	A10/1568-1	99%
Hexa-PCB congeners	µg/kg	<5.0	A10/1568-1	<5.0 <5.0	A10/1568-1	91%
Hepta-PCB congeners	µg/kg	<5.0	A10/1568-1	<5.0 <5.0	A10/1568-1	92%
Octa-PCB congeners	µg/kg	<5.0	A10/1568-1	<5.0 <5.0	A10/1568-1	93%
Nona-PCB congeners	µg/kg	<5.0	A10/1568-1	<5.0 <5.0	A10/1568-1	91%
Deca-PCB congeners	µg/kg	<5.0	A10/1568-1	<5.0 <5.0	A10/1568-1	89%
Total PCB congeners	µg/kg	<5.0	A10/1568-1	<5.0 <5.0	A10/1568-1	N/A
Surrogate 1 Recovery	%	117	A10/1568-1	104 115 RPD: 10	A10/1568-1	104%
Surrogate 2 Recovery	%	118	A10/1568-1	102 112 RPD: 9	A10/1568-1	98%

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Monobutyl tin	µgSn/kg	<0.50	A10/1568-1	<0.50 <0.50	A10/1568-1	#
Dibutyl tin	µgSn/kg	<0.50	A10/1568-1	<0.50 <0.50	A10/1568-1	70%
Tributyl tin	µgSn/kg	<0.50	A10/1568-1	<0.50 <0.50	A10/1568-1	69%
Surrogate 1 Recovery	%	97	A10/1568-1	90 88 RPD: 2	A10/1568-1	89%

TEST	UNITS	Blank
Total Organic Carbon	%	<0.02
Nitrate as N	mg/kg	<0.1
Nitrite as N	mg/kg	<0.1
Total Kjeldahl Nitrogen	mg/kg	<20
Total Nitrogen	mg/kg	<20
Phosphate as P	mg/kg	<0.1
Total Ammonia as N	mg/kg	<0.1

TEST	Units	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Benzene	mg/kg	[NT]	[NT]	[NT]	External	98%
Toluene	mg/kg	[NT]	[NT]	[NT]	External	104%
Ethyl Benzene	mg/kg	[NT]	[NT]	[NT]	External	100%
m+p xylenes	mg/kg	[NT]	[NT]	[NT]	External	103%
o-xylene	mg/kg	[NT]	[NT]	[NT]	External	104%
Total BTEX	mg/kg	[NT]	[NT]	[NT]	External	N/A
Surrogate 1 Recovery	%	[NT]	[NT]	[NT]	External	101%
Surrogate 2 Recovery	%	[NT]	[NT]	[NT]	External	102%
Surrogate 3 Recovery	%	[NT]	[NT]	[NT]	External	108%



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

TEST	Units	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Naphthalene	µg/kg	[NT]	[NT]	[NT]	External	90%
1-Methylnaphthalene	µg/kg	[NT]	[NT]	[NT]	External	99%
2-Methylnaphthalene	µg/kg	[NT]	[NT]	[NT]	External	98%
Acenaphthylene	µg/kg	[NT]	[NT]	[NT]	External	88%
Acenaphthene	µg/kg	[NT]	[NT]	[NT]	External	90%
Fluorene	µg/kg	[NT]	[NT]	[NT]	External	91%
Phenanthrene	µg/kg	[NT]	[NT]	[NT]	External	91%
Anthracene	µg/kg	[NT]	[NT]	[NT]	External	85%
Fluoranthene	µg/kg	[NT]	[NT]	[NT]	External	91%
Pyrene	µg/kg	[NT]	[NT]	[NT]	External	91%
Benz(a)anthracene	µg/kg	[NT]	[NT]	[NT]	External	96%
Chrysene	µg/kg	[NT]	[NT]	[NT]	External	86%
Benzo(b)&(k)fluoranthene	µg/kg	[NT]	[NT]	[NT]	External	97%
Benzo(a)pyrene	µg/kg	[NT]	[NT]	[NT]	External	91%
Indeno(1,2,3-cd)pyrene	µg/kg	[NT]	[NT]	[NT]	External	108%
Dibenz(a,h)anthracene	µg/kg	[NT]	[NT]	[NT]	External	102%
Benzo(g,h,i)perylene	µg/kg	[NT]	[NT]	[NT]	External	94%
Coronene	µg/kg	[NT]	[NT]	[NT]	External	100%
Benzo(e)pyrene	µg/kg	[NT]	[NT]	[NT]	External	100%
Perylene	µg/kg	[NT]	[NT]	[NT]	External	85%
Total PAHs (as above)	µg/kg	[NT]	[NT]	[NT]	External	N/A
Surrogate 1 Recovery	%	[NT]	[NT]	[NT]	External	84%
Surrogate 2 Recovery	%	[NT]	[NT]	[NT]	External	83%
Surrogate 3 Recovery	%	[NT]	[NT]	[NT]	External	85%



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

TEST	Units	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Aldrin	µg/kg	[NT]	[NT]	[NT]	External	79%
<i>alpha</i> -BHC	µg/kg	[NT]	[NT]	[NT]	External	79%
<i>beta</i> -BHC	µg/kg	[NT]	[NT]	[NT]	External	80%
<i>gamma</i> -BHC (Lindane)	µg/kg	[NT]	[NT]	[NT]	External	80%
<i>delta</i> -BHC	µg/kg	[NT]	[NT]	[NT]	External	76%
<i>cis</i> -Chlordane	µg/kg	[NT]	[NT]	[NT]	External	79%
<i>trans</i> -Chlordane	µg/kg	[NT]	[NT]	[NT]	External	79%
<i>p,p'</i> -DDD	µg/kg	[NT]	[NT]	[NT]	External	83%
<i>p,p'</i> -DDE	µg/kg	[NT]	[NT]	[NT]	External	80%
<i>p,p'</i> -DDT	µg/kg	[NT]	[NT]	[NT]	External	84%
Dieldrin	µg/kg	[NT]	[NT]	[NT]	External	80%
<i>alpha</i> -Endosulfan	µg/kg	[NT]	[NT]	[NT]	External	81%
<i>beta</i> -Endosulfan	µg/kg	[NT]	[NT]	[NT]	External	79%
Endosulfan Sulphate	µg/kg	[NT]	[NT]	[NT]	External	79%
Endrin	µg/kg	[NT]	[NT]	[NT]	External	87%
Endrin ketone	µg/kg	[NT]	[NT]	[NT]	External	81%
Endrin aldehyde	µg/kg	[NT]	[NT]	[NT]	External	88%
Heptachlor	µg/kg	[NT]	[NT]	[NT]	External	82%
Heptachlor epoxide	µg/kg	[NT]	[NT]	[NT]	External	69%
Hexachlorobenzene	µg/kg	[NT]	[NT]	[NT]	External	74%
Methoxychlor	µg/kg	[NT]	[NT]	[NT]	External	85%
Oxychlordane	µg/kg	[NT]	[NT]	[NT]	External	82%
Surrogate Recovery	%	[NT]	[NT]	[NT]	External	75%



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

TEST	Units	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Dichlorvos	µg/kg	[NT]	[NT]	[NT]	External	89%
Demeton-S-methyl	µg/kg	[NT]	[NT]	[NT]	External	86%
Dimethoate	µg/kg	[NT]	[NT]	[NT]	External	89%
Diazinon	µg/kg	[NT]	[NT]	[NT]	External	84%
Chlorpyrifos-methyl	µg/kg	[NT]	[NT]	[NT]	External	82%
Parathion-methyl	µg/kg	[NT]	[NT]	[NT]	External	87%
Pirimiphos-methyl	µg/kg	[NT]	[NT]	[NT]	External	85%
Fenitrothion	µg/kg	[NT]	[NT]	[NT]	External	84%
Malathion	µg/kg	[NT]	[NT]	[NT]	External	87%
Chlorpyrifos	µg/kg	[NT]	[NT]	[NT]	External	82%
Fenthion	µg/kg	[NT]	[NT]	[NT]	External	82%
Parathion	µg/kg	[NT]	[NT]	[NT]	External	86%
Chlorfenvinphos	µg/kg	[NT]	[NT]	[NT]	External	88%
Bromophos-ethyl	µg/kg	[NT]	[NT]	[NT]	External	82%
Methidathion	µg/kg	[NT]	[NT]	[NT]	External	83%
Fenamiphos	µg/kg	[NT]	[NT]	[NT]	External	107%
Prothiofos	µg/kg	[NT]	[NT]	[NT]	External	86%
Ethion	µg/kg	[NT]	[NT]	[NT]	External	105%
Carbophenothion	µg/kg	[NT]	[NT]	[NT]	External	90%
Phosalone	µg/kg	[NT]	[NT]	[NT]	External	93%
Azinphos-methyl	µg/kg	[NT]	[NT]	[NT]	External	92%
Surrogate Recovery	%	[NT]	[NT]	[NT]	External	81%



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

TEST	Units	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Mono-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	95%
Di-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	100%
Tri-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	92%
Tetra-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	92%
Penta-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	92%
Hexa-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	91%
Hepta-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	92%
Octa-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	93%
Nona-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	91%
Deca-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	89%
Total PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	N/A
Surrogate 1 Recovery	%	[NT]	[NT]	[NT]	External	90%
Surrogate 2 Recovery	%	[NT]	[NT]	[NT]	External	88%



Batch Number: A10/1568
Project Reference: Proj 31001-00448 APLNG Upstream

Comments:

RPD = Relative Percent Deviation

[NT] = Not Tested

[N/A] = Not Applicable

'#' = Spike recovery data could not be calculated due to high levels of contaminants

Acceptable replicate reproducibility limit or RPD: Results < 10 times LOR: no limits

Results >10 times LOR: 0% - 50%

Acceptable matrix spike & LCS recovery limits: Trace elements 70-130%

Organic analyses 50-150%

SVOC & speciated phenols 10-140%

Surrogates 10-140%

When levels outside these limits are obtained, an investigation into the cause of the deviation is performed before the batch is accepted or rejected, and results are released.