Marina site location and boundary

Georges Cove Marina Development
Supplementary Preliminary Investigation

Figure 1.1

1.1 Overview of the Preliminary Investigation

Environmental monitoring has been undertaken on the marina site since 1993 and parameters related to potential contamination were considered in various technical assessments. However, the previous (ie prior to the PI) frequency of sampling and the analytical suites did not allow a complete assessment of the current potential site contamination, consistent with the requirements of cl 7(2) of SEPP 55.

The PI (EMM 2015a) was undertaken in May to July 2015, and encompassed a desktop review of all available historic sampling information, a site inspection and a field investigation program assessing soil, dredge pond sediment and dredge pond water. The investigation was undertaken in accordance with the *Guidelines for Consultants Reporting on Contaminated Sites* (OEH 2011).

The PI results did not identify any exceedances of the National Environment Protection (Assessment of Contamination) Measures (ASC NEPM) human health guideline values (NEPC 2013). A small number of exceedances of ecological assessment criteria were identified, that were either considered to be irrelevant, or present at a low and acceptable risk in the context of the proposed future land use.

Accordingly, the PI did not identify contamination issues that would preclude the proposed future land use as a proposed marina development as well as for high-density residential dwellings with minimal opportunities for soil access. However, the source of the ammonia enriched groundwater and dredge pond water was uncertain. Ammonia enriched groundwater was not considered to represent a risk to human health and the potential, long-term ecological risk was not considered to be increased by the proposed development.

1.2 Scope of works

Works completed for this SPI allow further understanding of the current marina site contamination status. This was achieved via a supplementary environmental sampling program (ie in addition to the PI sampling program), comprising collection of:

- six soil samples from six test pits;
- ten dredge pond sediment samples;
- ten dredge pond water samples at five locations (comprising collection of a shallow and deep sample at each location); and
- three groundwater samples from existing groundwater monitoring bores.

Laboratory analysis of the primary and quality control samples for a range of contaminants of potential concern was undertaken. The field observations and analytical data are presented in Section 4 of this report.

The study was undertaken in accordance with contaminated land planning guidelines, and was performed in general accordance with relevant guidelines made or endorsed under Section 105 of the *Contaminated Land Management Act 1997* (CLM Act*)* including:

- *Guidelines for Consultants Reporting on Contaminated Sites* (OEH 2011); and
- *National Environment Protection (Assessment of Site Contamination) Measure*, Schedule *B2 Guideline on Site Characterisation* (ASC NEPM) (NEPC 2013).

2 Supplementary preliminary investigation method

As part of the SPI, samples were collected from four mediums: shallow soil, dredge pond sediment, dredge pond water and groundwater. Sampling was undertaken on 9 and 17 November 2015 by a qualified environmental scientist. Stormwater and Georges River water samples were not collected as part of the SPI as recent, quarterly monitoring results (from 2014 and 2015) collected by WaterTest were available.

The soil test pits locations, and the dredge pond sediment and water sampling locations were selected to provide broad and representative spatial coverage of the marina site, supplementing the coverage of previous investigations. Sampling locations including historic locations (ie prior to 2015), PI and SPI sampling locations are shown in Figure 2.1.

2.1 SPI sampling method

2.1.1 Soil

The soil samples were collected at locations around the perimeter of the dredge pond that were not assessed in the PI. This provided greater site coverage of site soil conditions.

An excavator was employed to excavate test pits for soil sample collection. The excavator had a 600 mm bucket. Fresh soil samples were collected directly from the bucket using a trowel. Test pits soil samples were obtained:

- within the upper soil/fill; and
- at the fill and natural soil interface.

Field observations of visual and/or olfactory evidence of potential soil contamination, including the presence of anthropogenic material (eg debris, ash, bricks) were recorded during the test pit excavation. The test pits were back filled with the excavated material once the samples were collected.

2.1.2 Dredge pond sediment

The dredge pond sediment sampling program employed a systematic, grid-based sampling pattern for unbiased sample collection. The dredge pond was divided into 15 rectangles (each 7,000 m^2) (Figure 2.2). One dredge pond sediment sample was collected from each grid square.

Dredge pond sediment samples were collected from the base of the dredge pond (between 1 to 3 m below the water level) using a Van Veen grab sampler. Sampling was undertaken from a boat to allow samples to be collected away from the pond banks. Of the 15 dredge pond sediment samples, a representative 10 samples were sent to the laboratory for analysis.

Dredge pond sediment particle size distributions were analysed in samples from five locations. Sediment was classified into the following groups: fines (diameter <75µm), sand (75 µm to 2 mm), gravel (2 mm to 6 cm) and cobbles (>6 cm).

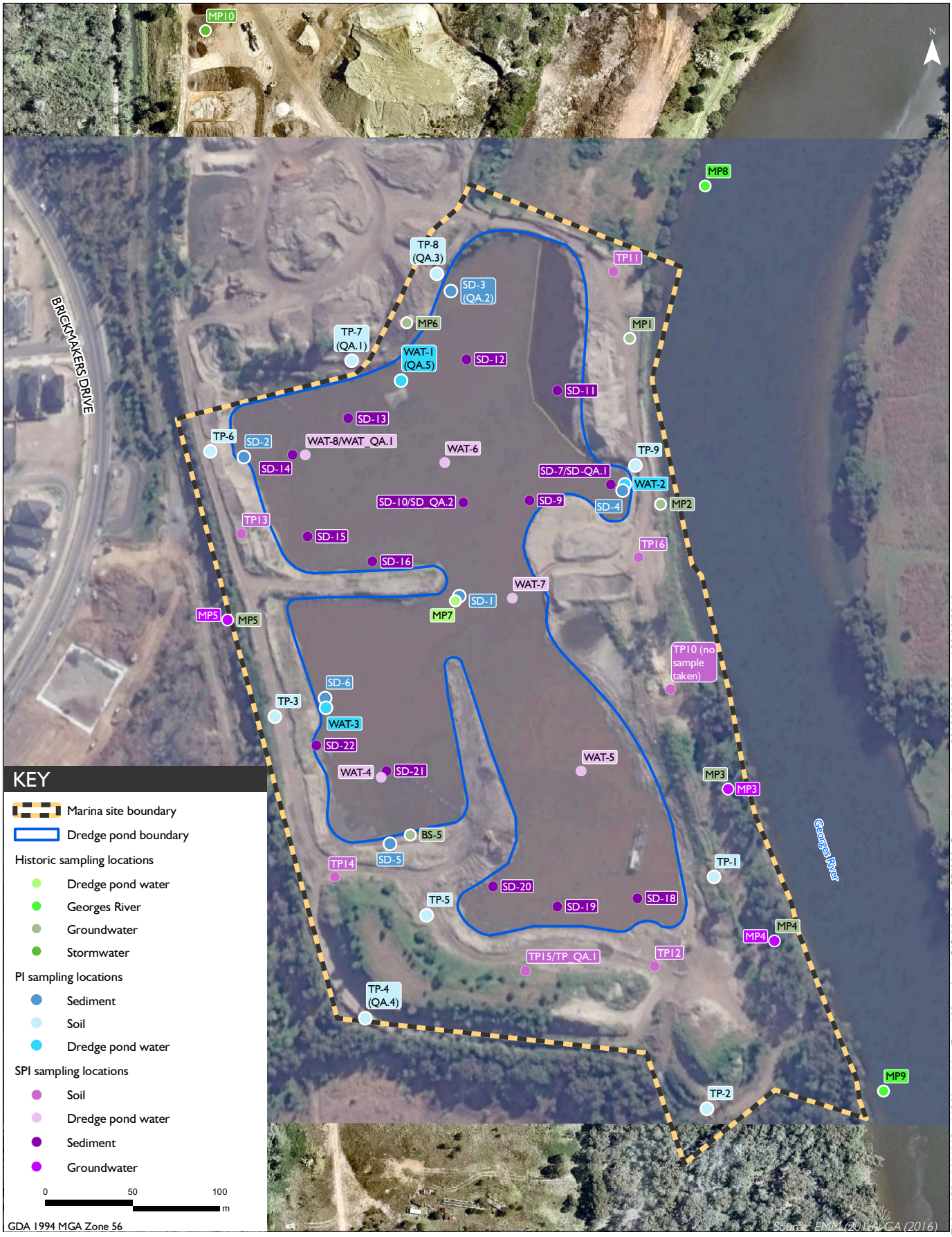
2.1.3 Dredge pond water

Ten dredge pond water samples were collected at five locations (Figure 2.2). A shallow (approximately 1 m below water level) and deep (approximately 3 m below the water level) sample was collected at each location.

Dredge pond water samples were collected using a double check, stainless steel bailer, lowered on a rope. Double check bailers allow for direct sample selection at the target sampling depth. Sampling was undertaken from a boat with the samples collected from alternative sides of the boat to minimise disturbance of the water column.

2.1.4 Groundwater

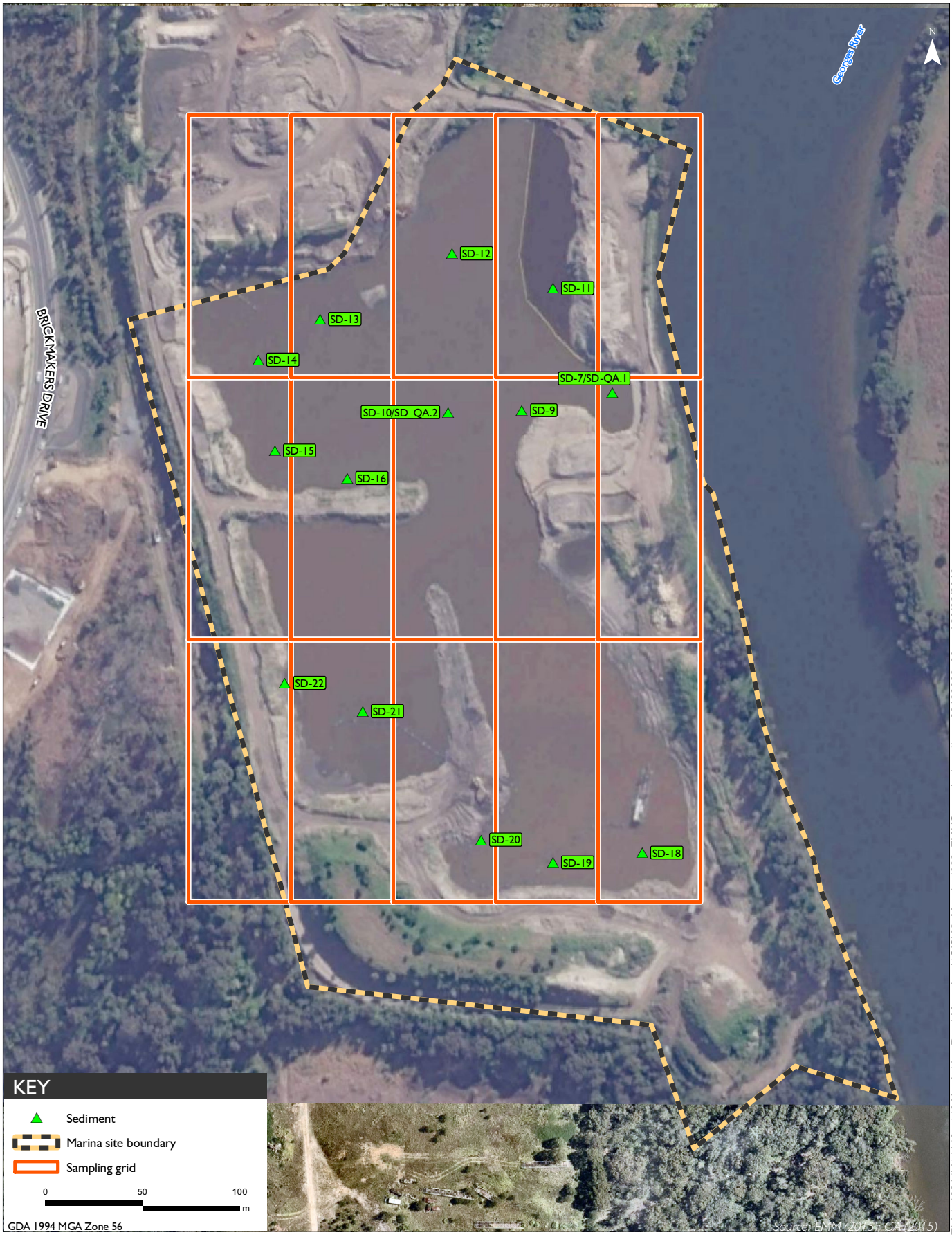
Groundwater samples were collected from three existing groundwater monitoring bores. The original network comprised six monitoring bores, although half of these have since been destroyed. An electro-submersible pump was used to purge the bores with sample collection once the field parameters (pH, electrical conductivity (EC) and temperature) had stabilised (in accordance with AS*/NZ 5667.11:1998, Water Quality - Sampling*).



Sampling locations

Georges Core Marina Development
Supplementary Preliminary Investigation

Figure 2.1



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Dredge pond sampling locations (grid pattern)

Georges Cove Marina Development
Supplementary Preliminary Investigation

Figure 2.2

2.2 Quality assurance and quality control measures

The field quality assurance/quality control (QA/QC) measures were in accordance with ASC NEPM (Schedule B2) and included the following:

- Soil and water samples were immediately placed in new, laboratory provided, bottles/jars, ensuring that the headspace within the sampling bottles/jars was minimised.
- Records of field activities, observations, sample locations (including duplicates) and field parameters were made immediately in the field.
- All sample jars and bottles were labelled and were stored in ice-cooled eskies.
- Samples were delivered to the primary and secondary laboratories within the appropriate handling times and with completed chain of custody documentation.
- All sampling equipment (ie the bailer, trowel, grab sampler) was rinsed with deionised water between sampling locations to avoid cross-contamination. A new pair of nitrile gloves was worn at each sampling location by the sampler.
- Duplicate or blind intra-laboratory samples were collected to measure the precision of the analytical procedure. Duplicate samples were collected for all mediums and were analysed for the same parameters as the primary sample.
- A duplicate inter-laboratory sample was collected to measure the precision of the primary laboratory (ALS) analytical procedure. This sample was sent to a secondary laboratory (Envirolab).
- A trip blank comprising a laboratory supplied deionised water sample, accompanied the samples during collection and was submitted with the samples to assess the potential for cross-contamination in the sample handling, storage and shipment process.
- A trip spike, comprising a laboratory supplied sample spiked with a known quantity of benzene, toluene, ethyl benzene, xylene, naphthalene (BETXN) and total petroleum hydrocarbons (TPH)/total recoverable hydrocarbons (TRH), accompanied the samples during collection and was submitted with the samples to assess the potential for loss of volatiles in the sample handling, storage and shipment process.
- Rinsate samples were obtained from sampling equipment by running deionised water over the decontaminated sampling equipment with subsequent collection of the sample to evaluate the effectiveness of decontamination procedures.

2.3 Field parameters

Groundwater and dredge pond water physiochemical parameters (temperature, EC, pH, oxidation reduction potential (ORP) and dissolved oxygen) were measured in the field using a calibrated YSI water quality meter.

2.4 Laboratory analytes

The SPI analytical suites for the different mediums are detailed in Table 2.1, with individual analytes included in the results summary tables (Appendix A). The number of samples collected for each medium and analytical suite is also included in Table 2.1. The laboratory analytical methods are listed in the laboratory reports (Appendix B).

Table 2.1 Overview of SPI analytical suite (including number of samples)

Analyte suite	Soil samples	Dredge pond sediment samples	Dredge pond water samples	Groundwater samples
Physiochemical parameters	-	-	10	3
Total suspended solids	-	-	10	3
Alkalinity	-	-	10	-
Major ions	-	-	10	-
Metals	6	10	10	3
Nutrients	-	10	10	3
Total petroleum hydrocarbons	6	10	10	3
Total recoverable hydrocarbons	6	10	10	3
BTEXN	6	10	10	3
Polycyclic aromatic hydrocarbons	6	10	10	3
Polychlorinated biphenyls	2	3	-	-
Pesticides	2	3	-	-

Notes: BTEXN = benzene, toluene, ethyl-xylene, xylene, naphthalene.

The numbers of combined PI and SPI samples are presented in Section 4.

2.5 Assessment criteria

2.5.1 Soil

The ASC NEMP *Schedule B1: Guideline on Investigation Levels for Soil and Groundwater* (NEPC 2013) presents health-based and ecological investigation and screening levels for soil, groundwater and vapour. The investigation and screening levels are intended for use as Tier 1 screening levels, and to trigger consideration of an appropriate site-specific risk-based assessment approach or appropriate risk management options where they are exceeded.

i Health-based assessment criteria

In consideration of the proposed future land uses for the site, which include residential, commercial and open space, the following health-based soil assessment criteria were adopted for the assessment of contamination within the site:

- The ASC NEMP risk-based Health Investigation Levels (HIL) were adopted for selected organic and inorganic chemicals in Table 1A(1) of Schedule B(1) – “health investigation levels for soil contaminants”. For this investigation, a high-density residential exposure scenario (HIL B: residential with minimal opportunities for soil access) was conservatively adopted.

- The ASC NEPM Health Screening Levels (HSL) in Table 1A(3) of Schedule B(1) – "soil HSLs for vapour intrusion" were adopted. For this investigation, the HSL A&B "low-high residential land use" criteria for assessing human health risk via the inhalation pathway were conservatively adopted. Given the sandy nature of the fill and natural soil at the site, HSLs for sandy soil at a depth of 0 m to <1 m were adopted. In addition, the non-volatile TRH fractions (>C_{16}-C_{40}) were assessed via the direct contact assessment criteria presented in the CRC CARE Technical Report no.10 (Friebel and Nadebaum 2011).

ii Ecological assessment criteria

The ecological soil assessment criteria adopted for the assessment of site contamination included the following:

- The ASC NEPM Ecological Investigation Levels (EIL) "urban residential and public open space" exposure criteria in Tables 1B(1) to 1B(5) of Schedule B(1) were adopted.

- The ASC NEPM Ecological Screening Levels (ESL) in Table 1B(6) of Schedule B(1) were adopted, for fine soil in an "urban residential and public open space" exposure scenario.

It is noted that physical soil parameters were not analysed for the derivation of EILs for zinc, copper, chromium(III), nickel and lead. Accordingly, the most conservative combination of the ambient background concentrations for old suburbs with low traffic in NSW, and the added contaminant limits for urban residential and public open space were adopted. This is considered to be sufficiently conservative for assessing the ecological suitability of the site soils for the proposed land uses.

2.5.2 Dredge pond sediment

The *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (*Water Quality Guidelines*) (ANZECC and ARMCANZ 2000) include Interim Sediment Quality Guidelines (ISQG) (Table 3.5.1). Sediments are important, both as a source and sink of dissolved contaminants, and can provide a source of bioavailable contaminants for benthic biota. The guidelines are applicable to slightly to moderately disturbed (ISQG-low) and highly disturbed (ISGQ-high) conditions, and results have been compared to both the low and high trigger values. The ISQG aim to identify sediments where contamination concentrations are likely to result in adverse effects on sediment ecological health, and thus can be used as a trigger for consideration of management options.

2.5.3 Dredge pond water and groundwater

The *Water Quality Guidelines* have been used to assess the dredge pond water and groundwater quality. The application of the guidelines considers the environment type, environmental values and existing condition, as well as the level of change that is considered acceptable. The environmental values of the dredge pond water and groundwater are considered to be aquatic ecosystem (freshwater and marine), with recreational use for dredge pond water only (once it becomes the marina basin).

Environmental value is considered in the freshwater and marine aquatic ecosystem trigger values. The environment is considered to be slightly to moderately disturbed, meaning the toxicant trigger values for the protection of 95% of species have been used except where ANZECC and ARMCANZ (2000) recommend the use of the trigger values for the protection of 99% of species for slightly to moderately disturbed ecosystems.

Trigger values for freshwater and marine water species are different, with freshwater trigger values generally lower for metals, non-metallic inorganics, phenols and xylenols than marine trigger values. However, marine water trigger values are lower for total petroleum hydrocarbons and pesticides. The comparison of results for the groundwater and dredge pond water samples with both fresh and marine water trigger values is considered warranted for this assessment as these waters are expected to interact with the Georges River, which is estuarine and has a variable EC/total dissolved solids (TDS) concentration.

Default trigger values for the physico-chemical stressors (ie EC and ammonia) for South-east Australia, Lowland Rivers (Lowland Rivers) for have been adopted. These trigger values are derived from ecosystem data for unmodified or slightly to modified ecosystems. Therefore, the adoption of these default trigger values is conservative for both the dredge pond and Georges River given they receive substantial storm water runoff contribution from an urban, industrial catchment.

The *Guidelines for Managing Risks in Recreational Water* (NHMRC 2008) (*Recreational Water*) assesses the risks to recreational uses of water (eg water used for water skiing or swimming) from physical and chemical stressors. Section 9.3.2 of the guidelines recommends adopting a multiplier of the *Australian Drinking Water Guidelines* (NHMRC/NRMMC 2011) criteria to account for the difference in the assumed water ingestion volume in a recreational context when assessing the human health hazards associated with chemicals. The guidelines recommend that the *Australian Drinking Water Guidelines* criterion is multiplied by 10, with the assumption that water ingested during recreational activity is approximately 10% (200 mL) of that assumed for daily drinking water intake (2 L), used for the derivation of the health-based drinking water guidelines.

3 Quality control and quality assurance

Specific field quality assurance (QA) methods and quality control (QC) measures were employed to validate the reliability of the data for interpretive use and as the basis for decisions. The QA/QC program was completed in accordance with standard industry environmental protocols, including:

- ASC NEPM, *Schedule B2 Guideline on Site Characterisation*;
- Australian Standard 4482.1 2005 *Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil*; and
- Australian New Zealand Standard 5667.1:1998 *Water Quality–Sampling*.

3.1 Field quality assurance and quality control

3.1.1 Field sheets

Field observations and measurements recorded in the field were documented in field sheets. These are included in Appendix C.

3.1.2 Duplicate samples

Duplicate samples were collected for all mediums and were analysed for the same parameters as the primary sample. A duplicate intra-laboratory sample was collected to measure the precision of the primary laboratory.

Laboratory precision using duplicate samples was assessed via the relative percentage difference (RPD). The RPD is calculated by:

$$\text{RPD} = \frac{(C1 - C2)}{\left(\frac{C1 + C2}{2}\right)} x100\%$$

where C1 is the primary sample concentration and C2 is the duplicate sample concentration.

The RPD calculations are presented in Summary Table 5 in Appendix A. According to Australian Standard AS4482.1-2005, typical RPD values for soils and groundwater range from 30 to 50% while an RPD within the range of 50% is considered to show acceptable agreement. Conversely, data is considered to have poor agreement where an RPD is outside this 50% range.

There were no RPD exceedances greater than 50% from the applicable primary sample for all primary and secondary laboratory samples. The results show acceptable agreement between the primary and duplicate samples.

3.1.3 Trip spikes and blanks

All trip blank results were below the applicable laboratory limit of reporting (LOR). The maximum RPD for the soil and water trip spikes was 10%, indicating that volatile loss or gains during fieldwork was not significant.

3.1.4 Rinsate blanks

Rinsate blank concentrations higher than the laboratory LOR were reported indicating the potential for contaminants to be carried between samples. The dissolved copper and zinc, ammonia, nitrate, total nitrogen and total phosphorus concentrations were an order of magnitude higher than the laboratory LOR in the rinsate blanks. However, the rinsate results were mostly lower or comparable to the sample results.

Petroleum hydrocarbons (TPH C_6–C_9, TRH C_6–C_{10}) rinsate blanks concentrations were higher than the laboratory LOR. The same light hydrocarbon fraction results for groundwater and dredge water were below the laboratory LOR, meaning this result has not impacted the sample results

As concentrations in the rinsate blanks were lower than in the environmental samples the impact of the elevated rinsate blank concentrations is considered negligible and the assessment findings have not be adversely affected.

3.2 Laboratory quality assurance and quality control

ALS Environmental conducts its own internal QC program, which consists of:

- laboratory duplicate samples to assess the precision of the analytical procedures;
- matrix spikes to assess potential analytical bias or interferences attributable to the sample matrix;
- laboratory control samples to provide independent verification of the calibration validity;
- surrogate spikes to assess the extraction efficiency for organic analytes; and
- method blanks to assess the potential for cross-contamination in the analytical procedure and instrumentation.

The laboratory QC report sheets are presented in Appendix B. The laboratory reports also detail the surrogates and spikes used by the laboratory, the instrument detection and laboratory LOR.

3.3 Quality assurance and quality control data evaluation

Based on the review of the data completeness and comparability, and the SPI field and laboratory QA/QC procedures and results the analytical results are considered to be representative of actual conditions, and suitable for interpretive use.

The sample collection, documentation, handling, storage and transportation procedures utilised in this investigation are of an acceptable standard:

- the results of field and laboratory QA/QC samples demonstrate an adequate level of precision and accuracy as there were no exceedances of the RPD for inter-laboratory and intra-laboratory duplicate samples;
- the trip spike recoveries were within the acceptable range, indicating a negligible potential for loss of volatiles during sampling handling, storage and transport;
- the trip blank results were all below the laboratory LOR, indicating a negligible potential for cross-contamination during sampling handling, storage and transport;

- while a number of analytes were reported above the LOR in the rinsate blank, the reported concentrations were low relative to the concentrations reported in the environmental samples, and are considered to present a low risk of a material impact to the reported concentrations in the primary samples;

- laboratory detection limits are less than the adopted assessment criteria;

- samples were analysed for a range of contaminants with testing undertaken within the recommended holding times; and

- there were no instances of internal laboratory QA/QC results failing to meet their acceptance criteria.

EMM notes that QA/QC information for historical environmental monitoring at the site was not available. The March 2015 Land and Environment Court order (Moorebank Recyclers Pty Ltd v Benedict Industries Pty Ltd) indicated that all information relevant to the assessment of potential contamination of the site should be considered in the PI. While QA/QC results for historic data are not available, historic data has been considered in the PI and SPI. However, the conclusions in the PI and SPI are largely based on the results from the PI and SPI sampling events. Accordingly, reference to historical monitoring data is considered suitable for qualitative analysis (eg relative trends and patterns in historical data), but has not been relied upon for current quantitative interpretation or as the basis of management decisions.

4 Results

This chapter discusses the field and laboratory results from both the PI and SPI. Summary tables with all analyte concentrations and applicable trigger values are included in Appendix A. Laboratory SPI reports are included in Appendix B; the PI laboratory reports (from June 2015) are included in the PI report (EMM 2015a).

4.1 Soil

Test pits TP-1 to TP-9 were excavated for the PI and test pits TP-10 to TP-16 were excavated for the SPI. One soil sample was collected from each test pit, with the exception of TP-9, where two samples were collected, and TP-10 where the fill comprised bricks with insufficient matrix to collect a sample.

The samples collected for laboratory analysis were either from fill, natural material or the interface between fill and natural material. Samples were collected from all material types, with the sampling depth reflecting the depth of the future development.

An overview of the sample collection depths and field observations is provided in Table 4.1. Field notes are included in Appendix C. Given the nature of the material (largely heterogeneous fill), the descriptions in Table 4.1 are provided instead of test pit logs.

Table 4.1 Soil samples and field observations

Sample ID	Sample depth (m BGL)	Field observations
TP-1	0.5	Grey/white clay to 2 m BGL.
TP-2	0.5	Light brown, fine organic matter, becoming dark brown and very fine to 2 m BGL.
TP-3	0.5 (fill)	Fill composed of plastic and pipes to 2 m BGL.
TP-4	0.5	Light brown, fine organic matter to 1.5 m BGL, with grey/yellow, moderate plasticity clay underlying to 2 m BGL.
TP-5	0.5 (fill)	Fill composed of plastic and pipes to 2 m BGL.
TP-6	0.5 (fill)	Fill consisting of gravel road base to 1 m, overlying light brown sandy loam to 2 m BGL.
TP-7	0.5 (fill)	Fill to 0.2 m BGL, overlying low plasticity, brown clay.
TP-8	0.5	Dark brown, organic rich soil to 2 m BGL.
TP-9	0.5 & 2	Light grey, moderate plasticity clay to 2 m BGL.
TP-10	NA (fill)	Water level observed at 3 m BGL. Fill entire length of testpit, comprising bricks with minimal sand/clay matrix (ie not enough material to collect a sample).
TP-11	2.75 (fill/alluvium interface)	Fill to 2.7 m BGL, comprising brown sand, gravel with plastic and tyres. Sandy loam and alluvium underlying.
TP-12	1.5 (fill/alluvium interface)	Fill to 0.8 m BGL, comprising bricks with minimal sand/clay matrix. From 0.8 to 1.4 m BGL dark brown gravel/sand with underlying sandy loam.
TP-13	1.5 (fill)	Fill to 1.6 m BGL, comprising poly pipe, wire and plastic waste in a light brown clay matrix. Sandy loam underlying.
TP-14	3.1 (fill)	Fill to 3.5 m BGL, comprising grey/brown sand, gravel with plastic and tyres. Sandy loam underlying.
TP-15 (QA)	3.1 (fill/alluvium interface)	Fill to 3.1 m BGL, comprising light brown clay with plastic, tyres, tiles and glass. Sandy loam and alluvium underlying.
TP-16	1.1 (fill)	Fill to 1.3 m BGL, comprising brown sand, gravel with plastic. Sandy loam and alluvium underlying.

Notes: m BGL = meters below ground level.

i Field observations

The excavated material comprised fill overlying brown to light grey clayey, sandy silt, moderate plasticity clay and dark sandy loam. Fill material overlying natural soil was encountered in all test pit locations across the site, ranging in thickness from 1.6 to greater than 4.0 m. The fill typically comprised a sandy clay matrix with inclusions of anthropogenic waste, including tyres, plastic, tiles and glass.

ii Laboratory results

A statistical overview of the soil analytical results (sample count, minimum value, maximum value, mean value, the applicable trigger values and number of exceedances above trigger values) from the PI and SPI soil sampling is provided in Table 4.2. Where all concentrations were below the laboratory LOR, the analyte has not been included in this table. A full summary of results is included in Summary Table 1 (Appendix A).

Table 4.2 Soil summary

Analytes	Units	Number of samples	Minimum	Maximum	Mean	Trigger values (the number of results greater than the trigger values)			
						NEPM HIL(B)	NEMP EIL (urban residential & open space)	NEPM HSL (A&B) 0- to <1 m, sand	NEPM ESL (urban residential & open space, coarse)
Laboratory parameters									
pH		9	4.0	8.3	6.9	-	-	-	-
Metals									
Aluminium	mg/kg	6	4,960	12,400	7,168	-	-	-	-
Arsenic	mg/kg	16	<5	10	6	500 (0)	100 (0)	-	-
Cadmium	mg/kg	16	<1	1	1	150 (0)	-	-	-
Chromium	mg/kg	16	3	40	14	500 (0)	198 (0)	-	-
Copper	mg/kg	16	<5	190	48	30,000 (0)	80 (2)	-	-
Iron	mg/kg	16	2,900	38,300	19,184	-	-	-	-
Lead	mg/kg	16	<5	144	45	1,200 (0)	1,200 (0)	-	-
Manganese	mg/kg	6	76	286	176	14,000 (0)	-	-	-
Nickel	mg/kg	16	<2	17	8	1,200 (0)	35 (0)	-	-
Zinc	mg/kg	16	<5	345	96	60,000 (0)	145 (3)	-	-
Mercury	mg/kg	16	<0.1	0.1	0.1	120 (0)	-	-	-
TRH									
$>C_{16}–C_{34}$ fraction	mg/kg	16	100	240	87	-	-	5,800 (0)	300 (0)
$>C_{34}–C_{40}$ fraction	mg/kg	16	110	110	54	-	-	8,100 (0)	2,800 (0)
$>C_{10}–C_{40}$ fraction (sum)	mg/kg	16	<50	320	75	-	-	-	-
$>C_{10}–C_{16}$ fraction minus Naphthalene (F2)	mg/kg					-	-	110 (0)	120 (0)

Table 4.2 Soil summary

Analytes	Units	Number of samples	Minimum	Maximum	Mean	Trigger values (the number of results greater than the trigger values)			
						NEPM HIL(B)	NEMP EIL (urban residential & open space)	NEPM HSL (A&B) 0- to <1 m, sand	NEPM ESL (urban residential & open space, coarse)
PAH									
Phenanthrene	mg/kg	16	<0.5	3.7	0.6	-	-	-	-
Anthracene	mg/kg	16	<0.5	0.8	<0.5	-	-	-	-
Fluoranthene	mg/kg	16	<0.5	3.8	0.7	-	-	-	-
Pyrene	mg/kg	16	<0.5	3.8	0.7	-	-	-	-
Benz(a)anthracene	mg/kg	16	<0.5	1.5	<0.5	-	-	-	-
Chrysene	mg/kg	16	<0.5	1.6	<0.5	-	-	-	-
Benzo(b+j)fluoranthene	mg/kg	16	<0.5	1.7	<0.5	-	-	-	-
Benzo(k)fluoranthene	mg/kg	16	<0.5	0.6	<0.5	-	-	-	-
Benzo(a)pyrene	mg/kg	16	<0.5	1.5	<0.5	-	-	-	0.7 (2)
Indeno(1.2.3.cd)pyrene	mg/kg	16	<0.5	0.6	<0.5	-	-	-	-
Benzo(g.h.i)perylene	mg/kg	16	<0.5	0.9	<0.5	-	-	-	-
Benzo(a)pyrene TEQ	mg/kg	16	<0.5	2	1.5	4 (0)	-	-	-
Total PAHs	mg/kg	16	<0.5	20.5	7.2	400 (0)	-	-	-

Notes: ASC NEMP, NEPC (2013).

- = no trigger value for that analyte.

The key results from the soil PI and SPI results are as follows (interpretation is provided in Section 5.1):

- All metal concentrations (aluminium, arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel and zinc), with the exception of mercury, were reported above the applicable laboratory LOR in one or more samples, although there were no exceedances of the health assessment criteria (ASC NEPM: HIL B). Samples from TP-5 and TP-12 exceeded the conservative EIL for copper and zinc. The zinc EIL was also exceeded at TP-3.

- The benzo(a)pyrene concentrations at TP-3 and TP-15 (and the TP-15 QA sample) exceeded the ASC NEPM ESL trigger value. The maximum concentration was 1.5 mg/kg (TP-15), the concentration at TP-3 was 0.8 mg/kg and the concentration at TP05QA was 0.9 mg/L (Summary Table 5).

- TRH concentrations in the non-volatile carbon range (>C_{16}–C_{40}) were reported above the laboratory LOR in three samples, none of which exceeded the relevant HSLs (direct contact) and ESLs.

- All BTEXN concentrations were below the applicable laboratory LOR, as were all pesticide and total polychlorinated biphenyls (PCB) concentrations at the two sample locations.

4.2 Dredge pond sediment

A statistical overview of the PI and SPI dredge pond sediment results is provided in Table 4.3. Where all concentrations were below the laboratory LOR, the analyte has not been included in Table 4.3. A full summary table of concentrations is included in Summary Table 2 (Appendix A).

Table 4.3 Dredge pond sediment summary

Analytes	Units	Number of samples	Minimum	Maximum	Mean	Trigger values (the number of results greater than the trigger values)	
						ISQG-low	ISQG-high
pH	-	16	7.7	8.9	8	-	-
Metals*							
Arsenic	mg/kg	16	6	17	14	20 (0)	70 (0)
Chromium	mg/kg	16	<2	43	26	80 (0)	370 (0)
Copper	mg/kg	16	<5	99	69	65 (10)	270 (0)
Lead	mg/kg	16	12	270	168	50 (12)	220 (7)
Nickel	mg/kg	16	<2	21	14	21 (0)	52 (0)
Zinc	mg/kg	16	16	388	242	200 (10)	410 (0)
Mercury	mg/kg	16	<0.1	0.7	1.0	0.15 (12)	1 (0)
Nutrients							
Ammonia	mg N/kg	16	2.4	170	58	-	-
Nitrite	mg/kg	10	<0.1	0.3	0.3	-	-
Nitrate	mg/kg	3	<0.1	0.5	0.2	-	-
Nitrite+nitrate	mg/kg	3	<0.1	0.5	0.3	-	-
Total Kjeldahl nitrogen	mg/kg	10	1,290	2,260	1,702	-	-
Total nitrogen	mg/kg	10	1,290	2,260	1,702	-	-
Total organic carbon	%	6	0.32	1.92	1	-	-

Table 4.3 Dredge pond sediment summary

Analytes	Units	Number of samples	Minimum	Maximum	Mean	Trigger values (the number of results greater than the trigger values)	
						ISQG-low	ISQG-high
TPH							
C_{15}– C_{28} fraction	mg/kg	10	<100	320	141	-	-
C_{29}– C_{36} fraction	mg/kg	10	<100	460	175	-	-
C_{10}– C_{36} fraction (sum)	mg/kg	10	<50	680	288	-	-
TRH							
>C_{16}–C_{34} fraction	mg/kg	10	<100	570	248	-	-
>C_{3}–C_{40} fraction	mg/kg	7	<100	340	124	-	-
>C_{10}–C_{40} fraction (sum)	mg/kg	10	<50	840	325	-	-
PAH							
Phenanthrene	mg/kg	16	<0.8	3.6	<0.8	0.24 (1)	1.5 (1)
Fluoranthene	mg/kg	16	<0.5	4.0	1.1	-	-
Pyrene	mg/kg	16	<0.6	4.2	1.1	0.665 (8)	2.6 (1)
Benz(a)anthracene	mg/kg	16	<0.7	1.5	<0.7	0.261 (4)	1.6 (0)
Chrysene	mg/kg	16	<0.8	1.4	<0.8	0.384 (3)	2.8 (0)
Benzo(b+j)fluoranthene	mg/kg	16	<0.9	1.2	<0.9	-	-
Benzo(a)pyrene	mg/kg	16	<0.11	1.3	<0.1	0.43 (5)	1.6 (0)
Sum of PAH	mg/kg	16	<0.15	17	5.9	-	-

Notes: *ISQG = Interim sediment quality guidelines (ANZECC and ARMCANZ 2000).*

- = no trigger value for that analyte.

** Aluminium, iron and manganese are abundant in the environment and there are no ISQGs for these metals so are not summarised here.*

Sediment samples were generally composed of grey to dark grey and brown, fine silt and sand, and were odourless. No vegetation was observed in the samples.

The key results from the dredge pond sediment PI and SPI results are as follows (interpretation is provided in Section 5.2):

- The sediment pH was slightly alkaline with a mean pH of 8.
- Total arsenic, chromium and nickel concentrations were below the ISQG-low trigger values, while copper, lead, mercury and zinc concentrations exceeded the ISQG-low trigger values in one or more samples. Lead concentrations also exceeded the ISQG-high trigger value in seven samples.
- There are no assessment criteria applicable for sediment nutrients. Nitrite and nitrate concentrations were typically below the laboratory LOR. The ammonia and total nitrogen concentrations were above the laboratory LOR; the mean ammonia concentration was 58 mg N/kg and the mean total nitrogen concentration was 1,702 mg/kg.
- Concentrations of five PAH compounds (phenanthrene, pyrene, benzo(a)anthracene, chrysene and benzo(a)pyrene) exceeded the ISQG-low trigger values in one or more samples, while phenanthrene and pyrene exceeded the ISQG-high trigger values at SD-6 in the PI.

- TRH concentrations in the non-volatile carbon range (>C_{16}–C_{40}) were reported above the laboratory LOR in 10 samples. There are no applicable petroleum hydrocarbon trigger values but to provide an indicative assessment, the results were assessed against the NEMP ESL guidelines used for soil assessment. The >C_{16}–C_{34} fraction concentration was above the soil trigger value (300 mg/kg) at six locations.

- All BTEXN, pesticides and PCB concentrations were below the applicable laboratory LORs.

4.2.1 Dredge pond sediment particle size

Dredge pond sediment particle size results are provided in Table 4.4. Fine particles (<75 µm) dominate the sediments. All of the particles in SD-7 and SD-14 were fines and greater than 85% were fines at the remaining locations.

Table 4.4 Dredge pond sediment particle size distribution

Particle size range	Percentage in size range				
	SD-7	SD-9	SD-11	SD-14	SD-19
<75 µm (fines)	100	99	93	100	85
75 µm to 2 mm (sand)	<1	1	7	<1	15
2 mm to 6 mm (gravel)	<1	<1	<1	<1	<1
>6 mm (cobbles)	<1	<1	<1	<1	<1

The sand extraction dredging operation removes sand sized particles and returns the fine material to the pond. As expected, there was little sand and no gravel or cobbles in any dredge pond sediment samples.

4.3 Dredge pond water

An overview of the laboratory PI and SPI dredge pond water results is provided in Table 4.5. Where all concentrations were below the laboratory LOR, the analyte has not been included in Table 4.5.

The dredge was operating during sampling, suspending sediment and increasing the total suspended solid (TSS) concentrations. Dissolved metals were measured in the dredge pond water as the total metal concentrations are expected to reflect concentrations associated with the suspended sediment. The dissolved metal concentrations are more representative of conditions expected in the dredge pond after dredging has ceased and suspended solids have settled. The total mercury concentrations have been reported, as dissolved mercury concentrations were not analysed.

Table 4.5 Dredge pond water summary

Analyte	Units	Number of samples	Minimum	Maximum	Mean	Trigger values (the number of results greater than the trigger values)		
						Water Quality Guideline 95% protection (freshwater)	*Water Quality Guideline* 95% protection (marine)	Recreational Water
Field parameters								
Temperature	°C	13	14.7	24.1	21.0	-	-	-
EC	µS/cm	13	7,305	12,720	11,275	>2,200* (13)	-	-
pH		13	7.44	8.87	8	6.5–8* (9)	-	-
Redox	mV	13	-206.6	-15.5	-127	-	-	-
Laboratory parameters								
pH		3	7.7	7.7	7.7	6.5–8* (0)	-	-
Total dissolved solids	mg/L	10	7,710	10,400	8,742	-	-	-
Suspended solids	mg/L	10	14	112,000	37,198	-	-	-
Alkalinity	mg/L							
Bicarbonate alkalinity as $CaCO_3$	mg/L	10	179	320	217	-	-	-
Total alkalinity as $CaCO_3$	mg/L	10	179	320	217	-	-	-
Major ions	mg/L							
Sulfate	mg/L	10	699	822	734	-	-	-
Chloride	mg/L	10	3,100	3,630	3,489	-	-	-
Calcium	mg/L	10	245	330	270	-	-	-
Magnesium	mg/L	10	178	225	211	-	-	-
Sodium	mg/L	10	1,840	2,090	2,013	-	-	-
Potassium	mg/L	10	71	82	78	-	-	-
Dissolved metals								
Aluminium	mg/L	10	0.01	0.3	0.1	0.055 (6)	ID (0)	-
Arsenic	mg/L	13	0.002	0.005	<0.001	0.013 (0)	ID (0)	0.07 (0)
Chromium	mg/L	13	<0.01	0.001	<0.01	0.001 (0)	0.0044 (0)	0.5 (0)
Copper	mg/L	13	<0.01	0.004	<0.01	0.0014 (1)	0.0013 (1)	20 (0)
Iron	mg/L	13	<0.05	0.99	0.3	ID (0)	ID (0)	-
Nickel	mg/L	13	0.004	0.006	0.005	0.011 (0)	0.07/0.007 (0)[#]	0.2 (0)
Manganese	mg/L	10	0.342	0.55	0.4	1.9 (0)	ID (0)	5 (0)
Zinc	mg/L	13	0.007	0.35	0.1	0.008 (10)	0.015 (8)	-
Mercury (total in November)	mg/L	10	<0.01	0.021	<0.01	0.0006 (7)/0.00006 (7)[#]	0.0004 (5)/0.0001 (5)[#]	0.01 (3)
Nutrients								
Ammonia	mg N/L	13	5.56	13.2	8.2	0.90 (13)/0.02* (13)	0.91 (13)	-
Nitrite	mg/L	5	<0.01	0.03	<0.01	0.04* (0)	-	30 (0)
Nitrate	mg/L	10	0.03	0.32	0.1	0.04* (6)	-	500 (0)
Nitrite+nitrate	mg/L	10	0.03	0.35	0.1	-	-	-

Table 4.5 Dredge pond water summary

Analyte	Units	Number of samples	Minimum	Maximum	Mean	Trigger values (the number of results greater than the trigger values)		
						Water Quality Guideline 95% protection (freshwater)	*Water Quality Guideline* 95% protection (marine)	Recreational Water
Total Kjeldahl nitrogen	mg/L	10	5.7	152	47	-	-	-
Total nitrogen	mg/L	10	5.8	152	47	0.5* (10)	-	-
Total phosphorous	mg/L	10	0.07	60	18	0.05* (10)	-	-
Dissolved organic carbon	mg/L	10	12	60	25	-	-	-
Total organic carbon	mg/L	10	19	1,590	386	-	-	-
Chemical oxygen demand	mg/L	10	63	12,100	4,465	-	-	-
Biochemical oxygen demand	mg/L	10	<2	414	208	-	-	-
Carbonaceous biochemical oxygen demand	mg/L	10	<2	386	211	-	-	-
TPH								
C_{15}– C_{28} fraction	µg/L	13	<100	2,220	340	-	-	-
C_{29}– C_{36} fraction	µg/L	13	<50	2,400	312	-	-	-
C_{10}– C_{36} fraction (sum)	µg/L	13	<50	4,620	614	-	-	-
TRH								
>C_{16}–C_{34} fraction	µg/L	13	<100	3,990	532	-	-	-
>C_3–C_{40} fraction	µg/L	13	<100	1,300	196	-	-	-
>C_{10}–C_{40} fraction (sum)	µg/L	13	<100	5,290	690	-	-	-
PAH								
Acenaphthylene	µg/L	13	<1	2.8	2.8	-	-	-
Phenanthrene	µg/L	13	<1.0	5.1	2.6	-	-	-
Anthracene	µg/L	13	<1.0	3.3	3.3	-	-	-
Fluoranthene	µg/L	13	<1.0	14	7.5	-	-	-
Pyrene	µg/L	13	<1.0	20	10.2	-	-	-
Benz(a)anthracene	µg/L	13	<1.0	8.1	4.0	-	-	-
Chrysene	µg/L	13	<1.0	7.9	3.9	-	-	-
Benzo(b+j)fluoranthene	µg/L	13	<1.0	14	6.8	-	-	-
Benzo(k)fluoranthene	µg/L	13	<1.0	6.4	3.0	-	-	-
Benzo(a)pyrene	µg/L	13	<0.5	10	5.2	-	-	0.1 (3)
Indeno(1.2.3.cd)pyrene	µg/L	13	<1.0	6.7	3.4	-	-	-
Dibenz(a.h)anthracene	µg/L	13	<1.0	1.4	1.4	-	-	-
Benzo(g.h.i)perylene	µg/L	13	<1.0	7.6	3.9	-	-	-

Notes: *- = no trigger value for that analyte.*

* = South-east Australian Lowland Rivers default value.

[#] Trigger value for the protection of 99% of species is recommended for slightly-moderately disturbed marine ecosystems.

The key results from the dredge pond water PI and SPI results are as follows (interpretation is provided in Section 5.3):

- Field pH was slightly alkaline with a mean pH of 8.4, most pH values exceeded the upper limit of the Lowland Rivers trigger value (pH 8).
- The mean EC was 12,455 µS/cm, indicating the water was moderately saline (Australian Resource Council 1998). All EC measurements exceeded the upper limit of the Lowland Rivers trigger value (2,200 µS/cm).
- The TSS concentrations varied from 10 mg/L to 112,000 mg/L (112 g/L) indicating that the water quality in the pond was influenced by ongoing dredging at the time of sampling.
- Dissolved aluminium, copper and zinc concentrations exceeded the freshwater trigger value in at least one sample. Zinc and copper concentrations exceeded the marine trigger value in at least one sample; there is no marine trigger for aluminium. Dissolved arsenic, chromium, iron, nickel and manganese concentrations were below the freshwater, marine and recreation trigger values (where applicable).
- Total mercury concentrations exceeded the LOR (0.0001 mg/L) in six samples (out of ten analysed) and therefore freshwater trigger values (for the protection of 99% of species) were exceeded in these samples. Five total mercury concentrations exceeded the marine trigger values (95% and 99% protection (both high ecological value and slightly to moderately disturbed ecosystem values are recommended), and three samples exceeded the recreational trigger value.
- Dredge pond water nutrient concentrations typically exceeded the applicable assessment criteria. The total nitrogen and total phosphorous concentrations exceeded the trigger value for Lowland Rivers at all sampling locations. The mean ammonia concentration measured during the PI and SPI was 8.2 mg N/L. This exceeds the Lowland Rivers trigger value of 0.02 mg N/L, the trigger value for the protection of 95% of aquatic freshwater species (0.9 mg N/L) and the trigger value for the protection of 95% of aquatic marine species (0.91 mg N/L). The nitrate concentration exceeded the Lowland Rivers trigger value (0.04 mg N/L) at six locations. There was no trend in nutrient concentrations between the shallow and deep samples.
- The benzo(a)pyrene concentrations exceeded the *Recreational Water* trigger value (0.0001 mg/L) at three locations. Additional PAH compounds were reported above the laboratory LOR (in a total of three samples), there are no other PAH guideline values available.
- TRH concentrations in the non-volatile carbon range (>C_{16}–C_{40}) were reported above the laboratory LOR in 3 samples. There are no *Water Quality Guideline* freshwater or marine TRH guideline values.
- All BTEXN concentrations were below the laboratory LOR at all locations.

4.4 Groundwater

Three groundwater samples were collected from the existing monitoring network. Bore logs prepared by Dames & Moore (1994) are included in Appendix D. An overview of the groundwater PI and SPI laboratory concentrations is provided in Table 4.6. Where all concentrations were below the laboratory LOR, the analyte has not been included in Table 4.6.

Table 4.6 Groundwater summary

Analyte	Units	Number of samples	Minimum	Maximum	Mean	Trigger values (the number of exceedances of the trigger values)	
						Water Quality Guideline **95% protection (freshwater)**	***Water Quality Guideline*** **95% protection (marine)**
Field parameters							
Temperature	°C	3	18.8	19.2	19	-	-
EC	µS/cm	3	1,520	13,263	8,977	>2,200* (2)	-
pH	pH units	3	5.75	8.22	7	6.5 (1)–8* (1)	-
Dissolved oxygen	mg/L	3	3.31	17.93	11	-	-
Redox	mV	3	-167.7	36.9	-93	-	-
Laboratory parameters							
pH	pH units	3	4.07	7.89	6	6.5(2)	-
Total dissolved solids	mg/L	3	932	9,210	6,307	-	-
Dissolved metals							
Aluminium	mg/L	3	0.06	7.83	3	0.055 (3)	ID (0)
Arsenic	mg/L	3	<0.001	0.01	0.006	0.013 (0)	ID (0)
Cadmium	mg/L	3	<0.001	0.0041	0.001	0.0002 (1)	0.005/0.0007 (1)[#]
Copper	mg/L	3	0.001	0.006	0.003	0.0014 (2)	0.0013 (2)
Iron	mg/L	3	3.4	28	12	ID (0)	ID (0)
Lead	mg/L	3	<0.001	0.002	0.002	0.0034 (0)	0.0044 (0)
Manganese	mg/L	3	0.33	2.7	1	1.9 (1)	ID (0)
Nickel	mg/L	3	0.003	0.06	0.02	0.011 (1)	0.007 (1)/0.0007 (3)[#]
Zinc	mg/L	3	0.037	0.92	0.3	0.008 (3)	0.015 (3)
Nutrients							
Ammonia	mg N/L	3	1.1	4.7	2.4	0.9 (3)/0.02* (3)	0.91 (3)
Nitrate	mg/L	3	0.01	0.04	0.02	0.04* (0)	-
Nitrite+nitrate	mg/L	3	0.01	0.04	0.02	-	-
Total Kjeldahl nitrogen	mg/L	3	1.8	7.6	4.8	-	-
Total nitrogen	mg/L	3	1.8	7.6	4.8	0.5* (3)	-
Total organic carbon	mg/L	3	14	94	45.7	-	-

Notes: *- = no trigger value for that analyte.*

* = South-east Australian Lowland Rivers default value.

[#] Trigger value for the protection of 99% of species is recommended for slightly-moderately disturbed marine ecosystems.

The key results from the groundwater PI and SPI results are as follows (interpretation is provided in Section 5.4):

- Groundwater salinity is variable across the marina site and overall is considered to be marginally to moderately saline. The EC result exceeded the Lowland Rivers upper trigger value (2,200 µS/cm) at two locations.
- The pH range was 5.75 to 8.22, and overall conditions were acidic to slightly alkaline.

- Dissolved aluminium, cadmium, copper, manganese, nickel and zinc concentrations were above the applicable *Water Quality Guideline* freshwater trigger values in at least one sample. Cadmium, copper, nickel and zinc concentrations were above the applicable freshwater and marine trigger values in at least one sample. Arsenic and lead concentrations were below the marine and freshwater trigger values. There is no trigger value for iron;

- The ammonia and total nitrogen concentrations exceeded the Lowland Rivers trigger values at all locations sampled. The mean ammonia concentration, 2.4 mg N/L (MP-3), exceeded the trigger value for the protection of 95% of aquatic freshwater species (0.9 mg N/L) and the trigger value for the protection of 95% of aquatic marine species (0.91 mg N/L).

- All TPH/TRH, BTEXN and PAH concentrations were below the laboratory LOR.

The 2014 and 2015 WaterTest quarterly groundwater sampling results indicate:

- That the groundwater EC fluctuates, and can be an order of magnitude higher than the EC measured by EMM.

- The mean groundwater ammonia concentration (2014–15) was 8.1 mg N/L with the maximum concentration (33 mg N/L) reported for MP-5 in October 2015.

- The TPH concentration was below the laboratory LOR in July 2015.

5 Site characterisation

Historic, PI and SPI site investigations have assessed the contamination status of the marina site soil, dredge pond sediment, dredge pond water and groundwater. The current contamination status of the marina site based on these investigations is discussed in this chapter. The proposed marina outline is superimposed onto the investigation locations in Figure 5.1 to indicate the proposed land use in each area of the site.

5.1 Soil

Fill material, including anthropogenic debris, is widespread across the site to an average depth of approximately 2.5 m BGL, and was greater than 4 m thick in one test pit (TP-10, on the eastern border between Georges River and the dredge pond).

The combined PI and SPI soil analytical results indicated seven exceedances of soil assessment criteria. Two exceedances were for the ASC NEPM ESL for benzo(a)pyrene (0.7 mg/kg) in soil samples containing fill. The maximum concentration was 1.5 mg/kg at TP-15 (3.1 m BGL, near the southern site boundary) and the other exceedance was 0.8 mg/kg at TP-3 (0.5 m BGL, near the western site boundary). Both of these test pits included anthropogenic debris such as plastic (Table 4.1). The remaining five exceedances were for the ASC NEPM EIL for copper and zinc at TP-3, TP-5 and TP-12. Again, these test pits contained anthropogenic debris.

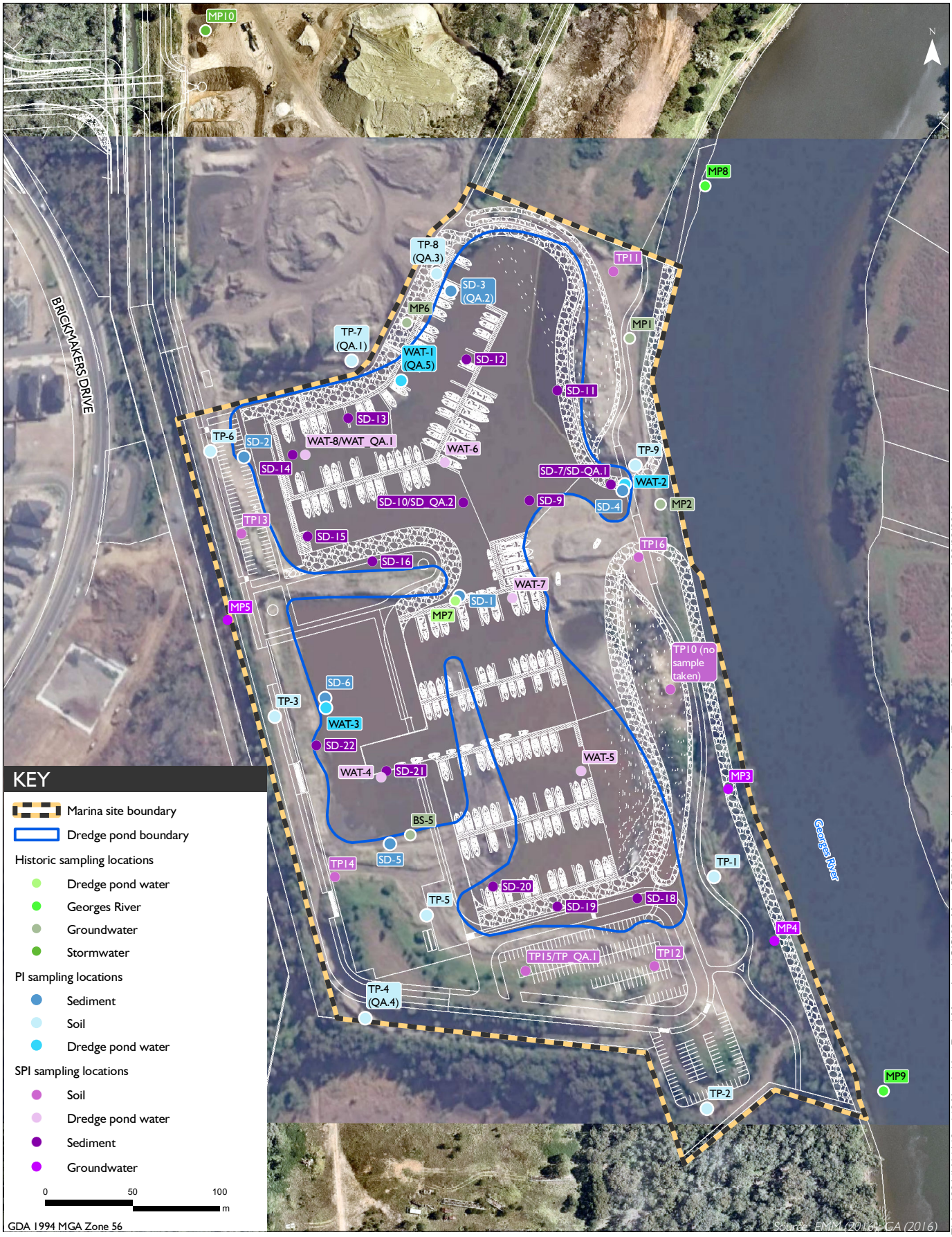
The proposed marina development will consist predominantly of parking lots, buildings and roadways close to the western and southern marina site boundaries. Each of the areas with soil assessment criteria exceedances (TP-3, TP-5, TP-12 and TP-15) will be covered by road, carpark or building (Figure 5.1). Ecological values are considered to be of low relevance in areas that will be beneath sealed surfaces. Therefore, the elevated soil benzo(a)pyrene and metals concentrations are of low ecological relevance.

The potential aesthetic soil impacts posed by anthropogenic debris in the fill material are considered to be of limited relevance as the majority of the existing fill will either be below sealed surfaces or building footprints, or will be removed from the marina site to prepare the landform for development.

5.2 Dredge pond sediment

The dredge pond sediment copper, lead, mercury and zinc concentrations were above the applicable ISQG-low assessment criteria. Lead concentrations also exceeded the ISQG-high assessment criteria. Therefore, further investigation of dredge pond sediment management is required.

A study investigating the distribution of heavy metals in surficial sediments of the Georges River and the Botany Bay estuary was used in planning for the extensive dredging associated with the construction of an additional runway at Sydney's international airport (Birch et al 1996). This study found that sediments of the Georges River and tributaries have high copper, zinc and lead concentrations. The maximum copper concentration in the main channel was 80 mg/kg, the maximum lead concentration was 110 mg/kg and the maximum zinc concentration was 340 mg/kg. Higher concentrations were measured in bays and tributaries, where flow is lower and where there are historic contamination sources (maximum copper concentration of 457 mg/kg, maximum lead concentration of 924 mg/kg and maximum zinc concentration of 2,641 mg/kg). The concentrations of these metals are generally higher in the upstream sections compared to lower in the estuary, possibly due to lower flushing in the upper river compared to frequent tidal flow flushing in the lower estuary (Birch et al. 1996).



Sampling locations and proposed development

Georges Core Marina Development
Supplementary Preliminary Investigation

Figure 5.1

As the marina site is in the upstream section of the Georges River, metal concentrations in the Georges River sediments are expected to be at the higher end of the range adjacent to the dredge pond. The maximum concentrations of copper (99 mg/kg) and zinc (388 mg/kg) in the dredge pond sediment are similar to the maximum concentrations of these metals in the main channel of the Georges River. The maximum concentration of lead (270 mg/kg) in the dredge pond sediment is higher than the maximum lead concentration measured in the main channel of the Georges River. There were 12 exceedances of the ISQG-low trigger values for mercury in the dredge pond sediments. However, equivalent information on mercury concentrations in the Georges River could not be found.

The dredge pond sediment contains high concentrations of organic matter (mean 1.9% total organic carbon) and high total nitrogen concentrations (mean 1,702 mg/kg). Nitrate and nitrite concentrations were mostly below the laboratory LOR, but ammonia concentrations were high (mean 58 mg N/kg).

The PAH concentrations in the sediment were above the ISQG-low for five analytes, including benzo(a)pyrene. There were two exceedances of the ISQG-high, for phenanthrene and pyrene at SD-6. The sum of PAH ranged from <0.5 mg/kg to 17 mg/kg.

Sediments of Georges River have high concentrations of PAH (Brown and Maher 1992). The PAH concentrations in sediment of the Georges River (0.01 to 1.3 mg/kg) exceed those found in previous studies of similar rivers in industrialised urban areas of Australia (Brown and Maher 1992).

In the absence of a more detailed understanding of metal and nutrient concentrations in the Georges River sediments adjacent to the site and given the elevated PAH concentrations, management measures should be implemented to minimise the transfer of sediments from the dredge pond to the Georges River.

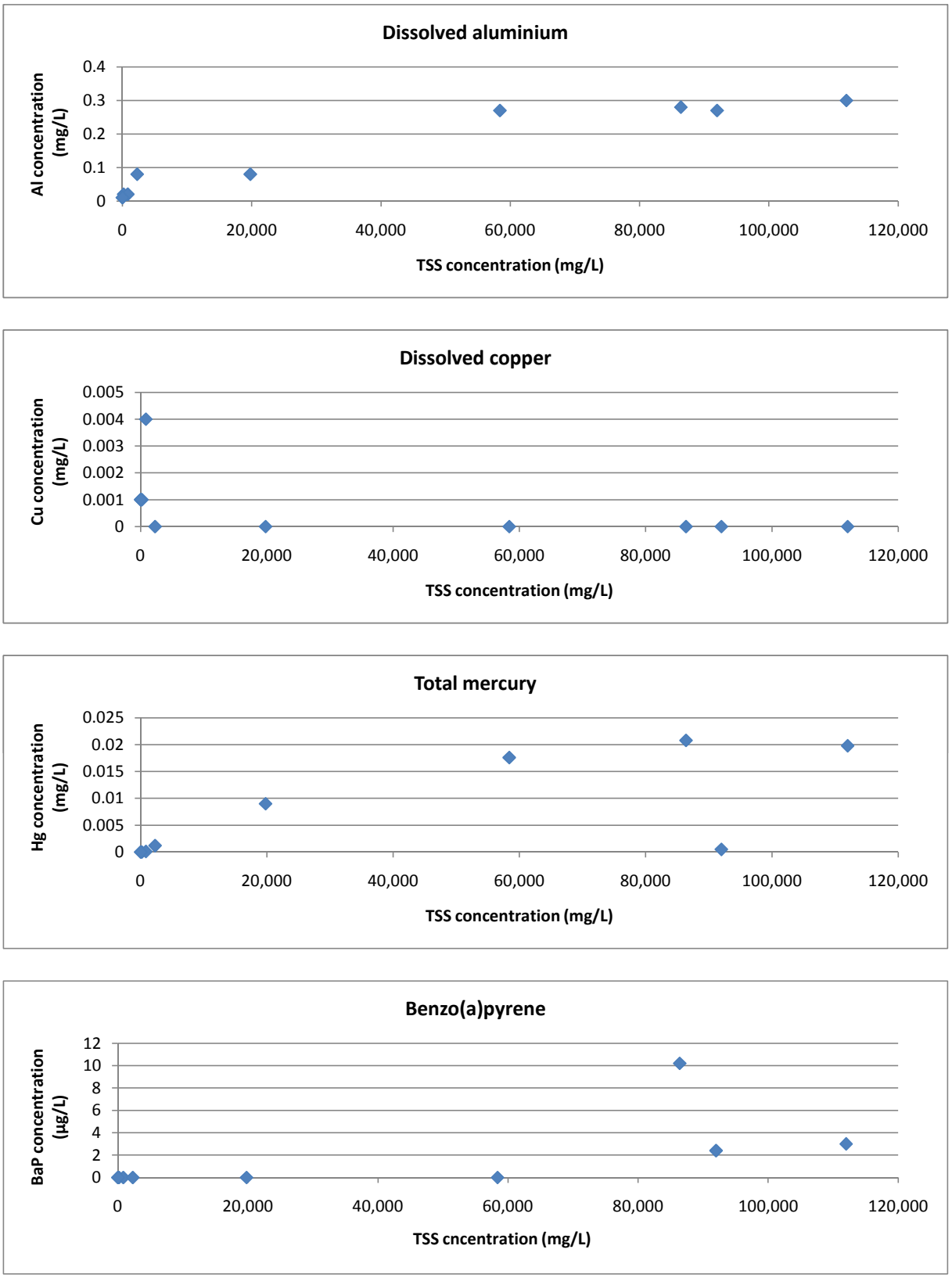
5.3 Dredge pond water

As stated in Section 4.2, the dredge was operating on the dredge pond at the time of SPI water sampling, resulting in high TSS concentrations in the majority of the samples.

The dissolved metal concentrations in the dredge pond water were generally below the trigger values for the protection of freshwater and marine ecosystems, with the exception of aluminium (six samples), zinc (ten samples) and copper (one sample). The elevated aluminium and zinc concentrations were associated with elevated TSS concentrations (up to 112,000 mg/L). The sample with the highest dissolved copper concentration (0.004 mg/L at WAT-7s also had a high TSS concentration (836 mg/L).

The total mercury concentration exceeded the LOR in seven out of ten samples. These mercury concentrations exceeded the freshwater triggers (for protection of 95% and 99% of species), while five samples exceeded the marine triggers (for protection of 95% and 99% of species) and three samples exceeded the recreational trigger.

The higher total mercury concentrations were correlated with higher TSS concentrations. The samples with low TSS concentrations also had low dissolved metal (and total mercury) concentrations (Figure 5.2). This indicates that metal concentrations will be much lower in the dredge pond water once suspended sediments are allowed to settle.



Metals and benzo(a)pyrene concentrations in the dredge pond

Georges Cove Marina Development

Supplementary Preliminary Investigation

Figure 5.2

The recreational guideline for benzo(a)pyrene (0. 1 µg/L) was exceeded in three samples, the maximum concentration was 10.2 µg/L WAT-6s. These samples all had high TSS concentrations (>86,000 mg/L). It is acknowledged that the laboratory LOR for benzo(a)pyrene (0.5 µg/L) exceeded the recreational guideline value (0.1 µg/L). However, the concentrations of all organic analytes (TRHs, BTEX and PAHs) were below the LOR in all of the samples where benzo(a)pyrene was below the LOR. This indicates that is unlikely any organic analytes (including benzo(a)pyrene) were present above a concentration of concern in these samples.

The dredge pond water had high total organic carbon concentrations (mean 386 mg/L) and high dissolved organic carbon concentrations (mean 386 mg/L). Total nitrogen concentrations (mean 47 mg/L) and total phosphorous concentrations (mean 18 mg/L) were above the Lowland Rivers trigger values in all dredge pond water samples. These high nutrient concentrations are reflected in the high chemical oxygen demand (mean 4,465 mg/L) and biochemical oxygen demand (208 mg/L). There was generally a correlation between nutrient and TSS concentrations (Figure 5.3).

The dredge pond water ammonia concentrations have been generally increasing since 2009 but have been decreasing more recently. The ammonia concentrations reported in the PI and SPI were above the trigger values for Lowland Rivers. The mean ammonia concentration was 12.6 mg N/L in the PI samples, decreasing to 6.8 mg N/L in the SPI samples. In the SPI samples, there was little correlation between ammonia concentrations and TSS concentrations at low TSS concentrations, but there was a correlation at higher TSS concentrations (Figure 5.3).

The results from the PI and SPI indicate that the concentrations of some metals, benzo(a)pyrene and nutrients were elevated in the dredge pond water. Accordingly, consideration of appropriate management measures is warranted to ensure that they do not present an unacceptable risk to the aquatic ecosystem of Georges River.

Elevated metals and benzo(a)pyrene concentrations were associated with elevated TSS concentrations. Therefore a decline in TSS concentrations in dredge pond water (eg by allowing suspended sediments to settle) would be expected to accompany a decrease in metals and benzo(a)pyrene concentrations. The concentrations of these contaminants are likely to remain low as long as sediment is not resuspended into the water column.

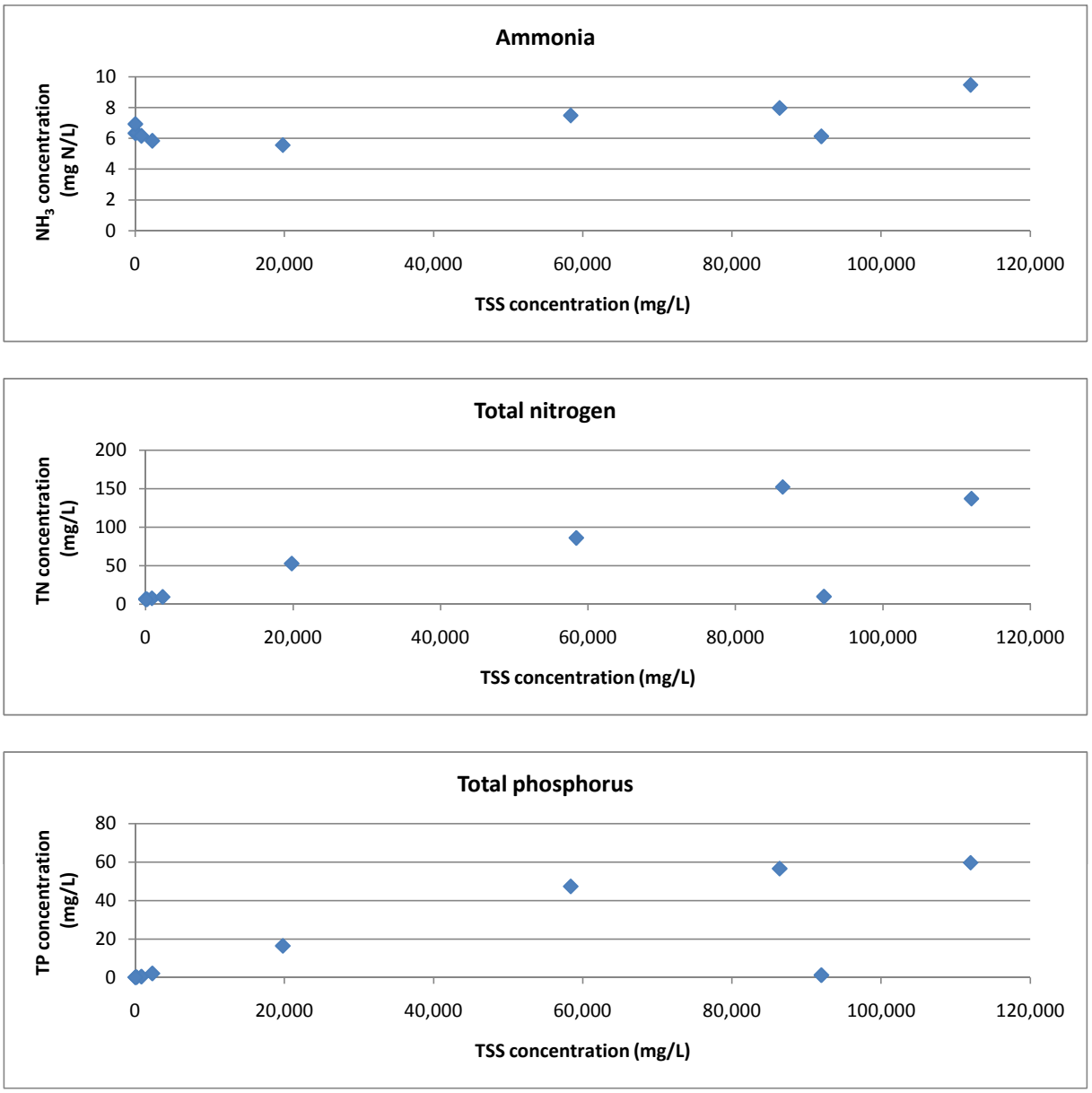
Eutrophication, or algal blooms, result from excessive algal and plant growth that is reliant on nutrient food sources, particularly phosphates. Upon death the algal consumes oxygen and a state of hypoxia ensues. Nutrient concentrations in the dredge pond water will need to be managed to prevent eutrophication when the marina basin is opened to the Georges River. As detailed in the EIS (EMM 2015b), Benedict Industries has committed to only opening the dredge pond to the Georges River once the water quality in the dredge pond and Georges River are similar.

5.4 Groundwater

Groundwater was sampled as part of the SPI. Sampling results collected as part of routine monitoring by WaterTest were also considered in this assessment.

The groundwater is marginal to moderately saline and acidic to slightly alkaline.

The dissolved aluminium, cadmium, copper, manganese, nickel and zinc concentrations in the groundwater were above the trigger values for the 95% protection of freshwater species in some or all of the SPI groundwater samples. Dissolved metals were highest at MP-5, to the west of the dredge pond, and were lower at TP-3 and TP-4 between the dredge pond and the Georges River.



Nutrient and ammonia concentrations in the dredge pond

Georges Cove Marina Development

Supplementary Preliminary Investigation

Figure 5.3

Total organic carbon concentrations in groundwater ranged from 14 to 94 mg/L in the SPI samples. Based on the SPI samples, the mean total nitrogen concentration in the groundwater (4.8 mg/L) exceeded the trigger value for Lowland Rivers (0.5 mg/L). The mean ammonia concentration (2.4 mg N/L) exceeded the trigger value for the protection of 95% of freshwater aquatic species (0.9 mg N/L) and the trigger value for the protection of 95% of marine species (0.91 mg N/L).

Historic groundwater ammonia concentrations are available for ammonia from 2002 to 2015. The ammonia concentration at MP-5 has fluctuated with a maximum concentration of 68 mg N/L in July 2011. The highest ammonia concentration measured as part of the SPI (4.7 mg N/L) was at MP-3, between the dredge pond and the river.

5.5 Contaminant sources

5.5.1 Soils

The elevated benzo(a)pyrene, copper and zinc concentrations were measured in soil samples from four test pits that all contained fill containing ash and anthropogenic debris. It is likely that this anthropogenic debris is the source of these contaminants.

Prior to 1993, the unlined stormwater drain running north–south along the western marina site boundary discharged to the paddock where the dredge pond is now located. Metals are common contaminants in urban runoff and it is likely that they entered the site via this drain.

5.5.2 Dredge pond sediments

Georges River has been exposed to discharge from urban and industrial development over many years. As a result, metal concentrations (eg copper, zinc and lead) are elevated in sediments in the river. Similarly, it is likely that runoff from the urban and industrial catchment in the unlined stormwater drain along the western marina site boundary (and previously discharged onto the site) has contributed to high metal concentrations in the dredge pond sediment. However unlike the Georges River, there has been very little flushing of the marina basin which has potentially allowed metals to accumulate. Metals, in particular lead, bind to clay material. As the sand has been removed from site via dredging, the clay material and clay-bound metals may have been concentrated.

The source of organic matter and high nutrient concentrations in dredge pond sediments is likely to be a combination of urban and industrial runoff (as for the metals) and potentially from surface runoff from recycling activities to the north of the marina site. Ammonia in sediments typically results from bacterial decomposition of natural and anthropogenic organic matter accumulated in sediment.

The sources of elevated PAH concentrations are likely to be a combination of urban and industrial runoff (as for the metals); and potentially fill at the marina site that has leached into the dredge pond.

The old landfill to the immediate south of site is a potential source of contamination, contributing to contamination of groundwater and the dredge pond sediments at the site. Operations at the site are described in the *Environmental Assessment for the Materials Recycling Facility, Newbridge Road, Moorebank* (Nexus Environmental Planning 2013) as follows:

> The main section of the Site is a disused landfill which occupies approximately 75% of the Site. Landfilling of the Site commenced in 1972 by Collex, following an approval from the then Metropolitan Waste Disposal Authority and the then State Pollution Control Commission. Landfilling continued until 1979. The Site was licensed to accept non-putrescible wastes which show little tendency to decompose such as document paper and builders rubble. Vegetation and other decomposable materials may have been accepted at the landfill as they were considered as non-putrescible at the time of landfilling.
>
> The landfill was constructed by first building a clay dam around the Site followed by filling inside. The ground beneath the fill was lined with clay in the southern section of the Site but not beneath the northern section of the Site. There does not appear to have been any excavation of the natural materials prior to filling. As filling of each area was completed, a layer of compacted clay was applied, with a thickness ranging between 300mm and 600mm. Stormwater channels draining to the Georges River were constructed to collect and remove surface water runoff from the landfill. The sequence of landfilling followed a natural ridge line which separated the southern and northern sides of the landfill area. The northern side was the first to be filled, between June 1972 and September 1975. The southern side was filled until June 1976, when, for reasons unknown, filling ceased for just over a year. Filling resumed in July 1977 and continued until 1979 when the landfill closed.

5.5.3 Dredge pond water

There is a hydraulic connection between the dredge pond, groundwater and the Georges River through the alluvium. The concentrations of identified contaminants of concern in the dredge pond and the groundwater (Table 5.1) provides an indication of likely contaminant sources.

Table 5.1 Dredge pond and groundwater comparison

Analyte	Units	Dredge pond water mean	Groundwater				Trigger values (the number of exceedances of the trigger values)	
			MP-3	MP-4	MP-5	Mean	*Water Quality Guideline* (freshwater)	*Water Quality Guideline* (marine)
Field parameters								
EC	µS/cm	11,275	12,148	13,263	1,520	8,977	>2,200*	-
pH	pH units	8.2	8.2	7.6	5.8	7.2	6.5 (1)–8*	-
Laboratory parameters								
Total dissolved solids	mg/L	8,742	9,210	8,780	932	6,307	-	-
Dissolved metals								
Copper	mg/L	<0.01	0.001	0.002	0.006	0.003	0.0014	0.0013
Lead	mg/L	<0.001	<0.001	<0.001	0.002	<0.001	0.0034	0.0044
Zinc	mg/L	0.35	0.037	0.065	0.92	0.34	0.008	0.015

Table 5.1 Dredge pond and groundwater comparison

Analyte	Units	Dredge pond water mean	Groundwater				Trigger values (the number of exceedances of the trigger values)	
			MP-3	MP-4	MP-5	Mean	*Water Quality Guideline* (freshwater)	*Water Quality Guideline* (marine)
Nutrients								
Ammonia	Mg N/L	8.2	4.67	1.12	1.43	2.41	0.9/0.02*	0.91
Total nitrogen	mg/L	47	5	1.8	7.6	4.8	0.5*	-
Total organic carbon	mg/L	386	29	14	94	46	-	-

Note: * = South-east Australian Lowland Rivers default value.

The salinity of dredge pond water and groundwater reflects a mixture of river water, fresher groundwater discharge (as shown by the lower TDS concentration in MP-5) and surface runoff.

The highest copper, lead and zinc concentrations were measured in samples from MP-5. This groundwater monitoring bore is located between the unlined drain to the west of the site and the dredge pond. This result indicates that the drain is a source of the metals in the pond. Metal concentrations are lower in the dredge pond and are lower again in monitoring bores MP-3 and MP-4, where some flushing with river water is likely to be occurring, compared to MP-5. This flushing is implied by the higher TDS concentration (salinity) in MP-3 and MP-4 compared to MP-5.

It is likely that the dredge pond sediments are a sink for copper, lead and zinc. In addition, the re-suspension of fines during dredging maintains metal levels above the guideline trigger values, as exceedances are associated with high TSS concentrations. Similarly, PAH may be resuspended with the sediments, although the source of PAH is more likely to be anthropogenic debris in fill.

The highest concentrations of nutrients are in the dredge pond water. This is consistent with nutrients being added to the dredge pond through surface runoff and groundwater. Nutrient concentrations in the groundwater are lower in MP-3 and MP-4, where some flushing with river water is likely to be occurring.

The source (or sources) of ammonia in the dredge pond water is not known. It is likely that nutrients are introduced to site via urban runoff; historic runoff or process water from the north of the site; and/or leachate from fill to the north and south of site of the site. There is also the potential for ammonia to be formed by bacterial decomposition of organic matter in the dredge pond sediments.

Given the flushing evident in the bores between the dredge pond and the river, and the general groundwater flow towards the river, the measured contaminants in the groundwater and dredge pond it is clear that these contaminants are currently discharging to the river. There does not appear to be any local impact to the Georges River related to ongoing discharge. The groundwater is not considered to represent a risk to human health and the potential ecological risk is not likely to be increased by the proposed development. However, management to minimise ecological risk to the Georges River is appropriate as part of developing the marina. This includes Benedict Industry's commitment not to open the dredge pond to the river until water quality in the pond is similar to the Georges River.

5.6 Human health and ecological risks

5.6.1 Risk identification

An overview of the contaminants of potential concern at the site and the mediums where contamination is observed is provided in Table 5.1. The contaminants of potential concern are: metals, ammonia, nutrients and PAHs although the risk from each contaminant in each mediums varies. Table 5.1 has been colour coded to identify the contaminants of highest concern in red; moderate concern in orange; and lowest concern in green.

Table 5.2 Contaminants of potential concern

Contaminant	Soil	Dredge pond sediment	Dredge pond water	Groundwater
		Assessment criteria/guideline exceedances		
Metals*				
Aluminium	-	-	Freshwater TV exceeded in 6 samples. Exceedances correlated with high TSS concentrations (>1 g/L). No exceedances in samples with low TSS concentrations (<1 g/L).	Freshwater TV exceeded by a factor of up to about 140 with the highest concentration in groundwater west of the basin. Low concentrations in groundwater adjacent to the Georges River.
Cadmium	-	-	-	Freshwater TV exceeded by a factor of about 20 and the marine TV (for protection of 99% if species) exceeded by a factor of about 6 in one sample from west of the basin. Lower concentrations in groundwater adjacent to the Georges River.
Copper	EIL exceeded in 2 samples by a factor of up to about 2.2.	ISQG-low exceeded in 10 samples but concentrations within range reported for the Georges River.	Freshwater and marine TVs exceeded in 1 sample.	Freshwater and marine TV exceeded by a factor of up to about 5 with the highest concentration in groundwater east of the basin. The highest concentration (0.005 mg/L) in groundwater is lower than the mean concentration in Georges River water (0.006 mg/L) (Marine Pollution Research 2010).
Lead	-	ISQG-low exceeded in 12 samples and the ISQG-high exceeded in 7 samples. Concentrations higher than in the main channel of the Georges River but within the range measured in bays and tributaries, where flow is lower and where there are historic contamination sources.	-	-

Table 5.2 Contaminants of potential concern

Contaminant	Soil	Dredge pond sediment	Dredge pond water	Groundwater
		Assessment criteria/guideline exceedances		
Manganese	-	-	-	Freshwater TV exceeded in one sample by a factor of about 1.4 with the highest concentration in groundwater west of the basin. Low concentrations (below Freshwater TV) in groundwater adjacent to the Georges River.
Nickel	-	-	-	Freshwater TV exceeded in one sample by a factor of about 5 with the highest concentration in groundwater west of the basin. Marine TV (for protection of 99% if species) exceeded by a factor of up to about 85 in one sample from west of the basin. Lower concentrations in groundwater adjacent to the Georges River.
Zinc	EIL exceeded in 3 samples by a factor of about 2.	ISQG-low exceeded in 10 samples but concentrations within range reported for the Georges River.	Freshwater and marine TVs exceeded. Concentrations correlated with TSS concentrations. Some exceedances (by a factor of about 2) in samples with low TSS concentrations (<1 g/L). However, these levels are similar to the mean concentration in the Georges River (Marine Pollution Research 2010).	Freshwater and marine TV exceeded by a factor of up to about 115 with the highest concentration in groundwater west of the basin.

Table 5.2 Contaminants of potential concern

Contaminant	Soil	Dredge pond sediment	Dredge pond water	Groundwater
		Assessment criteria/guideline exceedances		
Mercury (total)	-	ISQG-low exceeded in 12 samples.	Freshwater and marine TVs exceeded by total mercury concentrations in 6 samples. All exceedances correlated with high TSS concentrations (>1 g/L). No exceedances in samples with low TSS concentrations (<1 g/L). Recreational guideline exceeded in 2 samples, both with high TSS concentrations (>58 g/L).	-
Nutrients				
Nitrate	-	-	Mean concentration exceeds TV for Lowland Rivers in 7 samples, by a factor of about 2.5.	-
Ammonia	-	-	Mean concentration exceeds TV for Lowland Rivers by a factor of about 400. Mean concentration exceeds freshwater and marine TVs by a factor of about 9.	Mean concentration exceeds TV for Lowland Rivers by a factor of about 120. Mean concentration exceeds freshwater and marine TVs by a factor of about 3. Lower concentrations in groundwater adjacent to the Georges River but still high.
Total nitrogen	-	Potential release of nutrients to water column and eutrophication risk.	Mean concentration exceeds trigger value for Lowland Rivers by a factor of about 95. Eutrophication risk.	Mean concentration exceeds trigger value for Lowland Rivers by a factor of about 10. Eutrophication risk.

Table 5.2 Contaminants of potential concern

Contaminant	Soil	Dredge pond sediment	Dredge pond water	Groundwater
		Assessment criteria/guideline exceedances		
Total phosphorus	-	-	Mean concentration exceeds trigger value for Lowland Rivers by a factor of about 370. Eutrophication risk	-
PAH				
Benzo(a) pyrene	ESL exceeded in two samples by a factor of about 1.6.	ISQG-low exceeded in 5 samples.	Recreational guideline value exceeded Exceedances correlated with high TSS concentrations (>1 g/L). No exceedances in samples with low TSS concentrations (<1 g/L).	-
Chrysene	-	ISQG-low exceeded in 3 samples.	-	-
Phenanthrene	-	Concentrations below the LOR in all but one sample. ISQG-low and -high exceeded in 1 sample.	-	-
Pyrene	-	ISQG-low exceeded in 8 samples and the ISQG-high exceeded in 1 sample.	-	-
Benzo(a) anthracene	-	ISQG-low exceeded in 4 samples.	-	-

Notes: ** Dissolved.*

EIL: environmental investigation level, and ESL: environmental screen level (NEPC 2013).

ISQG: interim sediment quality guidelines, high and low trigger values: (ANZECC and ARMCANZ 2000).

Freshwater & marine TVs: freshwater and marine trigger values for slightly to moderately disturbed ecosystems, generally for the protection of 95% of freshwater/marine species (ANZECC and ARMCANZ 2000).

River: default trigger values for South-east Australia Lowland Rivers (ANZECC and ARMCANZ 2000).

Recreational: recreational guideline (NHMRC 2008).

Eutrophication, no assessment criteria exceedance, but concentration high enough to consider a potential eutrophication risk.

5.6.2 Human health risks

The SPI and PI did not identify soil contamination issues that are considered to present an unacceptable risk to human health in the context of the proposed future land uses.

The elevated nutrient concentrations in the dredge pond water and the groundwater are not considered to represent a risk to human health as swimming in the pond water (leading to potential ingestion of pond water/groundwater) is unlikely in the context of a commercial marina.

The elevated benzo(a)pyrene and total mercury concentrations measured in the dredge pond water were associated with very high TSS concentrations. The concentrations measured in the samples with low TSS concentrations are not considered to represent an unacceptable risk to human health. Therefore, these contaminants are not considered to represent an unacceptable risk to human health if sediment remains on the base of the marina and are not resuspended into the water column.

5.6.3 Ecological risks

While the ecological assessment criteria for benzo(a)pyrene, zinc and copper were exceeded in five soil samples, the exceedances are considered to present a low and acceptable risk in the context of the operation of a commercial marina. The marina design (ie locations of car parks, roads and buildings) will contribute to further reductions in the current risk level. No other ecological criteria applicable to soils were exceeded.

The highest ecological toxicant risks contaminants in the groundwater, dredge pond water, dredge pond sediments are a result of:

- lead and pyrene in the dredge pond sediment;
- ammonia in the groundwater when the groundwater is discharging to the Georges River; and
- total mercury and ammonia in the dredge pond water.

The highest eutrophication risks are a result of:

- ammonia in the groundwater; and
- ammonia, total nitrogen and total phosphorus concentrations in the dredge pond water.

6 Conclusions and recommendations

6.1 Site suitability

A marina development is proposed on the marina site and this SPI report compliments the PI report prepared in July 2015. Together, these contamination investigations form part of the development application in accordance with cl 7(2) of SEPP 55 and have been prepared in accordance with the *Guidelines for Consultants Reporting on Contaminated* (OEH 2011).

The marina site, located adjacent to the Georges River in Western Sydney, is dominated by a dredge pond created by quarry activities that commenced in 1993. Prior to quarrying activities, the marina site was used for vegetable farming and as a dairy. Some disposal of waste (largely dredge tailings, bricks/masonry placed on access roads and some waste types that cannot be verified) occurred within the marina site. Land-filling previously occurred at the marina site and on adjoining properties to the north and south.

The PI undertaken in May to July 2015 provided an assessment of site contamination. Additional site sampling was undertaken as part of the SPI to further evaluate the nature and potential risk of ammonia in the dredge pond sediment groundwater and dredge pond water. In addition, a higher density of sampling for all mediums (ie soil, groundwater, dredge pond water and dredge pond sediment) further informed an assessment of the suitability of the site for development of a marina.

The results of historic and recent sampling indicated that the land is contaminated under the definition of contaminated land in Section 145A Part 7A of the EP&A Act:

> Contaminated land means land in, on or under which any substance is present at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.

However the PI and SPI results indicated that contaminants were limited in number and extent at the marina site. Sampling has not identified any exceedances of the ASC NEPM human health guideline values. The two exceedances of ecological assessment criteria identified in site soils were either considered to be irrelevant, present a low and acceptable risk and can be managed in the context of the proposed future land use.

Accordingly, the SPI confirmed the original conclusions of the PI, that contamination issues would not preclude the proposed future land use as a proposed marina development as well as for high-density residential dwellings with minimal opportunities for soil access.

There is the potential for metal, PAH, nutrients and nutrient concentrations in the dredge pond sediment and water to impact ecological values in the Georges River when the marina basin is first opened to the river (acute impacts) and/or during of marina operations (chronic impacts). Recommendations are provided below to minimise this risk to an acceptable level.

6.2 Recommendations

Based on the results of the PI and SPI, the following recommendations are made:

- Any material in the stockpiles or fill mounds present at the marina site that is proposed for on-site reuse should be characterised for land use suitability relative to the appropriate land use criteria in the ASC NEPM.

  Any material proposed for off-site disposal or reuse should be characterised for waste classification in accordance with the NSW EPA (2014) *Waste Classification Guidelines, Part 1: Classifying Waste*, or with regard to a relevant resource recovery order and exemption issued under the POEO Act. Upon removal, validation sampling of the footprints of the stockpiles and fill mound should be performed to confirm the suitability of the underlying soils for the proposed land use.

- Given the inherent heterogeneity of fill material present at the marina site, an unexpected finds protocol with clear instructions for identifying and managing potential undiscovered contamination issues during development should be prepared. In particular, although no evidence of asbestos containing material (ACM) was encountered during the PI, ACM is commonly associated with uncontrolled fill material in Australia and the potential presence of ACM should be proactively assessed during any civil works involving disturbance of fill material at the marina site.

- A remediation action plan should be prepared to address potential acute and/or chronic impacts to the Georges River as a result of elevated metal, nutrient and PAH concentrations in the dredge pond water and sediment. The preliminary remediation action plan should list the conditions for opening the dredge pond to the Georges River to prevent acute impacts. The risk of chronic impacts should be evaluated and appropriate management measures identified.

References

Agriculture and Resource Management Council of Australia and New Zealand and the Australian and New Zealand Environment and Conservation Council (ANZECC and ARMCANZ) 2000 *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*

Australian Water Resources Council 1998 *Hydrogeological Salinity Classification*

Australian Standard 2005 *Guide to the Investigation and Sampling of Site with Potentially Contaminated soil* AS 4482.1-2005

Australian New Zealand Standard 5667.1:1998 *Water Quality–sampling*

Birch, GF, Evenden, D and Teutsch, ME 1996, Dominance *of Point Source in Heavy Metal Distributions in Sediments of a Major Sydney Estuary (Australia*), Environmental Geology 28(4), pp. 169–174

Brown, G and Maher, W 1992, The Occurrence, Distribution and Sources of Polycylic Aromatic Hydrocarbons in the Sediments of the Georges River Estuary, Australia, *Organic Geochemistry* 18(5), pp. 657-668

Dames and Moore 1994 *Benedict Sand and Gravel Hydrogeological Investigations for Pollution Control Approval*. 21 September

EMM Mitchell McLennan (EMM) 2015a, *Preliminary Investigation of Contamination.* Report prepared for Benedict Industries Pty Ltd .July

EMM Mitchell McLennan Pty Ltd (EMM) 2015b *Georges Cove Marina, Moorebank, Environmental Impact Statement*. Report prepared for Benedict Industries Pty Ltd. July

Friebel E. And Nadebaum P. 2011 *Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater,* CRC for Contamination Assessment and Remediation of the Environment Technical Report No. 10

Marine Pollution Research 2010 *Aquatic Ecology Aspects & Environmental Assessment of Marine Concept Design.* MPR_510, June 2010

National Environment Protection Council (NEPC) (Assessment of Site Contamination) Measure 1999 (as amended in 2013a), *Schedule B1 Guideline on Investigation Levels for Soil and Groundwater* and *Schedule B2 Guideline on Site Characterisation*

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

National Health and Medical Research Council, and National Resource Management Ministerial Council 2004 *Australian Drinking Water Guidelines*

Nexus Environmental Planning 2013 *Environmental Assessment for the Materials Recycling Facility, Newbridge Road, Moorebank*. Report prepared for Concrete Recyclers (Group) Pty Ltd

NSW Environment Protection Authority (EPA) 2014 *Waste Classification Guidelines, Part 1: Classifying Waste*

NSW Office of Environment and Heritage (OEH) 2011, *Guidelines for Consultants Reporting on Contaminated Sites*

Appendix A

Summary tables

Summary Table 1 Analytical Results - Soil

Analytes	units	NEPM HIL(B)	NEMP EIL (urban residential & open space)	NEPM HSL (A&B) 0-<1 m, sand	NEPM ESL (urban residential & open space - coarse)	LOR	TP-1 0.5	TP-2 0.5	TP-3 0.5	TP-4 0.5	TP-5 0.5	TP-6 0.5	TP-7 0.5	TP-8 0.5	TP-9 0.5	TP-9 2
Laboratory parameters							3-Jun-15									
pH		-	-	-	-	0.1	7.7	4	7.1	4.8	7.5	8.3	7.8	7.5	7.8	-
Metals																
Aluminium	mg/kg	-	-	-	-	50	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	500	100	-	-	5	<5	10	7	8	6	<5	10	6	<5	<5
Cadmium	mg/kg	150	-	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/kg	500	198	-	-	2	12		18	16	33	3	21	8	10	4
Copper	mg/kg	30000	80	-	-	5	17	8	65	9	**176**	<5	22	67	14	<5
Iron	mg/kg	-	-	-	-	50	14200	28600	18300	37400	20600	3060	22800	14500	9200	2900
Lead	mg/kg	1200	1200	-	-	5	25	22	112	20	144	7	30	33	24	<5
Manganese	mg/kg	14000	-	-	-	5	-	-	-	-	-	-	-	-	-	-
Nickel	mg/kg	1200	35	-	-	2	4	<2	10	9	15	7	14	4	3	<2
Zinc	mg/kg	60000	145	-	-	5	37	8	**217**	25	**309**	21	61	71	43	<5
Mercury	mg/kg	120	-	-	-	0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TPH																
C6 - C9 Fraction	mg/kg	-	-	-	-	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C14 Fraction	mg/kg	-	-	-	-	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	mg/kg	-	-	-	-	100	<100	<100	**120**	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	mg/kg	-	-	-	-	100	<100	<100	**140**	<100	<100	<100	<100	<100	<100	<100
C10 - C36 Fraction (sum)	mg/kg	-	-	-	-	50	<50	<50	**260**	<50	<50	<50	<50	<50	<50	<50
TRH																
C6 - C10 Fraction	mg/kg	-	-	-	-	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 Fraction minus BTEX	mg/kg	-	-	-	180	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C10 - C16 Fraction	**mg/kg**	-	-	-	-	**50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**	**<50**
>C16 - C34 Fraction	mg/kg	-	-	5800	300	100	<100	<100	**210**	<100	100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	mg/kg	-	-	8100	2,800	100	<100	<100	**110**	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)		-	-	-	-	50	<50	<50	**320**	<50	100	<50	<50	<50	<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	-	-	110	120	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
BTEX																
Benzene	mg/kg	-	-	0.5	50	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	-	-	160	85	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	-	-	55	70	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m&p-Xylenes	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of BTEX	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylenes - Total	mg/kg	-	-	40	105	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene	mg/kg	-	170	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PAH																
Naphthalene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	**1.1**	<0.5	<0.5	**0.6**	<0.5	<0.5	<0.5	<0.5
Anthracene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	**2.3**	<0.5	**0.7**	**0.9**	<0.5	<0.5	<0.5	<0.5
Pyrene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	**2.2**	<0.5	**0.8**	**0.8**	<0.5	<0.5	<0.5	<0.5

Analytes	units	NEPM HIL(B)	NEMP EIL (urban residential & open space)	NEPM HSL (A&B) 0-<1 m, sand	NEPM ESL (urban residential & open space - coarse)	LOR	TP-1 0.5	TP-2 0.5	TP-3 0.5	TP-4 0.5	TP-5 0.5	TP-6 0.5	TP-7 0.5	TP-8 0.5	TP-9 0.5	TP-9 2
Laboratory parameters							3-Jun-15									
Chrysene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	**0.8**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	**0.8**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	mg/kg	-	-	-	0.7	0.5	<0.5	<0.5	**0.8**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of polycyclic aromatic hydrocarbons	mg/kg	400	-	-	-	0.5	<0.5	<0.5	8.9	<0.5	1.5	2.3	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	mg/kg	4	-	-	-	0.5	<0.5	<0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (half LOR)	mg/kg	4	-	-	-	0.5	0.6	0.6	1.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	mg/kg	4	-	-	-	0.5	1.2	1.2	1.6	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Total Polychlorinated biphenyls		-	-	-	-	0.05										
Total Polychlorinated biphenyls	mg/kg	1	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Pesticides																
alpha-BHC	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Hexachlorobenzene (HCB)	mg/kg	15	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
beta-BHC	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
gamma-BHC	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
delta-BHC	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Heptachlor	mg/kg	10	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Aldrin	mg/kg	10	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Heptachlor epoxide	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
trans-Chlordane	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Total Chlordane (sum)	mg/kg	90	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
alpha-Endosulfan	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
cis-Chlordane	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Dieldrin	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
4.4`-DDE	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Endrin	mg/kg	20	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
beta-Endosulfan	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Endosulfan (sum)	mg/kg	400	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
4.4`-DDD	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Endrin aldehyde	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Endosulfan sulfate	mg/kg	-	-	-	-	0.2	-	-	-	-	<0.2	-	-	-	<0.2	<0.2
4.4`-DDT	mg/kg	-	180	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Endrin ketone	mg/kg	-	-	-	-	0.2	-	-	-	-	<0.2	-	-	-	<0.2	<0.2
Methoxychlor	mg/kg	500	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Sum of Aldrin + Dieldrin	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Sum of DDD + DDE + DDT	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Dichlorvos	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Demeton-S-methyl	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Monocrotophos	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.2	-	-	-	<0.2	<0.2

Analytes	units	NEPM HIL(B)	NEMP EIL (urban residential & open space)	NEPM HSL (A&B) 0-<1 m, sand	NEPM ESL (urban residential & open space - coarse)	LOR	TP-1 0.5	TP-2 0.5	TP-3 0.5	TP-4 0.5	TP-5 0.5	TP-6 0.5	TP-7 0.5	TP-8 0.5	TP-9 0.5	TP-9 2
Laboratory parameters											3-Jun-15					
Dimethoate	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Parathion-methyl	mg/kg	-	-	-	-	0.2	-	-	-	-	<0.2	-	-	-	<0.2	<0.2
Malathion	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Fenthion	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Chlorpyrifos	mg/kg	340	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Parathion	mg/kg	-	-	-	-	0.2	-	-	-	-	<0.2	-	-	-	<0.2	<0.2
Pirimphos-ethyl	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Chlorfenvinphos	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Bromophos-ethyl	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Fenamiphos	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Prothiofos	mg/kg	-	-	-	-	0.05	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Ethion	mg/kg	-	-	-	-	0.5	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Carbophenothion	mg/kg	-	-	-	-	0.5	-	-	-	-	<0.05	-	-	-	<0.05	<0.05
Azinphos Methyl	mg/kg	-	-	-	-	0.5	-	-	-	-	<0.05	-	-	-	<0.05	<0.05

Analytes	units	NEPM HIL(B)	NEMP EIL (urban residential & open space)	NEPM HSL (A&B) 0-<1 m, sand	NEPM ESL (urban residential & open space - coarse)	LOR	TP-11	TP-12	TP-13	TP-14	TP-15	TP-16
Laboratory parameters									9-Nov-15			
pH		-	-	-	-	0.1	-	-	-	-	-	-
Metals												
Aluminium	mg/kg	-	-	-	-	50	4960	7840	5200	6210	6400	12400
Arsenic	mg/kg	500	100	-	-	5	<5	8	<5	8	<5	7
Cadmium	mg/kg	150	-	-	-	1	<1	1	<1	<1	<1	<1
Chromium	mg/kg	500	198	-	-	2	8	40	8	8	8	14
Copper	mg/kg	30000	80	-	-	5	22	**190**	24	10	40	14
Iron	mg/kg	-	-	-	-	50	7790	38300	23000	25700	10500	30100
Lead	mg/kg	1200	1200	-	-	5	44	115	53	11	52	25
Manganese	mg/kg	14000	-	-	-	5	95	286	215	76	106	279
Nickel	mg/kg	1200	35	-	-	2	5	17	8	17	10	7
Zinc	mg/kg	60000	145	-	-	5	82	**345**	95	23	142	48
Mercury	mg/kg	120	-	-	-	0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1
TPH												
C6 - C9 Fraction	mg/kg	-	-	-	-	10	<10	<10	<10	<10	<10	<10
C10 - C14 Fraction	mg/kg	-	-	-	-	50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	mg/kg	-	-	-	-	100	<100	**120**	**140**	<100	<100	<100
C29 - C36 Fraction	mg/kg	-	-	-	-	100	<100	**120**	**150**	<100	<100	<100
C10 - C36 Fraction (sum)	mg/kg	-	-	-	-	50	<50	**240**	**290**	<50	<50	<50
TRH												
C6 - C10 Fraction	mg/kg	-	-	-	-	10	<10	<10	<10	<10	<10	<10
C6 - C10 Fraction minus BTEX (F1)	mg/kg	-	-	-	180	10	<10	<10	<10	<10	<10	<10
>C10 - C16 Fraction	mg/kg	-	-	-	-	50	<50	<50	<50	<50	<50	<50
>C16 - C34 Fraction	mg/kg	-	-	5800	300	100	<100	**190**	**240**	<100	**150**	<100
>C34 - C40 Fraction	mg/kg	-	-	8100	2,800	100	<100	<100	<100	<100	<100	<100

Analytes	units	NEPM HIL(B)	NEMP EIL (urban residential & open space)	NEPM HSL (A&B) 0-<1 m, sand	NEPM ESL (urban residential & open space - coarse)	LOR	TP-11	TP-12	TP-13	TP-14	TP-15	TP-16
Laboratory parameters							**9-Nov-15**					
BTEX												
Benzene	mg/kg	-	-	0.5	50	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	-	-	160	85	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	-	-	55	70	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m&p-Xylenes	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of BTEX	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylenes - Total	mg/kg	-	-	40	105	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene	mg/kg	-	170	-	-	1	<1	<1	<1	<1	<1	<1
PAH												
Naphthalene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.8	<0.5	<0.5
Acenaphthylene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.8	<0.5	<0.5
Acenaphthene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.8	<0.5	<0.5
Fluorene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.8	<0.5	<0.5
Phenanthrene	mg/kg	-	-	-	-	0.5	<0.5	**0.6**	<0.5	<0.8	**3.7**	<0.5
Anthracene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.8	**0.8**	<0.5
Fluoranthene	mg/kg	-	-	-	-	0.5	<0.5	**0.9**	<0.5	<0.8	**3.8**	<0.5
Pyrene	mg/kg	-	-	-	-	0.5	<0.5	**0.9**	<0.5	<0.8	**3.8**	<0.5
Benz(a)anthracene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.8	**1.5**	<0.5
Chrysene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.8	**1.6**	<0.5
Benzo(b+j)fluoranthene	mg/kg	-	-	-	-	0.5	<0.5	**0.5**	<0.5	<0.8	**1.7**	<0.5
Benzo(k)fluoranthene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.8	**0.6**	<0.5
Benzo(a)pyrene	mg/kg	-	-	-	0.7	0.5	<0.5	<0.5	<0.5	<0.8	**1.5**	<0.5
Indeno(1.2.3.cd)pyrene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.8	**0.6**	<0.5
Dibenz(a.h)anthracene	mg/kg	-	-	-	-	0.5	<0.5	<0.5	<0.5	<0.8	<0.5	<0.5
Sum of polycyclic aromatic hydrocarbons	mg/kg	400	-	-	-	0.5	<0.5	2.9	<0.5	<0.5	20.5	<0.5
Benzo(a)pyrene TEQ (zero)	mg/kg	4	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	2	<0.5
Benzo(a)pyrene TEQ (half LOR)	mg/kg	4	-	-	-	0.5	0.6	0.6	0.6	0.6	2.2	0.6
Benzo(a)pyrene TEQ (LOR)	mg/kg	4	-	-	-	0.5	1.2	1.2	1.2	1.2	2.5	1.2
Total Polychlorinated biphenyls		-	-	-	-	0.05						
Total Polychlorinated biphenyls	mg/kg	1	-	-	-	0.05	<0.1	-	-	-	-	<0.1
Pesticides												
alpha-BHC	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
Hexachlorobenzene (HCB)	mg/kg	15	-	-	-	0.05	<0.05	-	-	-	-	<0.05
beta-BHC	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
gamma-BHC	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
delta-BHC	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
Heptachlor	mg/kg	10	-	-	-	0.05	<0.05	-	-	-	-	<0.05
Aldrin	mg/kg	10	-	-	-	0.05	<0.05	-	-	-	-	<0.05
Heptachlor epoxide	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05

Analytes	units	NEPM HIL(B)	NEMP EIL (urban residential & open space)	NEPM HSL (A&B) 0-<1 m, sand	NEPM ESL (urban residential & open space - coarse)	LOR	TP-11	TP-12	TP-13	TP-14	TP-15	TP-16
Laboratory parameters							**9-Nov-15**					
trans-Chlordane	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
Total Chlordane (sum)	mg/kg	90	-	-	-	0.05	<0.05	-	-	-	-	<0.05
alpha-Endosulfan	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
cis-Chlordane	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
Dieldrin	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
4.4`-DDE	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
Endrin	mg/kg	20	-	-	-	0.05	<0.05	-	-	-	-	<0.05
beta-Endosulfan	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
Endosulfan (sum)	mg/kg	400	-	-	-	0.05	<0.05	-	-	-	-	<0.05
4.4`-DDD	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
Endrin aldehyde	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
Endosulfan sulfate	mg/kg	-	-	-	-	0.2	<0.05	-	-	-	-	<0.05
4.4`-DDT	mg/kg	-	180	-	-	0.05	<0.2	-	-	-	-	<0.2
Endrin ketone	mg/kg	-	-	-	-	0.2	<0.05	-	-	-	-	<0.05
Methoxychlor	mg/kg	500	-	-	-	0.05	<0.2	-	-	-	-	<0.2
Sum of Aldrin + Dieldrin	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
Sum of DDD + DDE + DDT	mg/kg	-	-	-	-	0.05	<0.05	-	-	-	-	<0.05
Dichlorvos	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Demeton-S-methyl	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Monocrotophos	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Dimethoate	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Diazinon	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Chlorpyrifos-methyl	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Parathion-methyl	mg/kg	-	-	-	-	0.2	-	-	-	-	-	-
Malathion	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Fenthion	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Chlorpyrifos	mg/kg	340	-	-	-	0.05	-	-	-	-	-	-
Parathion	mg/kg	-	-	-	-	0.2	-	-	-	-	-	-
Pirimphos-ethyl	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Chlorfenvinphos	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Bromophos-ethyl	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Fenamiphos	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Prothiofos	mg/kg	-	-	-	-	0.05	-	-	-	-	-	-
Ethion	mg/kg	-	-	-	-	0.5	-	-	-	-	-	-
Carbophenothion	mg/kg	-	-	-	-	0.5	-	-	-	-	-	-
Azinphos Methyl	mg/kg	-	-	-	-	0.5	-	-	-	-	-	-

National Environment Protection Council (NEPC) (Assessment of Site Contamination) Measure 1999 (as amended in 2013a), *Schedule B1 Guideline on Investigation Levels for Soil and Groundwater.*

EMM

Summary Table 2 Analytical Results - Dredge Pond Sediment

Analytes	units	ISQG (low)	ISQG (high)	LOR	SD-1	SD-2	SD-3	SD-4	SD-5	SD-6
Laboratory parameters					3-Jun-15					
pH	-	-	-	0.1	8.9	7.9	8.3	8	8.1	7.8
Metals										
Aluminium	mg/kg	-	-	50	-	-	-	-	-	-
Arsenic	mg/kg	20	70	5	<5	<5	<5	6	15	<5
Cadmium	mg/kg	1.5	10	1	<1	<1	<1	<1	1	<1
Chromium	mg/kg	80	370	2	13	<2	3	10	33	9
Copper	mg/kg	65	270	5	33	<5	16	26	96	21
Iron	mg/kg	-	-	50	9080	1660	2660	12200	31300	11800
Lead	mg/kg	50	220	5	90	20	12	38	268	49
Manganese	mg/kg	-	-		-	-	-	-	-	-
Nickel	mg/kg	21	52	2	8	<2	2	7	17	6
Zinc	mg/kg	200	410	5	148	16	44	67	316	60
Mercury	mg/kg	0.15	1	0.1	0.2	<0.1	<0.1	<0.1	0.5	<0.1
Nutrients										
Ammonia as N	mg/kg	-	-		45.1	2.4	10.2	7.8	48.6	8.1
Nitrite	mg/kg	-	-	0.1	-	-	-	-	-	-
Nitrate	mg/kg	-	-	0.1	-	-	-	-	-	-
Nitrite+nitrate	mg/kg	-	-	0.1	-	-	-	-	-	-
Total Kjeldahl nitrogen	mg/kg	-	-	20	-	-	-	-	-	-
Total nitrogen	mg/kg	-	-	20	-	-	-	-	-	-
Total organic carbon	%	-	-	-	1.75	0.32	0.66	1.15	1.92	1.04
TPH										
C6 - C9 Fraction	mg/kg	-	-	10	<10	<10	<10	<10	<10	<10
C10 - C14 Fraction	mg/kg	-	-	50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	mg/kg	-	-	100	**110**	<100	<100	<100	**180**	**120**
C29 - C36 Fraction	mg/kg	-	-	100	**130**	<100	<100	<100	**460**	**120**
C10 - C36 Fraction (sum)	mg/kg	-	-	50	**240**	<50	<50	<50	**640**	**240**
TRH										
C6 - C10 Fraction	mg/kg	-	-	10	<10	<10	<10	<10	<10	<10
C6 - C10 Fraction minus BTEX (F1)	mg/kg	-	-	10	<10	<10	<10	<10	<10	<10
>C10 - C16 Fraction	mg/kg	-	-	50	<50	<50	<50	<50	<50	<50
>C16 - C34 Fraction	mg/kg	-	-	100	**190**	<100	<100	<100	**490**	**200**
>C34 - C40 Fraction	mg/kg	-	-	100	<100	<100	<100	<100	**340**	<100
>C10 - C40 Fraction (sum)	mg/kg	-	-	50	**190**	<50	<50	<50	**830**	**200**
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	-	-	50	<50	<50	<50	<50	<50	<50
BTEX										
Benzene	mg/kg	-	-	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m&p-Xylenes	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of BTEX	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylenes - Total	mg/kg	-	-	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene	mg/kg	160	2100	1	<1	<1	<1	<1	<1	<1

Analytes	units	ISQG (low)	ISQG (high)	LOR	SD-1	SD-2	SD-3	SD-4	SD-5	SD-6
Laboratory parameters					**3-Jun-15**					
PAH										
Naphthalene	mg/kg	0.16	2.1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	mg/kg	0.044	0.64	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	mg/kg	0.016	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	mg/kg	0.019	0.54	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	mg/kg	0.24	1.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.6
Anthracene	mg/kg	0.85	1.1	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	mg/kg	-		0.5	**0.9**	<0.5	<0.5	<0.5	**2.2**	**4**
Pyrene	mg/kg	0.665	2.6	0.5	0.9	<0.5	<0.5	0.5	2.4	4.2
Benz(a)anthracene	mg/kg	0.261	1.6	0.5	<0.5	<0.5	<0.5	<0.5	0.9	1.5
Chrysene	mg/kg	0.384	2.8	0.5	<0.5	<0.5	<0.5	<0.5	0.9	1.4
Benzo(b+j)fluoranthene	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	**0.9**	**1**
Benzo(k)fluoranthene	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	mg/kg	0.43	1.6	0.5	<0.5	<0.5	<0.5	<0.5	1.2	1.3
Indeno(1.2.3.cd)pyrene	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	mg/kg	0.63	0.26	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of polycyclic aromatic hydrocarbons	mg/kg	-	-	0.5	**1.8**	<0.5	<0.5	0.5	**8.5**	**17**
Benzo(a)pyrene TEQ (zero)	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	1.4	1.6
Benzo(a)pyrene TEQ (half LOR)	mg/kg	-	-	0.5	0.6	0.6	0.6	0.6	1.7	1.9
Benzo(a)pyrene TEQ (LOR)	mg/kg	-	-	0.5	1.2	1.2	1.2	1.2	2	2.2
Total Polychlorinated biphenyls										
Total Polychlorinated biphenyls	mg/kg	0.023	-	0.05	-	-	<0.05	-	-	<0.05
Pesticides										
alpha-BHC	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Hexachlorobenzene (HCB)	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
beta-BHC	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
gamma-BHC	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
delta-BHC	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Heptachlor	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Aldrin	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Heptachlor epoxide	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
trans-Chlordane	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Total Chlordane (sum)	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
alpha-Endosulfan	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
cis-Chlordane	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Dieldrin	mg/kg	0.02	8	0.05	-	-	<0.05	-	-	<0.05
4.4`-DDE	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Endrin	mg/kg	0.02	8	0.05	-	-	<0.05	-	-	<0.05
beta-Endosulfan	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Endosulfan (sum)	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
4.4`-DDD	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Endrin aldehyde	mg/kg	-	-	0.2	-	-	<0.2	-	-	<0.2
Endosulfan sulfate	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
4.4`-DDT	mg/kg	-	-	0.2	-	-	<0.2	-	-	<0.2
Endrin ketone	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05

Analytes	units	ISQG (low)	ISQG (high)	LOR	SD-1	SD-2	SD-3	SD-4	SD-5	SD-6
Laboratory parameters					3-Jun-15					
Methoxychlor	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Sum of Aldrin + Dieldrin	mg/kg	-	-	0.05	-	-	-	-	-	-
Sum of DDD + DDE + DDT	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Dichlorvos	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Demeton-S-methyl	mg/kg	-	-	0.2	-	-	<0.2	-	-	<0.2
Monocrotophos	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Dimethoate	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Diazinon	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Chlorpyrifos-methyl	mg/kg	-	-	0.2	-	-	<0.2	-	-	<0.2
Parathion-methyl	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Malathion	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Fenthion	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Chlorpyrifos	mg/kg	-	-	0.2	-	-	<0.2	-	-	<0.2
Parathion	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Pirimphos-ethyl	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Chlorfenvinphos	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Bromophos-ethyl	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Fenamiphos	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Prothiofos	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Ethion	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Carbophenothion	mg/kg	-	-	0.05	-	-	<0.05	-	-	<0.05
Azinphos Methyl	mg/kg	-	-	0.05	-	-	<0.06	-	-	<0.05

Analytes	units	ISQG (low)	ISQG (high)	LOR	SD-7	SD-9	SD-10	SD-11	SD-13	SD-14	SD-15	SD-16	SD-18	SD-19
Laboratory parameters					9-Nov-15									
pH	-	-	-	0.1	7.9	7.9	7.9	8	8	7.7	7.8	7.9	8.1	8.2
Metals														
Aluminium	mg/kg	-	-	50	21400	19900	18800	23500	15800	19600	21600	22700	24600	14900
Arsenic	mg/kg	20	70	5	16	14	15	17	12	14	15	15	17	12
Cadmium	mg/kg	1.5	10	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chromium	mg/kg	80	370	2	37	36	32	43	30	27	34	36	40	27
Copper	mg/kg	65	270	5	88	87	70	99	71	54	82	93	97	99
Iron	mg/kg	-	-	50	30600	28700	29700	31900	25000	29900	30300	30300	33000	30200
Lead	mg/kg	50	220	5	249	230	190	264	197	134	229	239	270	209
Manganese	mg/kg	-	-		222	216	178	226	187	135	214	217	232	219
Nickel	mg/kg	21	52	2	19	18	17	21	16	15	18	19	20	17
Zinc	mg/kg	200	410	5	343	328	246	379	388	180	309	345	376	319
Mercury	mg/kg	0.15	1	0.1	0.6	0.6	0.4	0.7	0.4	0.2	0.5	0.5	0.7	0.7
Nutrients														
Ammonia as N	mg/kg	-	-		80	80	60	90	50	70	80	80	170	40
Nitrite	mg/kg	-	-	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3
Nitrate	mg/kg	-	-	0.1	0.5	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Nitrite+nitrate	mg/kg	-	-	0.1	0.5	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4
Total Kjeldahl nitrogen	mg/kg	-	-	20	1660	1960	1290	1890	1900	1480	1290	1800	2260	1490
Total nitrogen	mg/kg	-	-	20	1660	1960	1290	1890	1900	1480	1290	1800	2260	1490
Total organic carbon	%	-	-	-	-	-	-	-	-	-	-	-	-	-
TPH														
C6 - C9 Fraction	mg/kg	-	-	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Analytes	units	ISQG (low)	ISQG (high)	LOR	SD-7	SD-9	SD-10	SD-11	SD-13	SD-14	SD-15	SD-16	SD-18	SD-19
Laboratory parameters					**9-Nov-15**									
C10 - C14 Fraction	mg/kg	-	-	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	mg/kg	-	-	100	**200**	**320**	<100	**270**	**200**	<100	<100	**140**	**300**	**110**
C29 - C36 Fraction	mg/kg	-	-	100	**250**	**360**	<100	**320**	**230**	<100	<100	**160**	**330**	**140**
C10 - C36 Fraction (sum)	mg/kg	-	-	50	**450**	**680**	<50	**590**	**430**	<50	<50	**300**	**630**	**250**
TRH														
C6 - C10 Fraction	mg/kg	-	-	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 Fraction minus BTEX (F1)	mg/kg	-	-	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C10 - C16 Fraction	mg/kg	-	-	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
>C16 - C34 Fraction	mg/kg	-	-	100	**380**	**570**	<100	**500**	**350**	<100	<100	**260**	**510**	**210**
>C34 - C40 Fraction	mg/kg	-	-	100	**160**	**270**	<100	**220**	**120**	<100	<100	<100	**180**	**100**
>C10 - C40 Fraction (sum)	mg/kg	-	-	50	**540**	**840**	<50	**720**	**470**	<50	<50	**260**	**690**	**310**
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	-	-	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
BTEX														
Benzene	mg/kg	-	-	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m&p-Xylenes	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Sum of BTEX	mg/kg	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylenes - Total	mg/kg	-	-	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene	mg/kg	160	2100	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
PAH														
Naphthalene	mg/kg	0.16	2.1	0.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Acenaphthylene	mg/kg	0.044	0.64	0.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Acenaphthene	mg/kg	0.016	0.5	0.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Fluorene	mg/kg	0.019	0.54	0.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Phenanthrene	mg/kg	0.24	1.5	0.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Anthracene	mg/kg	0.85	1.1	0.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Fluoranthene	mg/kg	-		0.5	**1.1**	**1.6**	<0.8	**1.2**	**1.6**	<0.8	<0.8	<0.8	**1.5**	<0.8
Pyrene	mg/kg	0.665	2.6	0.5	1.2	1.7	<0.8	1.4	1.7	<0.8	<0.8	<0.8	1.6	<0.8
Benz(a)anthracene	mg/kg	0.261	1.6	0.5	<0.8	0.8	<0.8	<0.8	0.9	<0.8	<0.8	<0.8	<0.8	<0.8
Chrysene	mg/kg	0.384	2.8	0.5	<0.8	<0.8	<0.8	<0.8	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Benzo(b+j)fluoranthene	mg/kg	-	-	0.5	**0.8**	**1.1**	<0.8	**1**	**1.2**	<0.8	<0.8	<0.8	**1.2**	<0.8
Benzo(k)fluoranthene	mg/kg	-	-	0.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Benzo(a)pyrene	mg/kg	0.43	1.6	0.5	<0.8	1	<0.8	<0.8	1	<0.8	<0.8	<0.8	0.9	<0.8
Indeno(1.2.3.cd)pyrene	mg/kg	-	-	0.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Dibenz(a.h)anthracene	mg/kg	0.63	0.26	0.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Benzo(g.h.i)perylene	mg/kg	-	-	0.5	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Sum of polycyclic aromatic hydrocarbons	mg/kg	-	-	0.5	**3.1**	**6.2**	<0.8	**3.6**	**7.2**	<0.8	<0.8	<0.8	**5.2**	<0.8
Benzo(a)pyrene TEQ (zero)	mg/kg	-	-	0.5	<0.8	1.2	<0.8	<0.8	1.2	<0.8	<0.8	<0.8	1	<0.8
Benzo(a)pyrene TEQ (half LOR)	mg/kg	-	-	0.5	0.7	1.5	0.6	0.7	1.5	0.6	0.6	0.6	1.4	0.6
Benzo(a)pyrene TEQ (LOR)	mg/kg	-	-	0.5	1.2	1.8	1.2	1.3	1.8	1.2	1.2	1.2	1.7	1.2
Total Polychlorinated biphenyls														
Total Polychlorinated biphenyls	mg/kg	0.023	-	0.05	-	-	-	-	-	-	-	<0.1	<0.1	<0.1

Analytes	units	ISQG (low)	ISQG (high)	LOR	SD-7	SD-9	SD-10	SD-11	SD-13	SD-14	SD-15	SD-16	SD-18	SD-19
Laboratory parameters					**9-Nov-15**									
Pesticides														
alpha-BHC	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
beta-BHC	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
gamma-BHC	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
delta-BHC	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Heptachlor	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Aldrin	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Heptachlor epoxide	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
trans-Chlordane	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Total Chlordane (sum)	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
alpha-Endosulfan	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
cis-Chlordane	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Dieldrin	mg/kg	0.02	8	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
4.4`-DDE	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Endrin	mg/kg	0.02	8	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
beta-Endosulfan	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Endosulfan (sum)	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
4.4`-DDD	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg	-	-	0.2	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Endosulfan sulfate	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
4.4`-DDT	mg/kg	-	-	0.2	-	-	-	-	-	-	-	<0.2	<0.2	<0.2
Endrin ketone	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Methoxychlor	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.2	<0.2	<0.2
Sum of Aldrin + Dieldrin	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Sum of DDD + DDE + DDT	mg/kg	-	-	0.05	-	-	-	-	-	-	-	<0.05	<0.05	<0.05
Dichlorvos	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Demeton-S-methyl	mg/kg	-	-	0.2	-	-	-	-	-	-	-	-	-	-
Monocrotophos	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Dimethoate	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Diazinon	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos-methyl	mg/kg	-	-	0.2	-	-	-	-	-	-	-	-	-	-
Parathion-methyl	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Malathion	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Fenthion	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Chlorpyrifos	mg/kg	-	-	0.2	-	-	-	-	-	-	-	-	-	-
Parathion	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Pirimphos-ethyl	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Chlorfenvinphos	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Bromophos-ethyl	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Fenamiphos	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Prothiofos	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Ethion	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Carbophenothion	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-
Azinphos Methyl	mg/kg	-	-	0.05	-	-	-	-	-	-	-	-	-	-

Summary Table 3 Analytical Results - Dredge Pond Surface Water

Analyte	unit	ANZECC/ARMCANZ 95% protection (freshwater)	ANZECC/ARMCANZ 95% protection (marine)	NHMRC 2008 Risks in Recreational Water	LOR	WAT-1	WAT-2	WAT-3	WAT-4s	WAT-5s	WAT-6s	WAT-7s	WAT-8s	WAT-4d	WAT-5d	WAT-6d	WAT-7d	WAT-8d
Field parameters						3-Jun-15			9-Nov-15									
Temperature	°C	-	-	-	0.01	16	14.7	15.1	22.4	24.1	23.5	22.4	22.7	22.1	22	23	22.5	22
EC	uS/cm	125-2200	-	-	1	7392	7314	7305	12529	12720	12495	12490	12469	12608	12685	12520	12513	11529
pH	pH units	6.5-8	-	-	0.001	7.73	7.44	7.54	8.39	7.99	8.33	8.87	8.84	8.18	8.15	8.32	8.64	8.6
Dissolved oxygen	mg/L	-	-	-	0.001	4.76	9.78	8.81	77.28	60.09	53.43	17.65	37.77	35.35	46.49	27.31	17.05	12.76
Redox	mV	-	-	-	0.01	-49.4	-15.5	-27.6	-123.6	-139.2	-140.9	-182.6	-154	-127.7	-142.2	-156.7	-178.9	-206.6
Laboratory parameters																		
pH	pH units	6.5-8	-	-	0.01	7.7	7.76	7.78	-	-	-	-	-	-	-	-	-	-
Total dissolved solids	mg/L	-	-	-	10	-	-	-	7710	7750	9210	8720	9070	8260	8680	9690	10400	7930
Suspended solids	mg/L	-	-	-	5	-	-	-	14	204	86400	836	58400	92000	24	19800	2300	112000
Alkalinity	mg/L																	
Hydroxide Alkalinity as CaCO3	mg/L	-	-	-	1	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	mg/L	-	-	-	1	-	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	mg/L	-	-	-	1	-	-	-	193	186	227	188	227	269	194	190	179	320
Total Alkalinity as CaCO3	mg/L	-	-	-	1	-	-	-	193	186	227	188	227	269	194	190	179	320
Major ions	mg/L																	
Sulfate	mg/L	-	-	-	1	-	-	-	755	717	767	707	730	739	699	703	705	822
Chloride	mg/L	-	-	-	1	-	-	-	3540	3540	3630	3540	3510	3100	3530	3560	3540	3400
Calcium	mg/L	-	-	-	1	-	-	-	249	253	279	245	276	310	247	260	249	330
Magnesium	mg/L	-	-	-	1	-	-	-	213	219	225	214	218	178	213	212	212	204
Sodium	mg/L	-	-	-	1	-	-	-	2020	2090	2050	2070	2060	1840	2030	2030	2020	1920
Potassium	mg/L	-	-	-	1	-	-	-	80	82	78	80	77	71	80	79	81	72
Metals					LOR													
Aluminium	mg/L	0.055	ID	-	0.01	-	-	-	0.01	0.02	0.28	0.02	0.27	0.27	0.01	0.08	0.08	0.3
Arsenic	mg/L	0.013	ID	0.07	0.001	0.004	0.003	0.003	0.003	0.003	0.004	0.003	0.004	0.004	0.003	0.002	0.002	0.005
Cadmium	mg/L	0.0002	0.005/0.0007^	-	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L	0.001	0.0044	0.5	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Copper	mg/L	0.0014	0.0013	20	0.001	<0.001	0.001	0.001	0.001	0.001	<0.001	0.004	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Iron	mg/L	ID	ID	-	0.05	0.07	0.12	0.13	<0.05	<0.05	0.19	<0.05	0.26	0.36	<0.05	0.99	0.06	0.41
Lead	mg/L	0.0034	0.0044	0.1	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	mg/L	0.011	0.007/0.0007^	0.2	0.001	0.005	0.005	0.005	0.005	0.005	0.004	0.006	0.004	0.005	0.004	0.005	0.005	0.004
Manganese	mg/L	1.9	ID	5	0.001	-	-	-	0.37	0.369	0.507	0.342	0.458	0.47	0.361	0.442	0.363	0.551
Zinc	mg/L	0.008	0.015	-	0.005	0.008	0.008	0.007	0.016	0.015	0.249	0.016	0.302	0.298	0.009	0.345	0.207	0.321
Mercury (total in November 2015)	mg/L	0.0006/0.00006^	0.0004/0.0001^	0.01	0.0001	-	-	-	<0.0001	<0.0001	0.0208	0.0001	0.0176	0.0005	<0.0001	0.009	0.0012	0.0198
Nutrients																		
Ammonia (as N)	mg/L	0.02*/0.9	0.91	-	0.01	11.6	13.1	13.2	6.33	6.37	7.97	6.16	7.48	6.13	6.92	5.56	5.84	9.46
Nitrite	mg/L	0.04*	-	30	0.01	-	-	-	0.03	0.02	<0.01	0.03	<0.01	<0.01	0.02	<0.01	0.02	<0.01
Nitrate	mg/L	0.04*	-	500	0.01	-	-	-	0.11	0.05	0.05	0.32	0.04	0.05	0.03	0.04	0.07	0.03
Nitrite+nitrate	mg/L	-	-	-	0.01	-	-	-	0.14	0.07	0.05	0.35	0.04	0.05	0.05	0.04	0.09	0.03
Total Kjeldahl Nitrogen	mg/L	-	-	-	0.01	-	-	-	6.6	6	152	7	85.9	9.5	5.7	52.6	9.1	137
Total nitrogen	mg/L	0.5*	-	-	0.01	-	-	-	6.7	6.1	152	7.4	85.9	9.6	5.8	52.6	9.2	137
Total phosphorous	mg/L	0.05*	-	-	0.01	-	-	-	0.07	0.14	56.6	0.45	47.4	1.21	0.09	16.4	2.05	59.7
Reactive phosphorous	mg/L	-	-	-	0.01	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved organic carbon	mg/L	-	-	-	1	-	-	-	12	19	57	22	17	19	14	16	15	60
Total organic carbon	mg/L	-	-	-	1	-	-	-	19	19	951	22	72	1590	28	81	33	1040
Chemical oxygen demand	mg/L	-	-	-	10	-	-	-	80	63	10100	170	7560	11500	94	2600	386	12100
Biochemical oxygen demand	mg/L	-	-	-	2	-	-	-	<2	<2	193	4	249	347	<2	240	9	414
Carbonaceous biochemical oxygen demand	mg/L	-	-	-	2	-	-	-	<2	<2	139	3	239	299	<2	202	<2	386
TPH																		
C6 - C9 Fraction	ug/L	-	-	-	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C10 - C14 Fraction	ug/L	-	-	-	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	ug/L	-	-	-	100	<100	<100	<100	<100	<100	**2220**	<100	<100	**870**	<100	<100	<100	**830**
C29 - C36 Fraction	ug/L	-	-	-	50	<50	<50	<50	<50	<50	**2400**	<50	<50	**650**	<50	<50	<50	**760**
C10 - C36 Fraction (sum)	ug/L	-	-	-	50	<50	<50	<50	<50	<50	**4620**	<50	<50	**1520**	<50	<50	<50	**1590**
TRH																		
C6 - C10 Fraction	ug/L	-	-	-	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	ug/L	-	-	-	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction	ug/L	-	-	-	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	ug/L	-	-	-	100	<100	<100	<100	<100	<100	**3990**	<100	<100	**1200**	<100	<100	<100	**1230**
>C34 - C40 Fraction	ug/L	-	-	-	100	<100	<100	<100	<100	<100	**1300**	<100	<100	**330**	<100	<100	<100	**420**

Analyte	unit	ANZECC/ARMCANZ 95% protection (freshwater)	ANZECC/ARMCANZ 95% protection (marine)	NHMRC 2008 Risks in Recreational Water	LOR	WAT-1	WAT-2	WAT-3	WAT-4s	WAT-5s	WAT-6s	WAT-7s	WAT-8s	WAT-4d	WAT-5d	WAT-6d	WAT-7d	WAT-8d
Field parameters						3-Jun-15			9-Nov-15									
>C10 - C40 Fraction (sum)	ug/L	-	-	-	100	<100	<100	<100	<100	<100	**5290**	<100	<100	**1530**	<100	<100	<100	**1650**
>C10 - C16 Fraction minus Naphthalene (F2)	ug/L	-	-	-	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
BTEX																		
Benzene	ug/L	0.95	0.7	0.01	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/L	ID	ID	8	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	ug/L	ID	ID	3	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	ug/L	ID	ID	-	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
ortho-Xylene	ug/L	0.35	ID	-	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Xylenes	ug/L	ID	ID	6	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX	ug/L	-	-	-	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	ug/L	0.016	0.07	-	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
PAH																		
Naphthalene	ug/L	16	70	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	**2.8**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	**5.1**	<1.0	<1.0	**1.2**	<1.0	<1.0	<1.0	**1.5**
Anthracene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	**3.3**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	**14.3**	<1.0	<1.0	**3.7**	<1.0	<1.0	<1.0	**4.6**
Pyrene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	**19.5**	<1.0	<1.0	**4.9**	<1.0	<1.0	<1.0	**6.3**
Benz(a)anthracene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	**8.1**	<1.0	<1.0	**1.7**	<1.0	<1.0	<1.0	**2.3**
Chrysene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	**7.9**	<1.0	<1.0	**1.7**	<1.0	<1.0	<1.0	**2.2**
Benzo(b+j)fluoranthene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	**14.2**	<1.0	<1.0	**2.9**	<1.0	<1.0	<1.0	**3.4**
Benzo(k)fluoranthene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	**6.4**	<1.0	<1.0	**1.2**	<1.0	<1.0	<1.0	**1.5**
Benzo(a)pyrene	ug/L	-	-	0.01	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**10.2**	<0.5	<0.5	**2.4**	<0.5	<0.5	<0.5	**3**
Indeno(1.2.3.cd)pyrene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	**6.7**	<1.0	<1.0	**1.6**	<1.0	<1.0	<1.0	**2**
Dibenz(a.h)anthracene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	ug/L	-	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	**7.6**	<1.0	<1.0	**1.8**	<1.0	<1.0	<1.0	**2.3**
Sum of polycyclic aromatic hydrocarbons	ug/L	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	108	<0.5	<0.5	23.1	<0.5	<0.5	<0.5	29.1
Benzo(a)pyrene TEQ (zero)	ug/L	-	-	-	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	15.3	<0.5	<0.5	3.2	<0.5	<0.5	<0.5	4

* = South-east Australia Lowland River

^ = 99% protection value used

Agriculture and Resource Management Council of Australia and New Zealand and the Australian and New Zealand Environment and Conservation Council (ANZECC/ARMCANZ) 2000 *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*

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

Summary Table 4 Analytical Results - Dredge Pond Surface Water

Analyte	unit	ANZECC/ARMCANZ 95% protection (freshwater)	ANZECC/ARMCANZ 95% protection (marine)	LOR	MP-3	MP-4	MP-5
Field parameters					**17-Nov-15**		
Temperature	°C	-	-	0.01	18.9	19.2	18.8
EC	uS/cm	125-2200*	-	1	12148	13263	1520
pH	pH units	6.5-8*	-	0.001	8.22	7.59	5.75
Dissolved oxygen	mg/L	-	-	0.001	11.71	3.31	17.93
Redox	mV	-	-	0.01	-148.7	-167.7	36.9
Laboratory parameters							
pH	pH units	6.5-8*	-	0.01	6.47	7.89	4.07
Total dissolved solids	mg/L	-	-	1	9210	8780	932
Dissolved metals							
Aluminium	mg/L	0.055	ID	0.01	0.4	0.06	7.83
Arsenic	mg/L	0.013	ID	0.001	0.007	0.01	<0.001
Cadmium	mg/L	0.0002	0.005/0.0007^	0.0001	<0.0001	<0.0001	0.0041
Chromium	mg/L	0.001	0.0044	0.001	<0.001	<0.001	<0.001
Copper	mg/L	0.0014	0.0013	0.001	0.001	0.002	0.006
Iron	mg/L	ID	ID	0.05	28.2	4.87	3.36
Lead	mg/L	0.0034	0.0044	0.001	<0.001	<0.001	0.002
Manganese	mg/L	1.9	ID	0.001	0.331	0.367	2.71
Nickel	mg/L	0.011	0.007/0.0007^	0.001	0.007	0.003	0.06
Zinc	mg/L	0.008	0.015	0.005	0.037	0.065	0.92
Mercury	mg/L	0.0006	0.0001	0.0001	<0.0001	<0.0001	<0.0001
Nutrients							
Ammonia (as N)	mg/L	0.02*/0.9	0.91	0.01	4.67	1.12	1.43
Nitrite	mg/L	0.04*	-	0.01	<0.01	<0.01	<0.01
Nitrate	mg/L	0.04*	-	0.01	0.02	0.04	0.01
Nitrite+nitrate	mg/L	-	-	0.01	0.02	0.04	0.01
Total Kjeldahl Nitrogen	mg/L	-	-	0.01	5	1.8	7.6
Total nitrogen	mg/L	0.5*	-	0.01	5	1.8	7.6
Total organic carbon	mg/L	-	-	1	29	14	94
TPH							
C6 - C9 Fraction	ug/L	-	-	20	<20	<20	<20
C10 - C14 Fraction	ug/L	-	-	50	<50	<50	<50
C15 - C28 Fraction	ug/L	-	-	100	<100	<100	<100
C29 - C36 Fraction	ug/L	-	-	50	<50	<50	<50
C10 - C36 Fraction (sum)	ug/L	-	-	50	<50	<50	<50
TRH							
C6 - C10 Fraction	ug/L	-	-	20	<20	<20	<20
C6 - C10 Fraction minus BTEX (	ug/L	-	-	20	<20	<20	<20
>C10 - C16 Fraction	ug/L	-	-	100	<100	<100	<100
>C16 - C34 Fraction	ug/L	-	-	100	<100	<100	<100
>C34 - C40 Fraction	ug/L	-	-	100	<100	<100	<100
>C10 - C40 Fraction (sum)	ug/L	-	-	100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	ug/L	-	-	100	<100	<100	<100
BTEX							
Benzene	ug/L	0.95	0.7	1	<1	<1	<1
Toluene	ug/L	ID	ID	2	<2	<2	<2
Ethylbenzene	ug/L	ID	ID	2	<2	<2	<2
meta- & para-Xylene	ug/L	ID	ID	2	<2	<2	<2
ortho-Xylene	ug/L	0.35	ID	2	<2	<2	<2
Total Xylenes	ug/L	ID	ID	2	<2	<2	<2

Analyte	unit	ANZECC/ARMCANZ 95% protection (freshwater)	ANZECC/ARMCANZ 95% protection (marine)	LOR	MP-3	MP-4	MP-5
Laboratory ananlytes					**17-Nov-15**		
Sum of BTEX	ug/L	-	-	1	<1	<1	<1
Naphthalene	ug/L	0.016	0.07	5	<5	<5	<5
PAH							
Naphthalene	ug/L	16	70	1	<1.0	<1.0	<1.0
Acenaphthylene	ug/L	-	-	1	<1.0	<1.0	<1.0
Acenaphthene	ug/L	-	-	1	<1.0	<1.0	<1.0
Fluorene	ug/L	-	-	1	<1.0	<1.0	<1.0
Phenanthrene	ug/L	-	-	1	<1.0	<1.0	<1.0
Anthracene	ug/L	-	-	1	<1.0	<1.0	<1.0
Fluoranthene	ug/L	-	-	1	<1.0	<1.0	<1.0
Pyrene	ug/L	-	-	1	<1.0	<1.0	<1.0
Benz(a)anthracene	ug/L	-	-	1	<1.0	<1.0	<1.0
Chrysene	ug/L	-	-	1	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	ug/L	-	-	1	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	ug/L	-	-	1	<1.0	<1.0	<1.0
Benzo(a)pyrene	ug/L	-	-	0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	ug/L	-	-	1	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	ug/L	-	-	1	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	ug/L	-	-	1	<1.0	<1.0	<1.0
Sum of polycyclic aromatic hydrocarbons	ug/L	-	-	0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	ug/L	-	-	0.5	<0.5	<0.5	<0.5

* = South-east Australia Lowland River

^ = 99% protection value used

Agriculture and Resource Management Council of Australia and New Zealand and the Australian and New Zealand Environment and Conservation Council (ANZECC/ARMCANZ) 2000 *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*

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

Summary Table 5 RPD - Soil

Analytes	units	LOR	TP-7 0.5M	QA.1	RPD	TP-15	TP05QA	RPD
Laboratory parameters			3-Jun-15			9-Nov-15		
pH		0.1	7.8	7.6	0.6	-	-	
Metals								
Aluminium	mg/kg	50	-	-	-	6400	8660	7.5
Arsenic	mg/kg	5	10	6	13	2.5	8	26.2
Cadmium	mg/kg	1	<1	<1	-	<1	<1	-
Chromium	mg/kg	2	21	11	15.6	8	15	15.2
Copper	mg/kg	5	22	-	-	40	40	0.0
Iron	mg/kg	50	22800	16900	7.4	10500	18700	14.0
Lead	mg/kg	5	30	33	2.4	52	70	7.4
Manganese	mg/kg	5	-	-	-	106	186	13.7
Nickel	mg/kg	2	14	12	3.8	10	9	2.6
Zinc	mg/kg	5	61	108	-	142	121	4.0
Mercury	mg/kg	0.1	<0.1	-	-	0.5	0.1	33.3
TPH								
C6 - C9 Fraction	mg/kg	10	<10	<10	-	<10	<10	-
C10 - C14 Fraction	mg/kg	50	<50	<50	-	<50	<50	-
C15 - C28 Fraction	mg/kg	100	<100	<100	-	50	390	38.6
C29 - C36 Fraction	mg/kg	100	<100	<100		50	230	32.1
C10 - C36 Fraction (sum)	mg/kg	50	<50	<50	-	25	620	46.1
TRH								
C6 - C10 Fraction	mg/kg	10	<10	<10	-	<10	<10	-
C6 - C10 Fraction minus BTEX (F1)	mg/kg	10	<10	<10	-	<10	<10	-
>C10 - C16 Fraction	mg/kg	50	<50	<50	-	<50	<50	-
>C16 - C34 Fraction	mg/kg	100	<100	<100	-	150	560	28.9
>C34 - C40 Fraction	mg/kg	100	<100	<100	-	<100	<100	-
>C10 - C40 Fraction (sum)		50	<50	<50	-	150	560	28.9
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50	<50	<50	-	<50	<50	-
BTEX								
Benzene	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2	-
Toluene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
Ethylbenzene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
m&p-Xylenes	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
o-Xylene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
Sum of BTEX	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
Xylenes - Total	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2	-
Naphthalene	mg/kg	1	<1	<1	-	<1	<1	-
PAH					-			
Naphthalene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
Acenaphthylene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
Acenaphthene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
Fluorene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
Phenanthrene	mg/kg	0.5	0.025	0.8	47.0	3.7	1.3	24.0
Anthracene	mg/kg	0.5	<0.5	<0.5	-	0.8	0.5	11.5
Fluoranthene	mg/kg	0.5	0.025	1.2	48.0	3.8	2	15.5
Pyrene	mg/kg	0.5	0.025	1.2	48.0	3.8	2.1	14.4
Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	-	1.5	0.8	15.2
Chrysene	mg/kg	0.5	<0.5	<0.5	-	1.6	0.8	16.7
Benzo(b+j)fluoranthene	mg/kg	0.5	<0.5	<0.5	-	1.7	0.9	15.4
Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	-	0.6	<0.5	-
Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	-	1.5	0.9	12.5
Indeno(1.2.3.cd)pyrene	mg/kg	0.5	<0.5	<0.5	-	0.6	0.025	46.0
Dibenz(a.h)anthracene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
Benzo(g.h.i)perylene	mg/kg	0.5	<0.5	<0.5	-	0.9	0.025	47.3
Sum of polycyclic aromatic hydrocarbons	mg/kg	0.5	0.025	3.2	-49	20.5	9.3	18.8
Benzo(a)pyrene TEQ (zero)	mg/kg	0.5	<0.5	<0.5	-	2	1.1	14.5
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5	0.6	0.6	0	2.2	1.4	11.1
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5	1.2	1.2	0	2.5	1.7	9.5

RPD - Dredge Pond Surface Water								
Analyte	**unit**	LOR	WAT-1	QA.5	**RPD**	**WAT-8s**	WAT-QAs	**RPD**
Laboratory parameters			3-Jun-15			9-Nov-15		
pH	pH units	0.01	7.7	7.33	1.23	-	-	-
Total dissolved solids	mg/L	10	-	-	-	9070	9430	-0.97
Suspended solids	mg/L	5	-	-	-	58400	70700	-4.76
Alkalinity	mg/L							
Hydroxide Alkalinity as CaCO3	mg/L	1	-	-	-	<1	<1	-
Carbonate Alkalinity as CaCO3	mg/L	1	-	-	-	<1	<1	-
Bicarbonate Alkalinity as CaCO3	mg/L	1	-	-	-	227	239	-1.29
Total Alkalinity as CaCO3	mg/L	1	-	-	-	227	239	-1.29
Cations/anions	mg/L				-			
Sulfate	mg/L	1	-	-	-	730	794	-2.10
Chloride	mg/L	1	-	-	-	3510	3560	-0.35
Calcium	mg/L	1	-	-	-	276	280	-0.36
Magnesium	mg/L	1	-	-	-	218	218	0.00
Sodium	mg/L	1	-	-	-	2060	2060	0.00
Potassium	mg/L	1	-	-	-	77	77	0.00
Dissolved metals								
Aluminium	mg/L	0.1	-	-	-	448	192	20.00
Arsenic	mg/L	0.001	0.004	0.003	7	0.245	0.132	14.99
Cadmium	mg/L	0.0001	<0.0001	<0.0001	-	0.0186	0.0078	20.45
Chromium	mg/L	0.001	<0.001	<0.001	-	0.836	0.35	20.49
Copper	mg/L	0.001	0.0005	0.001	-17	2.06	0.838	21.08
Iron	mg/L	0.05	0.07	0.1	-9	876	739	4.24
Lead	mg/L	0.001	<0.001	<0.001	-	8.33	3.31	21.56
Nickel	mg/L	0.001	0.005	0.005	0	0.458	0.228	16.76
Manganese	mg/L	0.001	-	-	-	10.5	11	-1.16
Zinc	mg/L	0.005	0.008	0.01	-6	8.6	3.46	21.31
Mercury	mg/L	0.0001	-	-	-	0.0176	0.0134	6.77
Nutrients								
Ammonia (as N)	mg/L	0.01	11.6	12.1	-1	7.48	8.31	-2.63
Nitrite	mg/L	0.01	-	-	-	<0.01	<0.01	-
Nitrate	mg/L	0.01	-	-	-	0.04	0.05	-5.56
Nitrite+nitrate	mg/L	0.01	-	-	-	0.04	0.05	-5.56
Total Kjeldahl Nitrogen	mg/L	0.01	-	-	-	85.9	50.2	13.12
Total nitrogen	mg/L	0.01	-	-	-	85.9	50.2	13.12
Total phosphorous	mg/L	0.01	-	-	-	47.4	20.4	19.91
Reactive phosphorous	mg/L	0.01	-	-	-	0.005	0.02	-30.00
Dissolved organic carbon	mg/L	1	-	-	-	17	21	-5.26
Total organic carbon	mg/L	1	-	-	-	72	77	-1.68
Chemical oxygen demand	mg/L	10	-	-	-	7560	8560	-3.10
Biochemical oxygen demand	mg/L	2	-	-	-	249	235	1.45
Carbonaceous biochemical oxygen demand	mg/L	2	-	-	-	239	172	8.15
PAH								
Naphthalene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Acenaphthylene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Acenaphthene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Fluorene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Phenanthrene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Anthracene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Fluoranthene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Pyrene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Benz(a)anthracene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Chrysene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Benzo(b+j)fluoranthene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Benzo(k)fluoranthene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Benzo(a)pyrene	ug/L	0.5	<0.5	<0.5	-	<0.5	<0.5	-
Indeno(1.2.3.cd)pyrene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Dibenz(a.h)anthracene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Benzo(g.h.i)perylene	ug/L	1	<1.0	<1.0	-	<1.0	<1.0	-
Sum of polycyclic aromatic hydrocarbons	ug/L	0.5	<0.5	<0.5	-	<0.5	<0.5	-
Benzo(a)pyrene TEQ (zero)	ug/L	0.5	<0.5	<0.5	-	<0.5	<0.5	-
TPH					-			-
C6 - C9 Fraction	ug/L	20	<20	<20	-	<20	<20	-
C10 - C14 Fraction	ug/L	50	<50	<50	-	<50	<50	-
C15 - C28 Fraction	ug/L	100	<100	<100	-	<100	<100	-
C29 - C36 Fraction	ug/L	50	<50	<50	-	<50	<50	-
C10 - C36 Fraction (sum)	ug/L	50	<50	<50	-	<50	<50	-
TRH					-			-
C6 - C10 Fraction	ug/L		<20	<20	-	<20	<20	-
C6 - C10 Fraction minus BTEX (F	ug/L	20	<20	<20	-	<20	<20	-

Analyte	unit	LOR	WAT-1	QA.5	RPD	WAT-8s	WAT-QAs	RPD
Laboratory parameters			3-Jun-15			9-Nov-15		
>C10 - C16 Fraction	ug/L	100	<100	<100	-	<100	<100	-
>C16 - C34 Fraction	ug/L	100	<100	<100	-	<100	<100	-
>C34 - C40 Fraction	ug/L	100	<100	<100	-	<100	<100	-
>C10 - C40 Fraction (sum)	ug/L	100	<100	<100	-	<100	<100	-
>C10 - C16 Fraction minus Naphthalene (F2)	ug/L	100	<100	<100	-	<100	<100	-
BTEX					-			-
Benzene	ug/L	1	<1	<1	-	<1	<1	-
Toluene	ug/L	2	<2	<2	-	<2	<2	-
Ethylbenzene	ug/L	2	<2	<2	-	<2	<2	-
meta- & para-Xylene	ug/L	2	<2	<2	-	<2	<2	-
ortho-Xylene	ug/L	2	<2	<2	-	<2	<2	-
Total Xylenes	ug/L	2	<2	<2	-	<2	<2	-
Sum of BTEX	ug/L	1	<1	<1	-	<1	<1	-
Naphthalene	ug/L	5	<5	<5	-	<5	<5	-

RPD - Groundwater

Analyte	unit	LOR	MP-3	GW-QA	RPD	QA2 (interlab)	RPD
Laboratory parameters			9-Nov-15				
pH	pH units	0.01	6.47	6.42	0.19	-	
Total dissolved solids	mg/L	10	9210	8450	2.15	-	
Dissolved metals							
Aluminium	mg/L	0.1	0.4	0.4	0.00	0.4	0.00
Arsenic	mg/L	0.001	0.007	0.007	0.00	0.006	3.85
Cadmium	mg/L	0.0001	<0.0001	<0.0001	-	<0.001	-
Chromium	mg/L	0.001	<0.001	<0.001	-	<0.001	-
Copper	mg/L	0.001	0.001	<0.001	-	0.0005	16.67
Iron	mg/L	0.05	28.2	27.8	0.36	32	3.16
Lead	mg/L	0.001	<0.001	<0.001	-	<0.001	-
Manganese	mg/L	0.001	0.331	0.329	0.15	0.35	1.40
Nickel	mg/L	0.001	0.007	0.007	0.00	0.005	8.33
Zinc	mg/L	0.005	0.037	0.036	0.68	0.036	0.68
Mercury	mg/L	0.0001	<0.0001	<0.0001	-	<0.00005	-
Nutrients							
Ammonia (as N)	mg/L	0.01	4.67	5.19	2.64	4.5	0.93
Nitrite	mg/L	0.01	<0.01	<0.01	-	<0.005	-
Nitrate	mg/L	0.01	0.02	0.04	16.67	0.0025	38.89
Nitrite+nitrate	mg/L	0.01	0.02	0.04	16.67	-	-
Total Kjeldahl Nitrogen	mg/L	0.01	5	5.5	2.38	6.1	4.95
Total nitrogen	mg/L	0.01	5	5.5	2.38	6.1	4.95
Total organic carbon	mg/L	1	29	27	1.79	-	-
PAH							
Naphthalene	ug/L	1	<1.0	<1.0	-	-	-
Acenaphthylene	ug/L	1	<1.0	<1.0	-	-	-
Acenaphthene	ug/L	1	<1.0	<1.0	-	-	-
Fluorene	ug/L	1	<1.0	<1.0	-	-	-
Phenanthrene	ug/L	1	<1.0	<1.0	-	-	-
Anthracene	ug/L	1	<1.0	<1.0	-	-	-
Fluoranthene	ug/L	1	<1.0	<1.0	-	-	-
Pyrene	ug/L	1	<1.0	<1.0	-	-	-
Benz(a)anthracene	ug/L	1	<1.0	<1.0	-	-	-
Chrysene	ug/L	1	<1.0	<1.0	-	-	-
Benzo(b+j)fluoranthene	ug/L	1	<1.0	<1.0	-	-	-
Benzo(k)fluoranthene	ug/L	1	<1.0	<1.0	-	-	-
Benzo(a)pyrene	ug/L	0.5	<0.5	<0.5	-	-	-
Indeno(1.2.3.cd)pyrene	ug/L	1	<1.0	<1.0	-	-	-
Dibenz(a.h)anthracene	ug/L	1	<1.0	<1.0	-	-	-
Benzo(g.h.i)perylene	ug/L	1	<1.0	<1.0	-	-	-
Sum of polycyclic aromatic hydrocarbons	ug/L	0.5	<0.5	<0.5	-	-	-
Benzo(a)pyrene TEQ (zero)	ug/L	0.5	<0.5	<0.5	-	-	-
TPH							-
C6 - C9 Fraction	ug/L	20	<20	<20	-	<10	-
C10 - C14 Fraction	ug/L	50	<50	<50	-	<50	-
C15 - C28 Fraction	ug/L	100	<100	<100	-	<100	-
C29 - C36 Fraction	ug/L	50	<50	<50	-	<50	-
C10 - C36 Fraction (sum)	ug/L	50	<50	<50	-	-	-
TRH							
C6 - C10 Fraction	ug/L		<20	<20	-	<10	-
C6 - C10 Fraction minus BTEX (F1)	ug/L	20	<20	<20	-	<10	-
>C10 - C16 Fraction	ug/L	100	<100	<100	-	<50	-
>C16 - C34 Fraction	ug/L	100	<100	<100	-	<100	-
>C34 - C40 Fraction	ug/L	100	<100	<100	-	<100	-
>C10 - C40 Fraction (sum)	ug/L	100	<100	<100	-	-	-

Analyte	unit	LOR	MP-3	GW-QA	RPD	QA2 (interlab)	RPD
Laboratory parameters			9-Nov-15				
>C10 - C16 Fraction minus Naphthalene (F2)	ug/L	100	<100	<100	-	<50	-
BTEX							
Benzene	ug/L	1	<1	<1	-	<1	-
Toluene	ug/L	2	<2	<2	-	<1	-
Ethylbenzene	ug/L	2	<2	<2	-	<1	-
meta- & para-Xylene	ug/L	2	<2	<2	-	<2	-
ortho-Xylene	ug/L	2	<2	<2	-	<1	-
Total Xylenes	ug/L	2	<2	<2	-	-	-
Sum of BTEX	ug/L	1	<1	<1	-	-	-
Naphthalene	ug/L	5	<5	<5	-	<1	-

- Dredge pond sediment

Analytes	units	LOR	SD-3	QA.2	RPD	SD-7	SDQA1	RPD	SD-10	SD-QA.2	RPD
Laboratory parameters			3-Jun-15			9-Nov-15			9-Nov-15		
pH	-	0.1	8.3	8.3	0	7.9	7.9	0	7.9	8	-0.31
Metals											
Aluminium	mg/kg	50	-	-	-	21400	18200	4	18800	19000	-0.26
Arsenic	mg/kg	5	<5	<5	-	16	12	7	15	13	3.57
Cadmium	mg/kg	1	<1	<1	-	<1	<1	-	<1	<1	-
Chromium	mg/kg	2	3	3	0.0	37	36	1	32	32	0.00
Copper	mg/kg	5	16	6	23	88	77	3	70	91	-6.52
Iron	mg/kg	50	2660	2660	0.0	30600	24700	5	29700	28000	1.47
Lead	mg/kg	5	12	11	2.2	249	216	4	190	244	-6.22
Manganese	mg/kg		-	-	-	222	179	5	178	214	-4.59
Nickel	mg/kg	2	2	1	16.7	19	15	6	17	18	-1.43
Zinc	mg/kg	5	44	43	0.6	343	296	4	246	327	-7.07
Mercury	mg/kg	0.1	<0.1	<0.1	-	0.6	0.6	0	0.4	0.5	-5.56
Nutrients											
Ammonia as N	mg/kg		10.2	-	-	80	60	7	60	110	-14.71
Nitrite	mg/kg	0.1	-	-	-	<0.1	<0.1	-	<0.1	<0.1	-
Nitrate	mg/kg	0.1	-	-	-	0.5	0.5	0	0.1	0.5	-33.33
Nitrite+nitrate	mg/kg	0.1	-	-	-	0.5	0.5	0	0.1	0.5	-33.33
Total Kjeldahl nitrogen	mg/kg	20	-	-	-	1660	1540	2	1290	1950	-10.19
Total nitrogen	mg/kg	20	-	-	-	1660	1540	2	1290	1950	-10.19
Total organic carbon	%	-	0.66	-	-	-	-	-	-	-	-
TPH											
C6 - C9 Fraction	mg/kg	10	<10	<10	-	<10	<10	-	<10	<10	-
C10 - C14 Fraction	mg/kg	50	<50	<50	-	<50	<50	-	<50	<50	-
C15 - C28 Fraction	mg/kg	100	<100	<100	-	200	230	-3	50	300	-35.71
C29 - C36 Fraction	mg/kg	100	<100	<100	-	250	210	4	50	350	-37.50
C10 - C36 Fraction (sum)	mg/kg	250	<50	<50	-	450	440	1	25	650	-46.30
TRH											
C6 - C10 Fraction	mg/kg	10	<10	<10	-	<10	<10	-	<10	<10	-
C6 - C10 Fraction minus BTEX (F1)	mg/kg	50	<10	<10	-	<10	<10	-	<10	<10	-
>C10 - C16 Fraction	mg/kg	100	<50	<50	-	<50	<50	-	<50	<50	-
>C16 - C34 Fraction	mg/kg	100	<100	<100	-	380	350	2	50	540	-41.53
>C34 - C40 Fraction	mg/kg	50	<100	<100	-	160	130	5	50	240	-32.76
>C10 - C40 Fraction (sum)	mg/kg	50	<50	<50	-	540	480	3	25	780	-46.89
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg		<50	<50	-	<50	<50	-	<50	<50	-
BTEX								-			-
Benzene	mg/kg	0.2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-
Toluene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Ethylbenzene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
m&p-Xylenes	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
o-Xylene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Sum of BTEX	mg/kg	0.2	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Xylenes - Total	mg/kg	0.5	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-
Naphthalene	mg/kg	1	<1	<1	-	<1	<1	-	<1	<1	-
PAH								-			-
Naphthalene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	<0.8	<0.8	-
Acenaphthylene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	<0.8	<0.8	-
Acenaphthene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	<0.8	<0.8	-
Fluorene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	<0.8	<0.8	-
Phenanthrene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	<0.8	<0.8	-
Anthracene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	<0.8	<0.8	-
Fluoranthene	mg/kg	0.5	<0.5	<0.5	-	1.1	0.9	5	0.4	1.6	-30.00
Pyrene	mg/kg	0.5	<0.5	<0.5	-	1.2	1	5	0.4	1.8	-31.82
Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	0.5	0.9	-14.29
Chrysene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	<0.8	<0.8	-
Benzo(b+j)fluoranthene	mg/kg	0.5	<0.5	<0.5	-	0.8	0.4	17	0.4	1	-21.43
Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	<0.8	<0.8	-
Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	0.4	1	-21.43
Indeno(1.2.3.cd)pyrene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	<0.8	<0.8	-

Analytes	units	LOR	SD-3	QA.2	RPD	SD-7	SDQA1	RPD	SD-10	SD-QA.2	RPD
Laboratory parameters			3-Jun-15			9-Nov-15			9-Nov-15		
Dibenz(a.h)anthracene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	<0.8	<0.8	-
Benzo(g.h.i)perylene	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	<0.8	<0.8	-
Sum of polycyclic aromatic hydrocarbons	mg/kg	0.5	<0.5	<0.5	-	3.1	1.9	12	0.4	6.3	-44.03
Benzo(a)pyrene TEQ (zero)	mg/kg	0.5	<0.5	<0.5	-	<0.8	<0.8	-	0.4	1.2	-25.00
Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5	0.6	0.6	-	0.7	0.6	4	0.6	1.5	-21.43
Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5	1.2	1.2	-	1.2	1.2	0	1.2	1.8	-10.00
Total Polychlorinated biphenyls											
Total Polychlorinated biphenyls	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Pesticides											
alpha-BHC	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Hexachlorobenzene (HCB)	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
beta-BHC	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
gamma-BHC	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
delta-BHC	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Heptachlor	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Aldrin	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Heptachlor epoxide	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
trans-Chlordane	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Total Chlordane (sum)	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
alpha-Endosulfan	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
cis-Chlordane	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Dieldrin	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
4.4`-DDE	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Endrin	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
beta-Endosulfan	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Endosulfan (sum)	mg/kg	0.2	<0.05	<0.05	-	-	-	-	-	-	-
4.4`-DDD	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Endrin aldehyde	mg/kg	0.2	<0.2	<0.2	-	-	-	-	-	-	-
Endosulfan sulfate	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
4.4`-DDT	mg/kg	0.05	<0.2	<0.2	-	-	-	-	-	-	-
Endrin ketone	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Methoxychlor	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Sum of Aldrin + Dieldrin	mg/kg	0.2	-	-	-	-	-	-	-	-	-
Sum of DDD + DDE + DDT	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Dichlorvos	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Demeton-S-methyl	mg/kg	0.05	<0.2	<0.2	-	-	-	-	-	-	-
Monocrotophos	mg/kg	0.2	<0.05	<0.05	-	-	-	-	-	-	-
Dimethoate	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Diazinon	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Chlorpyrifos-methyl	mg/kg	0.05	<0.2	<0.2	-	-	-	-	-	-	-
Parathion-methyl	mg/kg	0.2	<0.05	<0.05	-	-	-	-	-	-	-
Malathion	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Fenthion	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-
Chlorpyrifos	mg/kg	0.05	<0.2	<0.2	-	-	-	-	-	-	-
Parathion	mg/kg	0.05	<0.05	<0.05	-	-	-	-	-	-	-

Summary Table 6 TRIP SPIKE & BLANK WATER & RINSATE

			TRIP SPIKE	Spike concetration	RPD	TRIP BLANK	SD-RINSATE	WAT-RINSATE	RINSATE
Analyte	**unit**	LOR	6-Nov-15						17-Nov-15
Laboratory parameters									
pH	pH units	0.01	-			-	7.65	-	7.72
Total dissolved solids	mg/L	10	-			-	-	108	129
Total suspended solids	mg/L	5	-			-	-	<5	-
Alkalinity	mg/L		-			-	-	-	-
Hydroxide Alkalinity as CaCO3	mg/L	1	-			-	-	<1	-
Carbonate Alkalinity as CaCO3	mg/L	1	-			-	-	<1	-
Bicarbonate Alkalinity as CaCO3	mg/L	1	-			-	-	47	-
Total Alkalinity as CaCO3	mg/L	1	-			-	-	47	-
Cations/anions	mg/L		-			-	-	-	-
Sulfate	mg/L	1	-			-	-	10	-
Chloride	mg/L	1	-			-	-	29	-
Calcium	mg/L	1	-			-	-	14	-
Magnesium	mg/L	1	-			-	-	6	-
Sodium	mg/L	1	-			-	-	16	-
Potassium	mg/L	1	-			-	-	2	-
Dissolved metals									
Aluminium	mg/L	0.1	-			-	<0.01	0.01	0.01
Arsenic	mg/L	0.001	-			-	<0.001	<0.001	<0.001
Cadmium	mg/L	0.0001	-			-	<0.0001	<0.0001	<0.0001
Chromium	mg/L	0.001	-			-	<0.001	<0.001	<0.001
Copper	mg/L	0.001	-			-	0.374	0.397	0.129
Iron	mg/L	0.05	-			-	<0.05	<0.05	<0.05
Lead	mg/L	0.001	-			-	<0.001	0.005	<0.001
Nickel	mg/L	0.001	-			-	0.016	0.003	<0.001
Manganese	mg/L	0.001	-			-	0.002	0.003	0.002
Zinc	mg/L	0.005	-			-	0.092	0.096	0.024
Mercury	mg/L	0.0001	-			-	<0.0001	<0.0001	<0.0001
Nutrients									
Ammonia (as N)	mg/L	0.01	-			-	**0.24**	**0.28**	**0.32**
Nitrite	mg/L	0.01	-			-	**0.03**	**0.02**	**0.02**
Nitrate	mg/L	0.01	-			-	**0.16**	**0.16**	**0.31**
Nitrite+nitrate	mg/L	0.01	-			-	**0.19**	**0.18**	**0.33**
Total Kjeldahl Nitrogen	mg/L	0.01	-			-	**0.6**	**0.4**	**0.4**
Total nitrogen	mg/L	0.01	-			-	**0.8**	**0.6**	**0.7**
Total phosphorous	mg/L	0.01	-			-	-	<0.01	-
Reactive phosphorous	mg/L	0.01	-			-	-	<0.01	-
Dissolved organic carbon	mg/L	1	-			-	-	<1	-
Total organic carbon	mg/L	1	-			-	-	<1	z
Chemical oxygen demand	mg/L	10	-			-	-	**12**	-
Biochemical oxygen demand	mg/L	2	-			-	-	<2	-
Carbonaceous biochemical oxygen demand	mg/L	2	-			-	-	<2	-
PAH									
Naphthalene	ug/L	1	-			-	<1.0	<1.0	<1.0
Acenaphthylene	ug/L	1	-			-	<1.0	<1.0	<1.0
Acenaphthene	ug/L	1	-			-	<1.0	<1.0	<1.0
Fluorene	ug/L	1	-			-	<1.0	<1.0	<1.0
Phenanthrene	ug/L	1	-			-	<1.0	<1.0	<1.0
Anthracene	ug/L	1	-			-	<1.0	<1.0	<1.0
Fluoranthene	ug/L	1	-			-	<1.0	<1.0	<1.0
Pyrene	ug/L	1	-			-	<1.0	<1.0	<1.0
Benz(a)anthracene	ug/L	1	-			-	<1.0	<1.0	<1.0
Chrysene	ug/L	1	-			-	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	ug/L	1	-			-	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	ug/L	1	-			-	<1.0	<1.0	<1.0
Benzo(a)pyrene	ug/L	0.5	-			-	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	ug/L	1	-			-	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	ug/L	1	-			-	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	ug/L	1	-			-	<1.0	<1.0	<1.0
Sum of polycyclic aromatic hydrocarbons	ug/L	0.5	-			-	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ (zero)	ug/L	0.5	-			-	<0.5	<0.5	<0.5
TPH									
C6 - C9 Fraction	ug/L	20	-			<20	**50**	**30**	**20**
C10 - C14 Fraction	ug/L	50	-			-	<50	<50	<50
C15 - C28 Fraction	ug/L	100	-			-	<100	<100	<100
C29 - C36 Fraction	ug/L	50	-			-	<50	<50	<50
C10 - C36 Fraction (sum)	ug/L	50	-			-	<50	<50	<50

Analyte	unit	LOR	TRIP SPIKE	Spike concetration	RPD	TRIP BLANK	SD-RINSATE	WAT-RINSATE	RINSATE
			6-Nov-15						17-Nov-15
TRH									
C6 - C10 Fraction	ug/L		-			<20	**50**	**30**	**30**
C6 - C10 Fraction minus BTEX (F1)	ug/L	20	-			<20	**50**	**30**	**30**
>C10 - C16 Fraction	ug/L	100	-			-	<100	<100	<100
>C16 - C34 Fraction	ug/L	100	-			-	<100	<100	<100
>C34 - C40 Fraction	ug/L	100	-			-	<100	<100	<100
>C10 - C40 Fraction (sum)	ug/L	100	-			-	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	ug/L	100	-			-	<100	<100	<100
BTEX									
Benzene	ug/L	1	18	20	-2.63	<1	<1	<1	<1
Toluene	ug/L	2	16	20	-5.56	<2	<2	<2	<2
Ethylbenzene	ug/L	2	17	20	-4.05	<2	<2	<2	<2
meta- & para-Xylene	ug/L	2	17	20	-4.05	<2	<2	<2	<2
ortho-Xylene	ug/L	2	17	20	-4.05	<2	<2	<2	<2
Total Xylenes	ug/L	2	34	-	-	<2	<2	<2	<2
Sum of BTEX	ug/L	1	85	-	-	<1	<1	<1	<1
Naphthalene	ug/L	5	18	-	-	<5	<5	<5	<5

TRIP SPIKE & BLANK SOIL

Analyte	unit	LOR	Trip spike 3	Trip Sprike Control 3	RPD	Trip spike 4	Trip Spike Control 4	RPD	TB
			6-Nov-15						
Laboratory parameters									
TPH									
C6 - C9 Fraction	mg/kg	10	25	30	-4.55	52	46	3.06	<10
TRH					-			-	
C6 - C10 Fraction	mg/kg	10	28	34	-4.84	58	52	2.73	<10
C6 - C10 Fraction minus BTEX (F1)	mg/kg	10	12	18	-10.00	33	28	4.10	<10
BTEX					-			-	
Benzene	mg/kg	0.2	0.3	0.2	10.00	0.4	0.4	0.00	<0.2
Toluene	mg/kg	0.5	7.4	7.2	0.68	11.9	11	1.97	<0.5
Ethylbenzene	mg/kg	0.5	1	1	0.00	1.6	1.5	1.61	<0.5
m&p-Xylenes	mg/kg	0.5	5	5	0.00	7.9	7.6	0.97	<0.5
o-Xylene	mg/kg	0.5	2.1	2.1	0.00	3.3	3.1	1.56	<0.5
Sum of BTEX	mg/kg	0.5	15.8	15.5	0.48	25.1	23.6	1.54	<0.5
Xylenes - Total	mg/kg	0.2	7.1	7.1	0	11.2	10.7	1.14	<0.2
Naphthalene	mg/kg	1	<1	<1	0	<1	<1	0.00	<1

Appendix B

Laboratory results

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1535904**	Page	: 1 of 34
Client	: **EMGA MITCHELL MCLENNAN**	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Contact	:
Address	: Ground Floor Suite 1 20 Chandos Street St Leonards NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: npearsehawkins@emgamm.com	E-mail	:
Telephone	: +61 02 9493 9500	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9493 9599	Facsimile	: +61-2-8784 8500
Project	: GCM	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: J14149	Date Samples Received	: 11-Nov-2015 09:40
C-O-C number	: ----	Date Analysis Commenced	: 11-Nov-2015
Sampler	: SEAN CASSIDY	Issue Date	: 19-Nov-2015 18:43
Site	: ----		
		No. of samples received	: 44
Quote number	: ----	No. of samples analysed	: 40

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Dian Dao		Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Raymond Commodore	Instrument Chemist	Sydney Inorganics

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

- EP071: Results of sample TP05QA have been confirmed by re-extraction and re-analysis.
- EG020: Positive results for sample ES1535904 # 18 have been confirmed.
- ****Manual Comment****to appear on COA**
- EP080: Positive results of SD-RINSATE and WAT-RINSATE have been confirmed by re-analysis.
- EP075(SIM): LOR for samples raised due to high amount of moisture presents.
- EG035:ES1535904 # 30, 32, 33, 39,41 were diluted ten folds prior to digest due to high matrix interference.
- EG035: Positive Hg results have been confirmed by reanalysis.
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EK055G: It has been noted that Ammonia is greater thanTKN for various samples, however this difference is within the limits of experimental variation.
- EP080: The trip spike and its control have been analysed for volatile TPH and BTEX only. The trip spike and control were prepared in the lab using reagent grade sand spiked with petrol. The spike was dispatched from the lab and the control retained.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEX compounds spiked at 20 ug/L.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SD-7	SDQA1	SD-9	SD-10	SD-11
			Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535904-001	ES1535904-002	ES1535904-003	ES1535904-004	ES1535904-005
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	7.9	7.9	7.9	7.9	8.0
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	64.1	61.0	62.6	62.9	66.0
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	21400	18200	19900	18800	23500
Iron	7439-89-6	50	mg/kg	30600	24700	28700	29700	31900
Manganese	7439-96-5	5	mg/kg	222	179	216	178	226
Arsenic	7440-38-2	5	mg/kg	16	12	14	15	17
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	37	36	36	32	43
Copper	7440-50-8	5	mg/kg	88	77	87	70	99
Lead	7439-92-1	5	mg/kg	249	216	230	190	264
Nickel	7440-02-0	2	mg/kg	19	15	18	17	21
Zinc	7440-66-6	5	mg/kg	343	296	328	246	379
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.6	0.6	0.6	0.4	0.7
EK055: Ammonia as N								
Ammonia as N	7664-41-7	20	mg/kg	80	60	80	60	90
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	14797-65-0	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.)	14797-55-8	0.1	mg/kg	0.5	<0.1	<0.1	0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.5	<0.1	<0.1	0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	1660	1540	1960	1290	1890
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	1660	1540	1960	1290	1890
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	----
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SD-7	SDQA1	SD-9	SD-10	SD-11
			Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535904-001	ES1535904-002	ES1535904-003	ES1535904-004	ES1535904-005
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	----	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	----	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	----	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	----	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	----	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	----	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	----	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	----	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	----	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	----	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	----	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	----	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	----	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	----	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	----	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	----	----	----	----
^ Sum of DDD + DDE + DDT	----	0.05	mg/kg	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.8	<0.8	<0.8	<0.8	<0.8
Acenaphthylene	208-96-8	0.5	mg/kg	<0.8	<0.8	<0.8	<0.8	<0.8
Acenaphthene	83-32-9	0.5	mg/kg	<0.8	<0.8	<0.8	<0.8	<0.8
Fluorene	86-73-7	0.5	mg/kg	<0.8	<0.8	<0.8	<0.8	<0.8
Phenanthrene	85-01-8	0.5	mg/kg	<0.8	<0.8	<0.8	<0.8	<0.8
Anthracene	120-12-7	0.5	mg/kg	<0.8	<0.8	<0.8	<0.8	<0.8
Fluoranthene	206-44-0	0.5	mg/kg	**1.1**	**0.9**	**1.6**	<0.8	**1.2**
Pyrene	129-00-0	0.5	mg/kg	**1.2**	**1.0**	**1.7**	<0.8	**1.4**
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.8	<0.8	**0.8**	<0.8	<0.8
Chrysene	218-01-9	0.5	mg/kg	<0.8	<0.8	<0.8	<0.8	<0.8

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SD-7	SDQA1	SD-9	SD-10	SD-11
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-001	ES1535904-002	ES1535904-003	ES1535904-004	ES1535904-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		**0.8**	<0.8	**1.1**	<0.8	**1.0**
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.8	<0.8	**1.0**	<0.8	<0.8
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		**3.1**	**1.9**	**6.2**	<0.8	**3.6**
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.8	<0.8	**1.2**	<0.8	<0.8
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.7**	**0.6**	**1.5**	**0.6**	**0.7**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.8**	**1.2**	**1.3**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		**200**	**230**	**320**	<100	**270**
C29 - C36 Fraction	----	100	mg/kg		**250**	**210**	**360**	<100	**320**
^ C10 - C36 Fraction (sum)	----	50	mg/kg		**450**	**440**	**680**	<50	**590**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		**380**	**350**	**570**	<100	**500**
>C34 - C40 Fraction	----	100	mg/kg		**160**	**130**	**270**	<100	**220**
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**540**	**480**	**840**	<50	**720**
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SD-7	SDQA1	SD-9	SD-10	SD-11
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-001	ES1535904-002	ES1535904-003	ES1535904-004	ES1535904-005
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		----	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		----	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		117	120	112	95.2	96.4
2-Chlorophenol-D4	93951-73-6	0.5	%		101	103	93.2	85.8	100
2.4.6-Tribromophenol	118-79-6	0.5	%		118	130	117	121	116
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		97.7	97.8	98.4	98.4	99.3
Anthracene-d10	1719-06-8	0.5	%		107	108	110	108	108
4-Terphenyl-d14	1718-51-0	0.5	%		94.2	93.5	94.6	95.6	95.8
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		93.2	79.8	102	95.7	125
Toluene-D8	2037-26-5	0.2	%		93.6	84.5	104	88.7	112
4-Bromofluorobenzene	460-00-4	0.2	%		74.8	84.2	76.6	75.5	91.2

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SD-13	SD-14	SD-15	SD-16	SD-QA.2
			Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535904-007	ES1535904-008	ES1535904-009	ES1535904-010	ES1535904-012
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	8.0	7.7	7.8	7.9	8.0
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	56.5	66.2	65.8	65.3	61.8
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	15800	19600	21600	22700	19000
Iron	7439-89-6	50	mg/kg	25000	29900	30300	30300	28000
Manganese	7439-96-5	5	mg/kg	187	135	214	217	214
Arsenic	7440-38-2	5	mg/kg	12	14	15	15	13
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	30	27	34	36	32
Copper	7440-50-8	5	mg/kg	71	54	82	93	91
Lead	7439-92-1	5	mg/kg	197	134	229	239	244
Nickel	7440-02-0	2	mg/kg	16	15	18	19	18
Zinc	7440-66-6	5	mg/kg	388	180	309	345	327
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.4	0.2	0.5	0.5	0.5
EK055: Ammonia as N								
Ammonia as N	7664-41-7	20	mg/kg	50	70	80	80	110
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	14797-65-0	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.)	14797-55-8	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	1900	1480	1290	1800	1950
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	1900	1480	1290	1800	1950
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	<0.1	----
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	----	----	<0.05	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SD-13	SD-14	SD-15	SD-16	SD-QA.2
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-007	ES1535904-008	ES1535904-009	ES1535904-010	ES1535904-012
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		----	----	----	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg		----	----	----	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg		----	----	----	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg		----	----	----	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg		----	----	----	<0.05	----
Aldrin	309-00-2	0.05	mg/kg		----	----	----	<0.05	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		----	----	----	<0.05	----
^ Total Chlordane (sum)	----	0.05	mg/kg		----	----	----	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg		----	----	----	<0.05	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		----	----	----	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg		----	----	----	<0.05	----
Dieldrin	60-57-1	0.05	mg/kg		----	----	----	<0.05	----
4.4`-DDE	72-55-9	0.05	mg/kg		----	----	----	<0.05	----
Endrin	72-20-8	0.05	mg/kg		----	----	----	<0.05	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		----	----	----	<0.05	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		----	----	----	<0.05	----
4.4`-DDD	72-54-8	0.05	mg/kg		----	----	----	<0.05	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		----	----	----	<0.05	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		----	----	----	<0.05	----
4.4`-DDT	50-29-3	0.2	mg/kg		----	----	----	<0.2	----
Endrin ketone	53494-70-5	0.05	mg/kg		----	----	----	<0.05	----
Methoxychlor	72-43-5	0.2	mg/kg		----	----	----	<0.2	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		----	----	----	<0.05	----
^ Sum of DDD + DDE + DDT	----	0.05	mg/kg		----	----	----	<0.05	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
Acenaphthylene	208-96-8	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
Acenaphthene	83-32-9	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
Fluorene	86-73-7	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
Phenanthrene	85-01-8	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
Anthracene	120-12-7	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
Fluoranthene	206-44-0	0.5	mg/kg		**1.6**	<0.8	<0.8	<0.8	**1.6**
Pyrene	129-00-0	0.5	mg/kg		**1.7**	<0.8	<0.8	<0.8	**1.8**
Benz(a)anthracene	56-55-3	0.5	mg/kg		**0.9**	<0.8	<0.8	<0.8	**0.9**
Chrysene	218-01-9	0.5	mg/kg		**0.8**	<0.8	<0.8	<0.8	<0.8

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SD-13	SD-14	SD-15	SD-16	SD-QA.2
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-007	ES1535904-008	ES1535904-009	ES1535904-010	ES1535904-012
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		**1.2**	<0.8	<0.8	<0.8	**1.0**
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
Benzo(a)pyrene	50-32-8	0.5	mg/kg		**1.0**	<0.8	<0.8	<0.8	**1.0**
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.8	<0.8	<0.8	<0.8	<0.8
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		**7.2**	<0.8	<0.8	<0.8	**6.3**
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		**1.2**	<0.8	<0.8	<0.8	**1.2**
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**1.5**	**0.6**	**0.6**	**0.6**	**1.5**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.8**	**1.2**	**1.2**	**1.2**	**1.8**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		**200**	<100	<100	**140**	**300**
C29 - C36 Fraction	----	100	mg/kg		**230**	<100	<100	**160**	**350**
^ C10 - C36 Fraction (sum)	----	50	mg/kg		**430**	<50	<50	**300**	**650**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		**350**	<100	<100	**260**	**540**
>C34 - C40 Fraction	----	100	mg/kg		**120**	<100	<100	<100	**240**
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**470**	<50	<50	**260**	**780**
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SD-13	SD-14	SD-15	SD-16	SD-QA.2
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-007	ES1535904-008	ES1535904-009	ES1535904-010	ES1535904-012
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		----	----	----	86.1	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		----	----	----	97.4	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		----	----	----	82.0	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		92.2	98.2	122	121	121
2-Chlorophenol-D4	93951-73-6	0.5	%		100	102	102	103	102
2.4.6-Tribromophenol	118-79-6	0.5	%		124	118	116	127	117
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		95.0	96.4	97.6	98.0	96.4
Anthracene-d10	1719-06-8	0.5	%		94.8	106	108	107	107
4-Terphenyl-d14	1718-51-0	0.5	%		89.9	92.2	93.7	92.8	93.1
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		124	91.2	102	111	91.5
Toluene-D8	2037-26-5	0.2	%		115	87.4	98.4	97.9	92.8
4-Bromofluorobenzene	460-00-4	0.2	%		90.2	73.8	77.7	80.7	86.1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SD-18	SD-19	TP-11	TP-16	TP-12
			Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535904-013	ES1535904-014	ES1535904-019	ES1535904-020	ES1535904-021
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	8.1	8.2	----	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	68.5	50.3	14.0	24.0	18.3
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	24600	14900	4960	12400	7840
Iron	7439-89-6	50	mg/kg	33000	30200	7790	30100	38300
Manganese	7439-96-5	5	mg/kg	232	219	95	279	286
Arsenic	7440-38-2	5	mg/kg	17	12	<5	7	8
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	1
Chromium	7440-47-3	2	mg/kg	40	27	8	14	40
Copper	7440-50-8	5	mg/kg	97	99	22	14	190
Lead	7439-92-1	5	mg/kg	270	209	44	25	115
Nickel	7440-02-0	2	mg/kg	20	17	5	7	17
Zinc	7440-66-6	5	mg/kg	376	319	82	48	345
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.7	0.7	<0.1	<0.1	0.1
EK055: Ammonia as N								
Ammonia as N	7664-41-7	20	mg/kg	170	40	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	<0.1	0.3	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N (Sol.)	14797-55-8	0.1	mg/kg	<0.1	0.1	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	0.4	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	2260	1490	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	2260	1490	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	<0.1	<0.1	<0.1	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SD-18	SD-19	TP-11	TP-16	TP-12
			Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535904-013	ES1535904-014	ES1535904-019	ES1535904-020	ES1535904-021
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
^ Sum of DDD + DDE + DDT	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.8	<0.8	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.8	<0.8	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.8	<0.8	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.8	<0.8	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.8	<0.8	<0.5	<0.5	**0.6**
Anthracene	120-12-7	0.5	mg/kg	<0.8	<0.8	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	**1.5**	<0.8	<0.5	<0.5	**0.9**
Pyrene	129-00-0	0.5	mg/kg	**1.6**	<0.8	<0.5	<0.5	**0.9**
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.8	<0.8	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.8	<0.8	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SD-18	SD-19	TP-11	TP-16	TP-12
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-013	ES1535904-014	ES1535904-019	ES1535904-020	ES1535904-021
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		**1.2**	<0.8	<0.5	<0.5	**0.5**
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.8	<0.8	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		**0.9**	<0.8	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.8	<0.8	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.8	<0.8	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.8	<0.8	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		**5.2**	<0.8	<0.5	<0.5	**2.9**
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		**1.0**	<0.8	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**1.4**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.7**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		**300**	**110**	<100	<100	**120**
C29 - C36 Fraction	----	100	mg/kg		**330**	**140**	<100	<100	**120**
^ C10 - C36 Fraction (sum)	----	50	mg/kg		**630**	**250**	<50	<50	**240**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		**510**	**210**	<100	<100	**190**
>C34 - C40 Fraction	----	100	mg/kg		**180**	**100**	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**690**	**310**	<50	<50	**190**
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SD-18	SD-19	TP-11	TP-16	TP-12
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-013	ES1535904-014	ES1535904-019	ES1535904-020	ES1535904-021
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		86.5	85.0	89.7	90.4	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		105	105	96.7	105	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		95.5	98.5	70.3	72.3	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		128	122	120	116	121
2-Chlorophenol-D4	93951-73-6	0.5	%		107	105	102	98.4	101
2.4.6-Tribromophenol	118-79-6	0.5	%		117	118	106	112	118
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		95.8	98.4	93.6	93.0	94.2
Anthracene-d10	1719-06-8	0.5	%		112	109	105	103	105
4-Terphenyl-d14	1718-51-0	0.5	%		106	88.4	89.4	88.2	89.9
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		109	111	130	127	129
Toluene-D8	2037-26-5	0.2	%		104	104	127	128	128
4-Bromofluorobenzene	460-00-4	0.2	%		87.5	83.9	108	110	106

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP-15	TP05QA	TP-14	TP-13	TRIP SPIKE 3
			Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[06-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535904-022	ES1535904-023	ES1535904-024	ES1535904-025	ES1535904-026
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	----	----	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	19.4	21.5	50.1	29.4	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	6400	8660	6210	5200	----
Iron	7439-89-6	50	mg/kg	10500	18700	25700	23000	----
Manganese	7439-96-5	5	mg/kg	106	186	76	215	----
Arsenic	7440-38-2	5	mg/kg	<5	8	8	<5	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	8	15	8	8	----
Copper	7440-50-8	5	mg/kg	40	40	10	24	----
Lead	7439-92-1	5	mg/kg	52	70	11	53	----
Nickel	7440-02-0	2	mg/kg	10	9	17	8	----
Zinc	7440-66-6	5	mg/kg	142	121	23	95	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	0.1	<0.1	<0.1	----
EK055: Ammonia as N								
Ammonia as N	7664-41-7	20	mg/kg	----	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N (Sol.)	14797-55-8	0.1	mg/kg	----	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	----	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	----	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	----
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TP-15	TP05QA	TP-14	TP-13	TRIP SPIKE 3
			Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[06-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535904-022	ES1535904-023	ES1535904-024	ES1535904-025	ES1535904-026
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	----	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	----	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	----	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	----	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	----	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	----	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	----	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	----	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	----	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	----	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	----	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	----	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	----	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	----	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	----	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	----	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	----	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	----	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	----	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	----	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	----	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	----	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	----	----	----	----	----
^ Sum of DDD + DDE + DDT	----	0.05	mg/kg	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.8	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.8	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.8	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.8	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	**3.7**	**1.3**	<0.8	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	**0.8**	**0.5**	<0.8	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	**3.8**	**2.0**	<0.8	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	**3.8**	**2.1**	<0.8	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	**1.5**	**0.8**	<0.8	<0.5	----
Chrysene	218-01-9	0.5	mg/kg	**1.6**	**0.8**	<0.8	<0.5	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP-15	TP05QA	TP-14	TP-13	TRIP SPIKE 3
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[06-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-022	ES1535904-023	ES1535904-024	ES1535904-025	ES1535904-026
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		**1.7**	**0.9**	<0.8	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		**0.6**	<0.5	<0.8	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		**1.5**	**0.9**	<0.8	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		**0.6**	<0.5	<0.8	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.8	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		**0.9**	<0.5	<0.8	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		**20.5**	**9.3**	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		**2.0**	**1.1**	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**2.2**	**1.4**	**0.6**	**0.6**	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**2.5**	**1.7**	**1.2**	**1.2**	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	**25**
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	mg/kg		<100	**390**	<100	**140**	----
C29 - C36 Fraction	----	100	mg/kg		<100	**230**	<100	**150**	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	**620**	<50	**290**	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	**28**
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	**12**
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	----
>C16 - C34 Fraction	----	100	mg/kg		**150**	**560**	<100	**240**	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**150**	**560**	<50	**240**	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	**0.3**
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	**7.4**
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	**1.0**
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	**5.0**
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	**2.1**
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	**15.8**
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	**7.1**
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TP-15	TP05QA	TP-14	TP-13	TRIP SPIKE 3
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[06-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-022	ES1535904-023	ES1535904-024	ES1535904-025	ES1535904-026
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		----	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		----	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**106**	**95.5**	**94.0**	**95.2**	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**105**	**98.2**	**84.4**	**106**	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**118**	**97.0**	**96.0**	**104**	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**116**	**98.7**	**95.4**	**98.0**	----
Anthracene-d10	1719-06-8	0.5	%		**109**	**103**	**102**	**107**	----
4-Terphenyl-d14	1718-51-0	0.5	%		**95.8**	**86.6**	**89.7**	**90.9**	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**118**	**124**	**102**	**106**	**119**
Toluene-D8	2037-26-5	0.2	%		**118**	**117**	**102**	**103**	**93.5**
4-Bromofluorobenzene	460-00-4	0.2	%		**100.0**	**94.2**	**114**	**114**	**108**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	TRIP BLANK	TSC 3	TS4	TSC4	TB
			Client sampling date / time	[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1535904-027	ES1535904-042	ES1535904-043	ES1535904-044	ES1535904-045
				Result	Result	Result	Result	Result
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	----	----	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	----	----	----	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	----	----	----	----
Iron	7439-89-6	50	mg/kg	----	----	----	----	----
Manganese	7439-96-5	5	mg/kg	----	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	----	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	----	----	----	----	----
Chromium	7440-47-3	2	mg/kg	----	----	----	----	----
Copper	7440-50-8	5	mg/kg	----	----	----	----	----
Lead	7439-92-1	5	mg/kg	----	----	----	----	----
Nickel	7440-02-0	2	mg/kg	----	----	----	----	----
Zinc	7440-66-6	5	mg/kg	----	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	----
EK055: Ammonia as N								
Ammonia as N	7664-41-7	20	mg/kg	----	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N (Sol.)	14797-55-8	0.1	mg/kg	----	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	----	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	----	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	----	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	----
Total Polychlorinated biphenyls	----	0.1	mg/kg	----	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TRIP BLANK	TSC 3	TS4	TSC4	TB
				Client sampling date / time	[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-027	ES1535904-042	ES1535904-043	ES1535904-044	ES1535904-045
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		----	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg		----	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg		----	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg		----	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg		----	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg		----	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		----	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg		----	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg		----	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		----	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		----	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		----	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg		----	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		----	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		----	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		----	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		----	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		----	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		----	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		----	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		----	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		----	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		----	----	----	----	----
^ Sum of DDD + DDE + DDT	----	0.05	mg/kg		----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		----	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		----	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		----	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		----	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		----	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		----	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		----	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		----	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		----	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		----	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TRIP BLANK	TSC 3	TS4	TSC4	TB
				Client sampling date / time	[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-027	ES1535904-042	ES1535904-043	ES1535904-044	ES1535904-045
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		----	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		----	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		----	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		----	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		----	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		----	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		----	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		----	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	**30**	**46**	**52**	<10
C10 - C14 Fraction	----	50	mg/kg		----	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		----	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	**34**	**52**	**58**	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	**18**	**28**	**33**	<10
>C10 - C16 Fraction	----	50	mg/kg		----	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		----	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	**0.2**	**0.4**	**0.4**	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	**7.2**	**11.0**	**11.9**	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	**1.0**	**1.5**	**1.6**	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	**5.0**	**7.6**	**7.9**	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	**2.1**	**3.1**	**3.3**	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	**15.5**	**23.6**	**25.1**	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	**7.1**	**10.7**	**11.2**	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TRIP BLANK	TSC 3	TS4	TSC4	TB
				Client sampling date / time	[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]	[06-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-027	ES1535904-042	ES1535904-043	ES1535904-044	ES1535904-045
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		----	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		----	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		----	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		----	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		85.5	88.6	91.1	89.0	98.5
Toluene-D8	2037-26-5	0.2	%		91.8	91.4	93.7	95.7	101
4-Bromofluorobenzene	460-00-4	0.2	%		99.3	88.9	89.6	88.8	96.6

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SD-RINSATE	WAT-4-1m	WAT-5-1m	WAT-6-1m	WAT-7-1m
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-018	ES1535904-028	ES1535904-029	ES1535904-030	ES1535904-031
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		7.65	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		----	----	----	9210	----
Total Dissolved Solids @180°C	----	10	mg/L		----	7710	7750	----	8720
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		----	----	----	----	----
Suspended Solids (SS)	----	5	mg/L		----	14	204	86400	836
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		----	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		----	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		----	193	186	227	188
Total Alkalinity as CaCO3	----	1	mg/L		----	193	186	227	188
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	755	717	767	707
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		----	3540	3540	3630	3540
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		----	249	253	279	245
Magnesium	7439-95-4	1	mg/L		----	213	219	225	214
Sodium	7440-23-5	1	mg/L		----	2020	2090	2050	2070
Potassium	7440-09-7	1	mg/L		----	80	82	78	80
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	0.46	0.76	211	7.82
Arsenic	7440-38-2	0.001	mg/L		<0.001	0.004	0.004	0.146	0.011
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	0.0077	0.0002
Chromium	7440-47-3	0.001	mg/L		<0.001	0.002	0.002	0.363	0.018
Copper	7440-50-8	0.001	mg/L		0.374	0.003	0.004	0.860	0.030
Lead	7439-92-1	0.001	mg/L		<0.001	0.007	0.010	3.33	0.094
Manganese	7439-96-5	0.001	mg/L		0.002	0.379	0.384	11.1	0.448
Nickel	7440-02-0	0.001	mg/L		0.016	0.006	0.004	0.210	0.013
Zinc	7440-66-6	0.005	mg/L		0.092	0.032	0.024	3.59	0.128
Iron	7439-89-6	0.05	mg/L		<0.05	1.08	1.37	690	12.5
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	0.0208	0.0001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SD-RINSATE	WAT-4-1m	WAT-5-1m	WAT-6-1m	WAT-7-1m
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-018	ES1535904-028	ES1535904-029	ES1535904-030	ES1535904-031
					Result	Result	Result	Result	Result
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.24	6.33	6.37	7.97	6.16
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		0.03	0.03	0.02	<0.01	0.03
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		0.16	0.11	0.05	0.05	0.32
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.19	0.14	0.07	0.05	0.35
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		0.6	6.6	6.0	152	7.0
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		0.8	6.7	6.1	152	7.4
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		----	0.07	0.14	56.6	0.45
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		----	<0.01	<0.01	<0.01	<0.01
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		----	119	118	123	118
Total Cations	----	0.01	meq/L		----	120	124	124	122
Ionic Balance	----	0.01	%		----	0.17	2.12	0.28	1.48
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		----	12	19	57	22
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		----	19	19	951	22
EP026SP: Chemical Oxygen Demand (Spectrophotometric)									
Chemical Oxygen Demand	----	10	mg/L		----	80	63	10100	170
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		----	<2	<2	193	4
EP030C: Carbonaceous Biochemical Oxygen Demand (CBOD)									
CBOD	----	2	mg/L		----	<2	<2	139	3
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	<1.0	2.8	<1.0
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SD-RINSATE	WAT-4-1m	WAT-5-1m	WAT-6-1m	WAT-7-1m
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-018	ES1535904-028	ES1535904-029	ES1535904-030	ES1535904-031
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	<1.0	**5.1**	<1.0
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	**3.3**	<1.0
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	<1.0	**14.3**	<1.0
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	<1.0	**19.5**	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	<1.0	**8.1**	<1.0
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	<1.0	**7.9**	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	<1.0	**14.2**	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	<1.0	**6.4**	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	**10.2**	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	<1.0	**6.7**	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	**1.4**	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	<1.0	**7.6**	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	<0.5	**108**	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	<0.5	**15.3**	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		**50**	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	**2220**	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	**2400**	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	**4620**	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		**50**	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		**50**	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	**3990**	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	**1300**	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	**5290**	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SD-RINSATE	WAT-4-1m	WAT-5-1m	WAT-6-1m	WAT-7-1m
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-018	ES1535904-028	ES1535904-029	ES1535904-030	ES1535904-031
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		18.6	21.1	28.0	34.5	26.2
2-Chlorophenol-D4	93951-73-6	1	%		47.3	39.1	51.0	46.4	47.4
2.4.6-Tribromophenol	118-79-6	1	%		40.3	62.7	62.6	73.5	61.9
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		68.4	63.7	64.3	63.1	60.8
Anthracene-d10	1719-06-8	1	%		91.6	93.2	98.8	79.4	70.0
4-Terphenyl-d14	1718-51-0	1	%		86.6	77.2	81.8	92.7	79.6
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		100.0	89.1	103	122	98.2
Toluene-D8	2037-26-5	2	%		106	102	105	119	104
4-Bromofluorobenzene	460-00-4	2	%		105	100	102	112	101

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WAT-8-1m	WAT.QA.1m	WAT-RINSATE	TRIP BLANK	TRIP SPIKE
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-032	ES1535904-033	ES1535904-034	ES1535904-035	ES1535904-036
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		----	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		9070	9430	----	----	----
Total Dissolved Solids @180°C	----	10	mg/L		----	----	108	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		----	----	----	----	----
Suspended Solids (SS)	----	5	mg/L		58400	70700	<5	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		227	239	47	----	----
Total Alkalinity as CaCO3	----	1	mg/L		227	239	47	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		730	794	10	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		3510	3560	29	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		276	280	14	----	----
Magnesium	7439-95-4	1	mg/L		218	218	6	----	----
Sodium	7440-23-5	1	mg/L		2060	2060	16	----	----
Potassium	7440-09-7	1	mg/L		77	77	2	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		448	192	0.01	----	----
Arsenic	7440-38-2	0.001	mg/L		0.245	0.132	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		0.0186	0.0078	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		0.836	0.350	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		2.06	0.838	0.397	----	----
Lead	7439-92-1	0.001	mg/L		8.33	3.31	0.005	----	----
Manganese	7439-96-5	0.001	mg/L		10.5	11.0	0.003	----	----
Nickel	7440-02-0	0.001	mg/L		0.458	0.228	0.003	----	----
Zinc	7440-66-6	0.005	mg/L		8.60	3.46	0.096	----	----
Iron	7439-89-6	0.05	mg/L		876	739	<0.05	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		0.0176	0.0134	<0.0001	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WAT-8-1m	WAT.QA.1m	WAT-RINSATE	TRIP BLANK	TRIP SPIKE
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-032	ES1535904-033	ES1535904-034	ES1535904-035	ES1535904-036
					Result	Result	Result	Result	Result
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		7.48	8.31	0.28	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	0.02	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		0.04	0.05	0.16	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.04	0.05	0.18	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		85.9	50.2	0.4	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		85.9	50.2	0.6	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		47.4	20.4	<0.01	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	0.02	<0.01	----	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		119	122	1.96	----	----
Total Cations	----	0.01	meq/L		123	123	1.94	----	----
Ionic Balance	----	0.01	%		1.87	0.71	0.66	----	----
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		17	21	<1	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		72	77	<1	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)									
Chemical Oxygen Demand	----	10	mg/L		7560	8560	12	----	----
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		249	235	<2	----	----
EP030C: Carbonaceous Biochemical Oxygen Demand (CBOD)									
CBOD	----	2	mg/L		239	172	<2	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	----	----
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	<1.0	----	----
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	<1.0	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WAT-8-1m	WAT.QA.1m	WAT-RINSATE	TRIP BLANK	TRIP SPIKE
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-032	ES1535904-033	ES1535904-034	ES1535904-035	ES1535904-036
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	<1.0	----	----
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	<1.0	----	----
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	----	----
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	<1.0	----	----
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	<1.0	----	----
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	<1.0	----	----
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	<1.0	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	<1.0	----	----
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	<1.0	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	<1.0	----	----
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	----	----
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	<1.0	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	<0.5	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	**30**	<20	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	----	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	----	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	**30**	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	**30**	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	**18**
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	**16**
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	**17**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WAT-8-1m	WAT.QA.1m	WAT-RINSATE	TRIP BLANK	TRIP SPIKE
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-032	ES1535904-033	ES1535904-034	ES1535904-035	ES1535904-036
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	17
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	17
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	<2	<2	34
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	85
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	18
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		33.5	27.1	26.4	----	----
2-Chlorophenol-D4	93951-73-6	1	%		53.6	41.5	51.3	----	----
2.4.6-Tribromophenol	118-79-6	1	%		76.5	66.2	58.6	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		72.1	65.2	68.8	----	----
Anthracene-d10	1719-06-8	1	%		100	92.3	98.4	----	----
4-Terphenyl-d14	1718-51-0	1	%		87.3	81.8	81.9	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		121	122	115	117	116
Toluene-D8	2037-26-5	2	%		113	113	113	114	117
4-Bromofluorobenzene	460-00-4	2	%		113	112	110	110	120

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WAT-4-2m	WAT-5-2m	WAT-6-2m	WAT-7-2m	WAT-8-2m
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-037	ES1535904-038	ES1535904-039	ES1535904-040	ES1535904-041
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		----	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		8260	----	9690	10400	7930
Total Dissolved Solids @180°C	----	10	mg/L		----	8680	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		----	----	19800	2300	----
Suspended Solids (SS)	----	5	mg/L		92000	24	----	----	112000
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		269	194	190	179	320
Total Alkalinity as CaCO3	----	1	mg/L		269	194	190	179	320
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		739	699	703	705	822
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		3100	3530	3560	3540	3400
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		310	247	260	249	330
Magnesium	7439-95-4	1	mg/L		178	213	212	212	204
Sodium	7440-23-5	1	mg/L		1840	2030	2030	2020	1920
Potassium	7440-09-7	1	mg/L		71	80	79	81	72
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		19.3	0.47	291	30.2	311
Arsenic	7440-38-2	0.001	mg/L		0.036	0.003	0.179	0.029	0.209
Cadmium	7440-43-9	0.0001	mg/L		0.0006	<0.0001	0.0117	0.0014	0.0120
Chromium	7440-47-3	0.001	mg/L		0.034	0.003	0.467	0.054	0.547
Copper	7440-50-8	0.001	mg/L		0.083	0.004	1.09	0.106	1.30
Lead	7439-92-1	0.001	mg/L		0.236	0.006	5.05	0.582	5.19
Manganese	7439-96-5	0.001	mg/L		0.673	0.379	3.78	0.762	9.89
Nickel	7440-02-0	0.001	mg/L		0.022	0.005	0.263	0.035	0.308
Zinc	7440-66-6	0.005	mg/L		0.350	0.020	5.69	0.746	5.43
Iron	7439-89-6	0.05	mg/L		35.1	0.85	444	45.9	704
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		0.0005	<0.0001	0.0090	0.0012	0.0198

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WAT-4-2m	WAT-5-2m	WAT-6-2m	WAT-7-2m	WAT-8-2m
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-037	ES1535904-038	ES1535904-039	ES1535904-040	ES1535904-041
					Result	Result	Result	Result	Result
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		6.13	6.92	5.56	5.84	9.46
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	0.02	<0.01	0.02	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		0.05	0.03	0.04	0.07	0.03
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.05	0.05	0.04	0.09	0.03
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		9.5	5.7	52.6	9.1	137
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		9.6	5.8	52.6	9.2	137
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		1.21	0.09	16.4	2.05	59.7
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		108	118	119	118	119
Total Cations	----	0.01	meq/L		112	120	121	120	119
Ionic Balance	----	0.01	%		1.70	0.91	0.78	0.70	0.34
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L		19	14	16	15	60
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		1590	28	81	33	1040
EP026SP: Chemical Oxygen Demand (Spectrophotometric)									
Chemical Oxygen Demand	----	10	mg/L		11500	94	2600	386	12100
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		347	<2	240	9	414
EP030C: Carbonaceous Biochemical Oxygen Demand (CBOD)									
CBOD	----	2	mg/L		299	<2	202	<2	386
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WAT-4-2m	WAT-5-2m	WAT-6-2m	WAT-7-2m	WAT-8-2m
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-037	ES1535904-038	ES1535904-039	ES1535904-040	ES1535904-041
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L		**1.2**	<1.0	<1.0	<1.0	**1.5**
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L		**3.7**	<1.0	<1.0	<1.0	**4.6**
Pyrene	129-00-0	1	µg/L		**4.9**	<1.0	<1.0	<1.0	**6.3**
Benz(a)anthracene	56-55-3	1	µg/L		**1.7**	<1.0	<1.0	<1.0	**2.3**
Chrysene	218-01-9	1	µg/L		**1.7**	<1.0	<1.0	<1.0	**2.2**
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		**2.9**	<1.0	<1.0	<1.0	**3.4**
Benzo(k)fluoranthene	207-08-9	1	µg/L		**1.2**	<1.0	<1.0	<1.0	**1.5**
Benzo(a)pyrene	50-32-8	0.5	µg/L		**2.4**	<0.5	<0.5	<0.5	**3.0**
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		**1.6**	<1.0	<1.0	<1.0	**2.0**
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		**1.8**	<1.0	<1.0	<1.0	**2.3**
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		**23.1**	<0.5	<0.5	<0.5	**29.1**
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		**3.2**	<0.5	<0.5	<0.5	**4.0**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		**870**	<100	<100	<100	**830**
C29 - C36 Fraction	----	50	µg/L		**650**	<50	<50	<50	**760**
^ C10 - C36 Fraction (sum)	----	50	µg/L		**1520**	<50	<50	<50	**1590**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		**1200**	<100	<100	<100	**1230**
>C34 - C40 Fraction	----	100	µg/L		**330**	<100	<100	<100	**420**
^ >C10 - C40 Fraction (sum)	----	100	µg/L		**1530**	<100	<100	<100	**1650**
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WAT-4-2m	WAT-5-2m	WAT-6-2m	WAT-7-2m	WAT-8-2m
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1535904-037	ES1535904-038	ES1535904-039	ES1535904-040	ES1535904-041
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		35.6	32.2	20.5	29.8	39.3
2-Chlorophenol-D4	93951-73-6	1	%		53.9	54.9	32.6	53.5	53.6
2.4.6-Tribromophenol	118-79-6	1	%		89.2	71.6	66.6	74.2	91.2
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		75.2	72.2	56.4	71.2	73.0
Anthracene-d10	1719-06-8	1	%		100	96.7	93.1	101	96.3
4-Terphenyl-d14	1718-51-0	1	%		114	86.3	81.7	81.6	108
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		117	101	107	122	121
Toluene-D8	2037-26-5	2	%		102	104	106	118	108
4-Bromofluorobenzene	460-00-4	2	%		110	103	102	113	111

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1535904**	Page	: 1 of 24
Client	: **EMGA MITCHELL MCLENNAN**	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Contact	:
Address	: Ground Floor Suite 1 20 Chandos Street St Leonards NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: npearsehawkins@emgamm.com	E-mail	:
Telephone	: +61 02 9493 9500	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9493 9599	Facsimile	: +61-2-8784 8500
Project	: GCM	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: J14149	Date Samples Received	: 11-Nov-2015
C-O-C number	: ----	Date Analysis Commenced	: 11-Nov-2015
Sampler	: SEAN CASSIDY	Issue Date	: 19-Nov-2015
Site	: ----	No. of samples received	: 44
Quote number	: ----	No. of samples analysed	: 40

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

This Quality Control Report contains the following information:

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

NATA WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Dian Dao		Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
Phalak Inthakesone	Laboratory Manager - Organics	Sydney Organics
Raymond Commodore	Instrument Chemist	Sydney Inorganics

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA002 : pH (Soils) (QC Lot: 276884)									
ES1535904-013	SD-18	EA002: pH Value	----	0.1	pH Unit	8.1	8.1	0.00	0% - 20%
ES1535904-001	SD-7	EA002: pH Value	----	0.1	pH Unit	7.9	7.9	0.00	0% - 20%
EA055: Moisture Content (QC Lot: 278687)									
ES1535904-003	SD-9	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	62.6	62.8	0.350	0% - 20%
ES1535904-020	TP-16	EA055-103: Moisture Content (dried @ 103°C)	----	1	%	24.0	21.6	10.4	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 278240)									
ES1535904-001	SD-7	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	37	37	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	19	19	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	16	18	11.4	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	88	90	1.68	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	249	251	0.782	0% - 20%
		EG005T: Manganese	7439-96-5	5	mg/kg	222	224	0.733	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	343	346	0.632	0% - 20%
		EG005T: Aluminium	7429-90-5	50	mg/kg	21400	22200	3.53	0% - 20%
		EG005T: Iron	7439-89-6	50	mg/kg	30600	31600	3.17	0% - 20%
ES1536184-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	5	5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	6	<5	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	15	9	46.2	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	380	210	59.5	No Limit
		EG005T: Iron	7439-89-6	50	mg/kg	140	100	29.0	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 278732)									
ES1535575-014	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	2	<1	73.8	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	54	57	5.34	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	56	58	4.21	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	195	204	4.38	0% - 20%
		EG005T: Lead	7439-92-1	5	mg/kg	124	116	6.84	0% - 20%
		EG005T: Manganese	7439-96-5	5	mg/kg	544	472	14.2	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	1900	1980	4.59	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 (%)*
EG005T: Total Metals by ICP-AES (QC Lot: 278732) - continued									
ES1535575-014	Anonymous	EG005T: Aluminium	7429-90-5	50	mg/kg	12800	10700	17.8	0% - 20%
		EG005T: Iron	7439-89-6	50	mg/kg	48700	51200	4.98	0% - 20%
ES1535904-020	TP-16	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	14	14	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	7	7	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	7	7	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	14	16	11.6	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	25	27	7.64	No Limit
		EG005T: Manganese	7439-96-5	5	mg/kg	279	245	12.9	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	48	48	0.00	No Limit
		EG005T: Aluminium	7429-90-5	50	mg/kg	12400	11900	4.44	0% - 20%
		EG005T: Iron	7439-89-6	50	mg/kg	30100	29200	3.19	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 278238)									
ES1535775-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1535904-001	SD-7	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.6	0.6	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 278731)									
ES1535575-014	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1535904-020	TP-16	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK055: Ammonia as N (QC Lot: 279232)									
ES1535904-001	SD-7	EK055: Ammonia as N	7664-41-7	20	mg/kg	80	80	0.00	No Limit
ES1535904-013	SD-18	EK055: Ammonia as N	7664-41-7	20	mg/kg	170	160	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 276886)									
ES1535904-013	SD-18	EK057G: Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1535904-001	SD-7	EK057G: Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 276885)									
ES1535904-013	SD-18	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1535904-001	SD-7	EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	0.5	<0.1	131	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 277961)									
ES1535904-001	SD-7	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	1660	1880	12.2	0% - 20%
ES1535904-010	SD-16	EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	1800	1870	3.86	0% - 20%
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 274689)									
ES1535904-010	SD-16	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 274690)									
ES1535904-010	SD-16	EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 274690) - continued									
ES1535904-010	SD-16	EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 274687)									
ES1535904-001	SD-7	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.8	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	0.8	1.0	18.5	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	1.1	1.2	15.2	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	1.2	1.4	15.1	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	3.1	3.6	14.9	No Limit
ES1535904-010	SD-16	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.8	<0.8	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 274687) - continued									
ES1535904-010	SD-16	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.8	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.8	<0.8	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.8	0.8	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.8	0.8	46.2	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 274688)									
ES1535904-001	SD-7	EP071: C15 - C28 Fraction	----	100	mg/kg	200	220	8.32	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	250	250	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1535904-010	SD-16	EP071: C15 - C28 Fraction	----	100	mg/kg	140	150	8.21	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	160	170	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 274780)									
ES1535904-001	SD-7	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1535904-013	SD-18	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 274807)									
ES1535988-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1535988-004	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 274688)									
ES1535904-001	SD-7	EP071: >C16 - C34 Fraction	----	100	mg/kg	380	390	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	160	130	19.5	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1535904-010	SD-16	EP071: >C16 - C34 Fraction	----	100	mg/kg	260	260	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 274780)									
ES1535904-001	SD-7	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1535904-013	SD-18	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 274807)									
ES1535988-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1535988-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 274780)									
ES1535904-001	SD-7	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1535904-013	SD-18	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC Lot: 274807)									
ES1535988-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1535988-004	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA005P: pH by PC Titrator (QC Lot: 274233)									
ES1535899-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.27	7.14	1.80	0% - 20%
ES1535899-010	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	8.11	8.34	2.80	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 277530)									
ES1535846-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	186	196	4.97	0% - 50%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 277530) - continued									
ES1535846-011	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	222	227	2.45	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 277533)									
ES1535904-039	WAT-6-2m	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	9690	10700	9.78	0% - 20%
ES1535918-008	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	342	332	2.82	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 277531)									
ES1535846-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	96	92	4.23	0% - 50%
ES1535846-011	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	14	10	30.9	No Limit
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 277532)									
ES1535904-039	WAT-6-2m	EA025H: Suspended Solids (SS)	----	5	mg/L	19800	20300	2.66	0% - 20%
ES1535918-008	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.00	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 274232)									
ES1535899-001	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	25	24	0.00	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	25	24	0.00	0% - 20%
ES1535899-010	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	82	80	3.16	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	2	83.4	No Limit
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	82	82	0.00	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 274234)									
ES1535904-033	WAT.QA.1m	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	239	240	0.00	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	239	240	0.00	0% - 20%
ES1535935-002	Anonymous	ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	10	9	11.1	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	10	9	11.1	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 274225)									
ES1535899-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.00	No Limit
ES1535904-028	WAT-4-1m	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	755	763	1.09	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 274229)									
ES1535935-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	185	186	0.00	0% - 20%
ES1535904-033	WAT.QA.1m	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	794	791	0.419	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 274224)									
ES1535899-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	5	5	0.00	No Limit
ES1535904-028	WAT-4-1m	ED045G: Chloride	16887-00-6	1	mg/L	3540	3470	1.98	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 274228)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED045G: Chloride by Discrete Analyser (QC Lot: 274228) - continued									
ES1535904-033	WAT.QA.1m	ED045G: Chloride	16887-00-6	1	mg/L	3560	3710	3.93	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 276404)									
ES1535879-008	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	6	6	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	18	16	14.3	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	5	6	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	2640	2690	1.71	0% - 20%
ES1535904-038	WAT-5-2m	ED093F: Calcium	7440-70-2	1	mg/L	247	250	1.28	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	213	216	1.69	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	80	82	1.89	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	2030	2060	1.32	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 277408)									
EP1515772-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.009	0.010	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.017	0.018	9.67	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES1535895-002	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.002	0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.002	0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.127	0.129	1.38	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.006	0.006	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.59	0.57	2.86	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.50	0.51	3.55	0% - 50%
EG020T: Total Metals by ICP-MS (QC Lot: 277410)									
ES1535904-034	WAT-RINSATE	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.397	0.393	0.884	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.005	0.004	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.003	0.002	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.004	31.1	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.096	0.092	4.55	0% - 50%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 277410) - continued									
ES1535904-034	WAT-RINSATE	EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.01	0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES1535912-003	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.08	0.07	14.2	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 279771)									
ES1535854-021	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES1535883-009	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 279772)									
ES1535904-034	WAT-RINSATE	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES1535942-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 274529)									
ES1535681-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	104	106	1.34	0% - 20%
ES1535773-005	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.06	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 276251)									
ES1535879-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	300	0.70	80.0	No Limit
ES1535895-005	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.03	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 276254)									
ES1536061-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.08	0.07	16.6	No Limit
ES1535904-031	WAT-7-1m	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	6.16	6.28	1.84	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 274223)									
ES1535899-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1535904-028	WAT-4-1m	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.03	0.03	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 274227)									
ES1535957-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1535904-033	WAT.QA.1m	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 274531)									
ES1535912-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	5.15	5.19	0.744	0% - 20%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 276253)									
ES1535895-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.47	0.47	0.00	0% - 20%
ES1535904-031	WAT-7-1m	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.35	0.35	0.00	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 274512)									
ES1535811-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.3	33.5	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 276230)									
ES1535895-005	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	0.5	0.00	No Limit
ES1535904-031	WAT-7-1m	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	7.0	6.2	12.1	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 276229)									
ES1535883-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1535895-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.03	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 276231)									
ES1536061-006	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.06	143	No Limit
ES1535904-031	WAT-7-1m	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.45	0.51	12.5	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 274226)									
ES1535904-028	WAT-4-1m	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1535904-033	WAT.QA.1m	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.02	0.00	No Limit
EP002: Dissolved Organic Carbon (DOC) (QC Lot: 274547)									
ES1535591-001	Anonymous	EP002: Dissolved Organic Carbon	----	1	mg/L	8	11	23.4	0% - 50%
EP002: Dissolved Organic Carbon (DOC) (QC Lot: 274586)									
ES1535904-029	WAT-5-1m	EP002: Dissolved Organic Carbon	----	1	mg/L	19	20	0.00	0% - 20%
ES1535904-041	WAT-8-2m	EP002: Dissolved Organic Carbon	----	1	mg/L	60	51	15.8	0% - 20%
EP005: Total Organic Carbon (TOC) (QC Lot: 276174)									
ES1535904-028	WAT-4-1m	EP005: Total Organic Carbon	----	1	mg/L	19	20	0.00	0% - 50%
ES1535904-040	WAT-7-2m	EP005: Total Organic Carbon	----	1	mg/L	33	32	0.00	0% - 20%
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QC Lot: 279509)									
EP1515806-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	<10	0.00	No Limit
ES1535904-038	WAT-5-2m	EP026SP: Chemical Oxygen Demand	----	10	mg/L	94	81	14.8	No Limit
EP030: Biochemical Oxygen Demand (BOD) (QC Lot: 274265)									
ES1535904-028	WAT-4-1m	EP030: Biochemical Oxygen Demand	----	2	mg/L	<2	<2	0.00	No Limit
ES1535904-040	WAT-7-2m	EP030: Biochemical Oxygen Demand	----	2	mg/L	9	6	40.0	No Limit
EP030C: Carbonaceous Biochemical Oxygen Demand (CBOD) (QC Lot: 274266)									
ES1535904-028	WAT-4-1m	EP030C: CBOD	----	2	mg/L	<2	<2	0.00	No Limit
ES1535904-039	WAT-6-2m	EP030C: CBOD	----	2	mg/L	202	203	0.494	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 274937)									
ES1535904-018	SD-RINSATE	EP080: C6 - C9 Fraction	----	20	µg/L	50	40	0.00	No Limit
ES1535904-037	WAT-4-2m	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 274937)									
ES1535904-018	SD-RINSATE	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	50	40	0.00	No Limit
ES1535904-037	WAT-4-2m	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 274937)									
ES1535904-018	SD-RINSATE	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 274937) - continued									
ES1535904-018	SD-RINSATE	EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1535904-037	WAT-4-2m	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 278240)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	6134 mg/kg	128	70	130
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	112	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	102	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	101	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	113	86	120
EG005T: Iron	7439-89-6	50	mg/kg	<50	8400 mg/kg	93.9	70	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	107	80	114
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	109	85	117
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	106	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	103	80	122
EG005T: Total Metals by ICP-AES (QCLot: 278732)								
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	109	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	101	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	107	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	112	86	120
EG005T: Iron	7439-89-6	50	mg/kg	<50	8400 mg/kg	105	70	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	104	80	114
EG005T: Manganese	7439-96-5	5	mg/kg	<5	130 mg/kg	106	85	117
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	107	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	113	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 278238)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	74.4	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 278731)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	74.4	70	105
EK055: Ammonia as N (QCLot: 279232)								
EK055: Ammonia as N	7664-41-7	20	mg/kg	<20	125 mg/kg	99.7	84	104
EK057G: Nitrite as N by Discrete Analyser (QCLot: 276886)								
EK057G: Nitrite as N (Sol.)	14797-65-0	0.1	mg/kg	<0.1	2.5 mg/kg	101	85	111
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 276885)								
EK059G: Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	<0.1	2.5 mg/kg	110	88	118
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 277961)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 277961) - continued								
EK061G: Total Kjeldahl Nitrogen as N	----	20	mg/kg	<20	1000 mg/kg	90.3	72	106
				<20	100 mg/kg	105	70	122
				<20	500 mg/kg	101	74	118
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 274689)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	99.0	62	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 274690)								
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	87.9	69	121
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	84.8	67	115
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	101	66	120
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	87.4	69	115
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	93.8	69	113
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	93.4	66	116
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	92.4	67	119
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	93.0	69	115
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	78.5	64	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	94.7	65	117
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	106	66	116
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	99.1	62	124
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	101	67	123
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	83.5	56	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	90.4	64	122
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	91.1	68	116
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	89.1	67	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	79.9	62	118
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	82.8	65	117
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	104	54	130
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	78.4	63	117
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 274687)								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	83.0	73	127
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	83.9	72	124
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	86.1	77	127
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	83.8	69	123
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	85.1	70	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	82.9	68	116
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	74.6	63	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	83.4	74	126
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	84.4	75	127
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	81.1	62	118

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 274687) - continued								
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	87.7	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	74.4	72	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	81.2	61	121
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	86.2	77	125
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	84.8	75	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	82.2	74	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 274688)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	101	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	106	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	97.6	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 274780)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	84.1	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 274807)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	79.3	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 274688)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	99.1	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	108	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	92.1	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 274780)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	81.7	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 274807)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	77.5	68	128
EP080: BTEXN (QCLot: 274780)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	101	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	101	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	94.7	66	118
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	93.8	63	119
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	99.8	68	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	100	67	121
EP080: BTEXN (QCLot: 274807)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	85.2	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	85.2	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	88.6	66	118
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	91.9	63	119
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	94.8	68	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	88.6	67	121

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 277530)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	96.7	87	109
				<10	293 mg/L	98.0	66	126
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 277533)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	94.8	87	109
				<10	293 mg/L	95.9	66	126
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 277531)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	96.3	83	129
				<5	1000 mg/L	98.2	82	110
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 277532)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	99.7	83	129
				<5	1000 mg/L	99.0	82	110
ED037P: Alkalinity by PC Titrator (QCLot: 274232)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	97.9	81	111
ED037P: Alkalinity by PC Titrator (QCLot: 274234)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	96.5	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 274225)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	110	82	122
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 274229)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	109	82	122
ED045G: Chloride by Discrete Analyser (QCLot: 274224)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	92.0	75	123
				<1	1000 mg/L	87.2	78	128
ED045G: Chloride by Discrete Analyser (QCLot: 274228)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	88.0	75	123
				<1	1000 mg/L	87.7	78	128
ED093F: Dissolved Major Cations (QCLot: 276404)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	96.1	80	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	99.7	90	116
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	100	85	113
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	99.2	82	120
EG020T: Total Metals by ICP-MS (QCLot: 277408)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	96.1	82	120
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.5	82	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	92.2	84	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.3	86	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	89.1	83	118
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.6	85	117

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 277408) - continued								
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.7	85	115
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	90.7	85	113
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	87.3	84	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	89.1	79	117
EG020T: Total Metals by ICP-MS (QCLot: 277410)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	93.0	82	120
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.6	82	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	91.8	84	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.0	86	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	93.0	83	118
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	96.2	85	117
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.1	85	115
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	91.0	85	113
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.4	84	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	92.2	79	117
EG035T: Total Recoverable Mercury by FIMS (QCLot: 279771)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	94.9	77	111
EG035T: Total Recoverable Mercury by FIMS (QCLot: 279772)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	91.5	77	111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 274529)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	95.0	90	114
EK055G: Ammonia as N by Discrete Analyser (QCLot: 276251)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	97.3	90	114
EK055G: Ammonia as N by Discrete Analyser (QCLot: 276254)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	99.0	90	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 274223)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	89.4	82	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 274227)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	93.6	82	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 274531)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	102	91	113
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 276253)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	91	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 274512)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	94.0	69	101
				<0.1	1 mg/L	101	70	118
				<0.1	5 mg/L	102	74	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 276230)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	82.4	69	101
				<0.1	1 mg/L	82.2	70	118
				<0.1	5 mg/L	81.6	74	118
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 276229)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	89.7	71	101
				<0.01	0.442 mg/L	84.3	72	108
				<0.01	1 mg/L	94.8	78	118
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 276231)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	82.7	71	101
				<0.01	0.442 mg/L	86.2	72	108
				<0.01	1 mg/L	84.5	78	118
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 274226)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	100	85	117
EP002: Dissolved Organic Carbon (DOC) (QCLot: 274547)								
EP002: Dissolved Organic Carbon	----	1	mg/L	<1	10 mg/L	83.5	71	121
EP002: Dissolved Organic Carbon (DOC) (QCLot: 274586)								
EP002: Dissolved Organic Carbon	----	1	mg/L	<1	10 mg/L	93.2	71	121
EP005: Total Organic Carbon (TOC) (QCLot: 276174)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	115	72	120
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 279509)								
EP026SP: Chemical Oxygen Demand	----	10	mg/L	<10	50 mg/L	100	82	112
				<10	500 mg/L	97.2	83	113
EP030: Biochemical Oxygen Demand (BOD) (QCLot: 274265)								
EP030: Biochemical Oxygen Demand	----	2	mg/L	<2	200 mg/L	97.5	74	112
EP030C: Carbonaceous Biochemical Oxygen Demand (CBOD) (QCLot: 274266)								
EP030C: CBOD	----	2	mg/L	<2	200 mg/L	96.0	73	109
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 274734)								
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	69.6	62	113
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	66.9	64	114
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	81.0	64	116
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	# 62.1	64	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	73.3	63	117
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	66.5	62	119
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	71.4	59	118
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	75.0	63	115
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	80.1	63	116
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	70.4	61	117

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 274734) - continued								
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	79.4	64	118
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	69.9	64	115
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	75.2	60	118
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	85.8	50	94
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	76.3	63	116
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	70.9	63	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 274735)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	97.2	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	96.6	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	96.3	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 274937)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	94.8	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 274735)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	94.0	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	101	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	95.8	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 274937)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	96.2	75	127
EP080: BTEXN (QCLot: 274937)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	89.0	70	122
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	95.1	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	95.8	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	94.7	70	120
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	100	72	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	91.7	69	123

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005T: Total Metals by ICP-AES (QCLot: 278240)							
ES1536184-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	129	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	98.7	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	99.0	70	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 278240) - continued							
ES1536184-001	Anonymous	EG005T: Copper	7440-50-8	250 mg/kg	122	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	103	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	97.4	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	93.2	70	130
EG005T: Total Metals by ICP-AES (QCLot: 278732)							
ES1535575-022	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	114	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	105	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	101	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	117	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	107	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	84.0	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	86.7	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 278238)							
ES1535775-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	93.8	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 278731)							
ES1535575-014	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	102	70	130
EK055: Ammonia as N (QCLot: 279232)							
ES1535904-001	SD-7	EK055: Ammonia as N	7664-41-7	50 mg/kg	111	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 276886)							
ES1535904-001	SD-7	EK057G: Nitrite as N (Sol.)	14797-65-0	2.5 mg/kg	106	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 276885)							
ES1535904-001	SD-7	EK059G: Nitrite + Nitrate as N (Sol.)	----	2.5 mg/kg	96.4	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 277961)							
ES1535904-001	SD-7	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	120	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 274689)							
ES1535904-010	SD-16	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	95.0	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 274690)							
ES1535904-010	SD-16	EP068: 4.4`-DDT	50-29-3	2 mg/kg	89.9	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	79.1	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	82.5	70	130
		EP068: Endrin	72-20-8	2 mg/kg	92.8	70	130
		EP068: gamma-BHC	58-89-9	0.5 mg/kg	93.4	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	78.3	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 274687)							
ES1535904-010	SD-16	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	80.7	70	130

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%) MS	Matrix Spike (MS) Report: Recovery Limits (%) Low	Matrix Spike (MS) Report: Recovery Limits (%) High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 274687) - continued							
ES1535904-010	SD-16	EP075(SIM): Pyrene	129-00-0	10 mg/kg	78.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 274688)							
ES1535904-010	SD-16	EP071: C10 - C14 Fraction	----	523 mg/kg	92.5	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	104	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	123	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 274780)							
ES1535904-001	SD-7	EP080: C6 - C9 Fraction	----	32.5 mg/kg	84.2	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 274807)							
ES1535988-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	99.7	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 274688)							
ES1535904-010	SD-16	EP071: >C10 - C16 Fraction	----	860 mg/kg	97.4	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	116	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	117	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 274780)							
ES1535904-001	SD-7	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	81.0	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 274807)							
ES1535988-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	92.9	70	130
EP080: BTEXN (QCLot: 274780)							
ES1535904-001	SD-7	EP080: Benzene	71-43-2	2.5 mg/kg	87.7	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	87.9	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	84.3	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	77.7	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	87.8	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	82.5	70	130
EP080: BTEXN (QCLot: 274807)							
ES1535988-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	81.6	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	92.5	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	93.9	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	81.9	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	97.0	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	84.4	70	130

Sub-Matrix: **WATER**

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

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 274225)							
ES1535904-028	WAT-4-1m	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70	130
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 274229)							
ES1535904-033	WAT.QA.1m	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 274224)							
ES1535904-028	WAT-4-1m	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 274228)							
ES1535904-033	WAT.QA.1m	ED045G: Chloride	16887-00-6	250 mg/L	# Not Determined	70	130
EG020T: Total Metals by ICP-MS (QCLot: 277408)							
EP1515772-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	103	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	98.7	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	94.8	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	99.8	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	111	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	91.9	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	97.8	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	95.8	70	130
EG020T: Total Metals by ICP-MS (QCLot: 277410)							
ES1535904-031	WAT-7-1m	EG020A-T: Arsenic	7440-38-2	1 mg/L	112	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	96.9	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	90.0	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	100	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	111	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	85.2	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	97.5	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	92.1	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 279771)							
ES1535854-022	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	76.0	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 279772)							
ES1535904-038	WAT-5-2m	EG035T: Mercury	7439-97-6	0.01 mg/L	78.9	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 274529)							
ES1535681-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	# Not Determined	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK055G: Ammonia as N by Discrete Analyser (QCLot: 276251)							
ES1535879-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	84.0	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 276254)							
ES1535904-031	WAT-7-1m	EK055G: Ammonia as N	7664-41-7	1 mg/L	# Not Determined	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 274223)							
ES1535904-028	WAT-4-1m	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	107	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 274227)							
ES1535904-033	WAT.QA.1m	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	107	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 274531)							
ES1535912-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 276253)							
ES1535895-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	98.5	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 274512)							
ES1535815-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	102	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 276230)							
ES1535895-006	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	86.5	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 276229)							
ES1535883-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	86.6	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 276231)							
ES1535904-031	WAT-7-1m	EK067G: Total Phosphorus as P	----	1 mg/L	75.0	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 274226)							
ES1535904-028	WAT-4-1m	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	108	70	130
EP002: Dissolved Organic Carbon (DOC) (QCLot: 274547)							
ES1535591-002	Anonymous	EP002: Dissolved Organic Carbon	----	100 mg/L	87.5	70	130
EP002: Dissolved Organic Carbon (DOC) (QCLot: 274586)							
ES1535904-030	WAT-6-1m	EP002: Dissolved Organic Carbon	----	100 mg/L	83.9	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 276174)							
ES1535904-029	WAT-5-1m	EP005: Total Organic Carbon	----	100 mg/L	92.8	70	130
EP026SP: Chemical Oxygen Demand (Spectrophotometric) (QCLot: 279509)							
EP1515806-001	Anonymous	EP026SP: Chemical Oxygen Demand	----	47.6 mg/L	113	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 274937)							
ES1535904-018	SD-RINSATE	EP080: C6 - C9 Fraction	----	325 µg/L	107	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 274937)							
ES1535904-018	SD-RINSATE	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	105	70	130
EP080: BTEXN (QCLot: 274937)							
ES1535904-018	SD-RINSATE	EP080: Benzene	71-43-2	25 µg/L	74.7	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	84.1	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	87.4	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	87.5	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	88.7	70	130
		EP080: Toluene	108-88-3	25 µg/L	78.4	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1535904**	Page	: 1 of 20
Client	: **EMGA MITCHELL MCLENNAN**	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Telephone	: +61-2-8784 8555
Project	: GCM	Date Samples Received	: 11-Nov-2015
Site	: ----	Issue Date	: 19-Nov-2015
Sampler	: SEAN CASSIDY	No. of samples received	: 44
Order number	: J14149	No. of samples analysed	: 40

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons	QC-274734-002	----	**Benz(a)anthracene**	56-55-3	62.1 %	64-117%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1535904--033	WAT.QA.1m	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1535904--028	WAT-4-1m	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride by Discrete Analyser	ES1535904--033	WAT.QA.1m	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
ED045G: Chloride by Discrete Analyser	ES1535904--028	WAT-4-1m	**Chloride**	16887-00-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK055G: Ammonia as N by Discrete Analyser	ES1535904--031	WAT-7-1m	**Ammonia as N**	7664-41-7	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK055G: Ammonia as N by Discrete Analyser	ES1535681--001	Anonymous	**Ammonia as N**	7664-41-7	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	ES1535912--001	Anonymous	**Nitrite + Nitrate as N**	----	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP075(SIM)S: Phenolic Compound Surrogates	ES1535904-013	SD-18	**Phenol-d6**	13127-88-3	128 %	63-123 %	**Recovery greater than upper data quality objective**

Sub-Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP075(SIM)T: PAH Surrogates	ES1535904-037	WAT-4-2m	**4-Terphenyl-d14**	1718-51-0	114 %	32-112 %	**Recovery greater than upper data quality objective**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	*Extraction / Preparation*	*Analysis*

Matrix: **WATER**

Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Soil Glass Jar - Unpreserved						
SD-RINSATE	----	----	----	11-Nov-2015	09-Nov-2015	**2**
EK055G: Ammonia as N by Discrete Analyser						
Soil Glass Jar - Unpreserved						
SD-RINSATE	----	----	----	12-Nov-2015	10-Nov-2015	**1**
EK057G: Nitrite as N by Discrete Analyser						
Soil Glass Jar - Unpreserved						
SD-RINSATE	----	----	----	11-Nov-2015	10-Nov-2015	**1**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser						
Soil Glass Jar - Unpreserved						
SD-RINSATE	----	----	----	12-Nov-2015	10-Nov-2015	**1**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser						
Soil Glass Jar - Unpreserved						
SD-RINSATE	12-Nov-2015	10-Nov-2015	**1**	----	----	----
EP002: Dissolved Organic Carbon (DOC)						
Clear Plastic Bottle - Natural						
WAT-4-1m, WAT-5-1m, WAT-6-1m, WAT-7-1m, WAT-8-1m, WAT.QA.1m, WAT-RINSATE, WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	----	----	----	12-Nov-2015	10-Nov-2015	**1**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	18	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	15	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	18	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	15	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved (EA002)							
SD-7, SDQA1, SD-9, SD-10, SD-11, SD-13, SD-14, SD-15, SD-16, SD-QA.2, SD-18, SD-19	**09-Nov-2015**	**16-Nov-2015**	16-Nov-2015	✓	**16-Nov-2015**	16-Nov-2015	✓
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
SD-7, SDQA1, SD-9, SD-10, SD-11, SD-13, SD-14, SD-15, SD-16, SD-QA.2, SD-18, SD-19, TP-11, TP-16, TP-12, TP-15, TP05QA, TP-14, TP-13	**09-Nov-2015**	**----**	----	----	**16-Nov-2015**	23-Nov-2015	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
SD-7, SDQA1, SD-9, SD-10, SD-11, SD-13, SD-14, SD-15, SD-16, SD-QA.2, SD-18, SD-19, TP-11, TP-16, TP-12, TP-15, TP05QA, TP-14, TP-13	**09-Nov-2015**	**16-Nov-2015**	07-May-2016	✓	**17-Nov-2015**	07-May-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
SD-7, SDQA1, SD-9, SD-10, SD-11	**09-Nov-2015**	**16-Nov-2015**	07-Dec-2015	✓	**17-Nov-2015**	07-Dec-2015	✓
Soil Glass Jar - Unpreserved (EG035T)							
SD-13, SD-14, SD-15, SD-16, SD-QA.2, SD-18, SD-19, TP-11, TP-16, TP-12, TP-15, TP05QA, TP-14, TP-13	**09-Nov-2015**	**16-Nov-2015**	07-Dec-2015	✓	**18-Nov-2015**	07-Dec-2015	✓
EK055: Ammonia as N							
Soil Glass Jar - Unpreserved (EK055)							
SD-7, SDQA1, SD-9, SD-10, SD-11, SD-13, SD-14, SD-15, SD-16, SD-QA.2, SD-18, SD-19	**09-Nov-2015**	**----**	----	----	**17-Nov-2015**	07-May-2016	✓
EK057G: Nitrite as N by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK057G)							
SD-7, SDQA1, SD-9, SD-10, SD-11, SD-13, SD-14, SD-15, SD-16, SD-QA.2, SD-18, SD-19	**09-Nov-2015**	**16-Nov-2015**	07-May-2016	✓	**16-Nov-2015**	07-May-2016	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Soil Glass Jar - Unpreserved (EK059G)							
SD-7, SDQA1, SD-9, SD-10, SD-11, SD-13, SD-14, SD-15, SD-16, SD-QA.2, SD-18, SD-19	**09-Nov-2015**	**16-Nov-2015**	07-May-2016	✓	**16-Nov-2015**	07-May-2016	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Soil Glass Jar - Unpreserved (EK061G)							
SD-7, SDQA1, SD-9, SD-10, SD-11, SD-13, SD-14, SD-15, SD-16, SD-QA.2, SD-18, SD-19	**09-Nov-2015**	**16-Nov-2015**	07-May-2016	✓	**16-Nov-2015**	07-May-2016	✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066)							
SD-16, SD-18, SD-19, TP-11, TP-16	**09-Nov-2015**	**12-Nov-2015**	23-Nov-2015	✓	**13-Nov-2015**	22-Dec-2015	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
SD-16, SD-18, SD-19, TP-11, TP-16	**09-Nov-2015**	**12-Nov-2015**	23-Nov-2015	✓	**13-Nov-2015**	22-Dec-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
SD-7, SDQA1, SD-9, SD-10, SD-11, SD-13, SD-14, SD-15, SD-16, SD-QA.2, SD-18, SD-19, TP-11, TP-16, TP-12, TP-15, TP05QA, TP-14, TP-13	**09-Nov-2015**	**12-Nov-2015**	23-Nov-2015	✓	**13-Nov-2015**	22-Dec-2015	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
SD-7, SDQA1, SD-9, SD-10, SD-11, SD-13, SD-14, SD-15, SD-16, SD-QA.2, SD-18, SD-19, TP-11, TP-16, TP-12, TP-15, TP05QA, TP-14, TP-13	**09-Nov-2015**	**12-Nov-2015**	23-Nov-2015	✓	**13-Nov-2015**	22-Dec-2015	✓

Matrix: **SOIL**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
TRIP SPIKE 3, TRIP BLANK, TSC 3, TS4, TSC4, TB	**06-Nov-2015**	**12-Nov-2015**	20-Nov-2015	✓	**13-Nov-2015**	20-Nov-2015	✓
Soil Glass Jar - Unpreserved (EP080)							
SD-7, SDQA1, SD-9, SD-10, SD-11, SD-13, SD-14, SD-15, SD-16, SD-QA.2, SD-18, SD-19, TP-11, TP-16, TP-12, TP-15, TP05QA, TP-14, TP-13	**09-Nov-2015**	**12-Nov-2015**	23-Nov-2015	✓	**13-Nov-2015**	23-Nov-2015	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Soil Glass Jar - Unpreserved (EA005-P)							
SD-RINSATE	**09-Nov-2015**	**----**	----	----	**11-Nov-2015**	09-Nov-2015	×
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H)							
WAT-4-1m, WAT-5-1m, WAT-6-1m, WAT-7-1m, WAT-8-1m, WAT.QA.1m, WAT-RINSATE, WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	**09-Nov-2015**	**----**	----	----	**14-Nov-2015**	16-Nov-2015	✓
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
WAT-4-1m, WAT-5-1m, WAT-6-1m, WAT-7-1m, WAT-8-1m, WAT.QA.1m, WAT-RINSATE, WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	**09-Nov-2015**	**----**	----	----	**14-Nov-2015**	16-Nov-2015	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
WAT-4-1m,	WAT-5-1m,	**09-Nov-2015**	**----**	----	----	**11-Nov-2015**	23-Nov-2015	✓
WAT-6-1m,	WAT-7-1m,							
WAT-8-1m,	WAT.QA.1m,							
WAT-RINSATE,	WAT-4-2m,							
WAT-5-2m,	WAT-6-2m,							
WAT-7-2m,	WAT-8-2m							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)								
WAT-4-1m,	WAT-5-1m,	**09-Nov-2015**	**----**	----	----	**11-Nov-2015**	07-Dec-2015	✓
WAT-6-1m,	WAT-7-1m,							
WAT-8-1m,	WAT.QA.1m,							
WAT-RINSATE,	WAT-4-2m,							
WAT-5-2m,	WAT-6-2m,							
WAT-7-2m,	WAT-8-2m							
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
WAT-4-1m,	WAT-5-1m,	**09-Nov-2015**	**----**	----	----	**11-Nov-2015**	07-Dec-2015	✓
WAT-6-1m,	WAT-7-1m,							
WAT-8-1m,	WAT.QA.1m,							
WAT-RINSATE,	WAT-4-2m,							
WAT-5-2m,	WAT-6-2m,							
WAT-7-2m,	WAT-8-2m							
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F)								
WAT-4-1m,	WAT-5-1m,	**09-Nov-2015**	**----**	----	----	**13-Nov-2015**	16-Nov-2015	✓
WAT-6-1m,	WAT-7-1m,							
WAT-8-1m,	WAT.QA.1m,							
WAT-RINSATE,	WAT-4-2m,							
WAT-5-2m,	WAT-6-2m,							
WAT-7-2m,	WAT-8-2m							
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)								
WAT-4-1m,	WAT-5-1m,	**09-Nov-2015**	**14-Nov-2015**	07-May-2016	✓	**14-Nov-2015**	07-May-2016	✓
WAT-6-1m,	WAT-7-1m,							
WAT-8-1m,	WAT.QA.1m,							
WAT-RINSATE,	WAT-4-2m,							
WAT-5-2m,	WAT-6-2m,							
WAT-7-2m,	WAT-8-2m							
Soil Glass Jar - Unpreserved (EG020A-T)								
SD-RINSATE		**09-Nov-2015**	**14-Nov-2015**	07-May-2016	✓	**14-Nov-2015**	07-May-2016	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
WAT-4-1m, WAT-5-1m, WAT-6-1m, WAT-7-1m, WAT-8-1m, WAT.QA.1m, WAT-RINSATE, WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	**09-Nov-2015**	**----**	----	----	**18-Nov-2015**	07-Dec-2015	✓
Soil Glass Jar - Unpreserved (EG035T)							
SD-RINSATE	**09-Nov-2015**	**----**	----	----	**18-Nov-2015**	23-Nov-2015	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
WAT-4-1m, WAT-5-1m, WAT-6-1m, WAT-7-1m, WAT-8-1m, WAT.QA.1m, WAT-RINSATE, WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	**09-Nov-2015**	**----**	----	----	**13-Nov-2015**	07-Dec-2015	✓
Soil Glass Jar - Unpreserved (EK055G)							
SD-RINSATE	**09-Nov-2015**	**----**	----	----	**12-Nov-2015**	10-Nov-2015	×
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
WAT-4-1m, WAT-5-1m, WAT-6-1m, WAT-7-1m, WAT-8-1m, WAT.QA.1m, WAT-RINSATE, WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	**09-Nov-2015**	**----**	----	----	**11-Nov-2015**	11-Nov-2015	✓
Soil Glass Jar - Unpreserved (EK057G)							
SD-RINSATE	**09-Nov-2015**	**----**	----	----	**11-Nov-2015**	10-Nov-2015	×
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
WAT-4-1m, WAT-5-1m, WAT-6-1m, WAT-7-1m, WAT-8-1m, WAT.QA.1m, WAT-RINSATE, WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	**09-Nov-2015**	**----**	----	----	**13-Nov-2015**	07-Dec-2015	✓
Soil Glass Jar - Unpreserved (EK059G)							
SD-RINSATE	**09-Nov-2015**	**----**	----	----	**12-Nov-2015**	10-Nov-2015	×

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
WAT-4-1m, WAT-5-1m, WAT-6-1m, WAT-7-1m, WAT-8-1m, WAT.QA.1m, WAT-RINSATE, WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	**09-Nov-2015**	**13-Nov-2015**	07-Dec-2015	✓	**13-Nov-2015**	07-Dec-2015	✓
Soil Glass Jar - Unpreserved (EK061G)							
SD-RINSATE	**09-Nov-2015**	**12-Nov-2015**	10-Nov-2015	×	**12-Nov-2015**	10-Dec-2015	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
WAT-4-1m, WAT-5-1m, WAT-6-1m, WAT-7-1m, WAT-8-1m, WAT.QA.1m, WAT-RINSATE, WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	**09-Nov-2015**	**13-Nov-2015**	07-Dec-2015	✓	**13-Nov-2015**	07-Dec-2015	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
WAT-4-1m, WAT-5-1m, WAT-6-1m, WAT-7-1m, WAT-8-1m, WAT.QA.1m, WAT-RINSATE, WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	**09-Nov-2015**	**----**	----	----	**11-Nov-2015**	11-Nov-2015	✓
EP002: Dissolved Organic Carbon (DOC)							
Clear Plastic Bottle - Natural (EP002)							
WAT-4-1m, WAT-5-1m, WAT-6-1m, WAT-7-1m, WAT-8-1m, WAT.QA.1m, WAT-RINSATE, WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	**09-Nov-2015**	**----**	----	----	**12-Nov-2015**	10-Nov-2015	×
EP005: Total Organic Carbon (TOC)							
Amber VOC Vial - Sulfuric Acid (EP005)							
WAT-4-1m, WAT-5-1m, WAT-6-1m, WAT-7-1m, WAT-8-1m, WAT.QA.1m, WAT-RINSATE, WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	**09-Nov-2015**	**----**	----	----	**13-Nov-2015**	07-Dec-2015	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP026SP: Chemical Oxygen Demand (Spectrophotometric)								
Clear Plastic Bottle - Sulfuric Acid (EP026SP)								
WAT-4-1m,	WAT-5-1m,	**09-Nov-2015**	**----**	----	----	**17-Nov-2015**	07-Dec-2015	✓
WAT-6-1m,	WAT-7-1m,							
WAT-8-1m,	WAT.QA.1m,							
WAT-RINSATE,	WAT-4-2m,							
WAT-5-2m,	WAT-6-2m,							
WAT-7-2m,	WAT-8-2m							
EP030: Biochemical Oxygen Demand (BOD)								
Clear Plastic Bottle - Natural (EP030)								
WAT-4-1m,	WAT-5-1m,	**09-Nov-2015**	**----**	----	----	**11-Nov-2015**	11-Nov-2015	✓
WAT-6-1m,	WAT-7-1m,							
WAT-8-1m,	WAT.QA.1m,							
WAT-RINSATE,	WAT-4-2m,							
WAT-5-2m,	WAT-6-2m,							
WAT-7-2m,	WAT-8-2m							
EP030C: Carbonaceous Biochemical Oxygen Demand (CBOD)								
Clear Plastic Bottle - Natural (EP030C)								
WAT-4-1m,	WAT-5-1m,	**09-Nov-2015**	**----**	----	----	**11-Nov-2015**	11-Nov-2015	✓
WAT-6-1m,	WAT-7-1m,							
WAT-8-1m,	WAT.QA.1m,							
WAT-RINSATE,	WAT-4-2m,							
WAT-5-2m,	WAT-6-2m,							
WAT-7-2m,	WAT-8-2m							
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
WAT-4-1m,	WAT-5-1m,	**09-Nov-2015**	**16-Nov-2015**	16-Nov-2015	✓	**17-Nov-2015**	26-Dec-2015	✓
WAT-6-1m,	WAT-7-1m,							
WAT-8-1m,	WAT.QA.1m,							
WAT-RINSATE,	WAT-4-2m,							
WAT-5-2m,	WAT-6-2m,							
WAT-7-2m,	WAT-8-2m							
Soil Glass Jar - Unpreserved (EP071)								
SD-RINSATE		**09-Nov-2015**	**16-Nov-2015**	16-Nov-2015	✓	**17-Nov-2015**	26-Dec-2015	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP075(SIM))								
WAT-4-1m,	WAT-5-1m,	**09-Nov-2015**	**16-Nov-2015**	16-Nov-2015	✓	**17-Nov-2015**	26-Dec-2015	✓
WAT-6-1m,	WAT-7-1m,							
WAT-8-1m,	WAT.QA.1m,							
WAT-RINSATE,	WAT-4-2m,							
WAT-5-2m,	WAT-6-2m,							
WAT-7-2m,	WAT-8-2m							
Soil Glass Jar - Unpreserved (EP075(SIM))								
SD-RINSATE		**09-Nov-2015**	**16-Nov-2015**	16-Nov-2015	✓	**17-Nov-2015**	26-Dec-2015	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
TRIP SPIKE		**09-Nov-2015**	**13-Nov-2015**	23-Nov-2015	✓	**13-Nov-2015**	23-Nov-2015	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP080)								
WAT-4-1m,	WAT-5-1m,	**09-Nov-2015**	**13-Nov-2015**	23-Nov-2015	✓	**13-Nov-2015**	23-Nov-2015	✓
WAT-6-1m,	WAT-7-1m,							
WAT-8-1m,	WAT.QA.1m,							
WAT-RINSATE,	TRIP BLANK,							
WAT-4-2m,	WAT-5-2m,							
WAT-6-2m,	WAT-7-2m,							
WAT-8-2m								
Soil Glass Jar - Unpreserved (EP080)								
SD-RINSATE		**09-Nov-2015**	**13-Nov-2015**	16-Nov-2015	✓	**13-Nov-2015**	16-Nov-2015	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Buchi Ammonia	EK055	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055-103	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N - Soluble by Discrete Analyser	EK057G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	2	13	**15.38**	**9.52**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Buchi Ammonia	EK055	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	3	13	**23.08**	**14.29**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Buchi Ammonia	EK055	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	13	**7.69**	**4.76**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Buchi Ammonia	EK055	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N - Soluble by Discrete Analyser	EK057G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TKN as N By Discrete Analyser	EK061G	1	13	**7.69**	**4.76**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Carbonaceous Biochemical Oxygen Demand (CBOD)	EP030C	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	8	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	18	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	20	**10.00**	**9.52**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	15	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Carbonaceous Biochemical Oxygen Demand (CBOD)	EP030C	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	20	**10.00**	**9.52**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	9	**33.33**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Carbonaceous Biochemical Oxygen Demand (CBOD)	EP030C	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	1	20	**5.00**	**4.76**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	8	**12.50**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	18	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	15	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Moisture Content	EA055-103	SOIL	In-house. A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Buchi Ammonia	EK055	SOIL	In house: Referenced to APHA 4500 NH3+-B&G, H Samples are steam distilled (Buchi) prior to analysis and quantified using titration, FIA or Discrete Analyser.
Nitrite as N - Soluble by Discrete Analyser	EK057G	SOIL	In house: Referenced to APHA 4500 NO3- B. Nitrite in a water extract is determined by direct colourimetry by Discrete Analyser.
Nitrate as N - Soluble by Discrete Analyser	EK058G	SOIL	In house: Referenced to APHA 4500 NO3--F. Nitrate in the 1:5 soil:water extract is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results.
Nitrite and Nitrate as N (NOx)- Soluble by Discrete Analyser	EK059G	SOIL	In house: Referenced to APHA 4500 NO3- F. Combined oxidised Nitrogen (NO2+NO3) in a water extract is determined by Chemical Reduction, and direct colourimetry by Discrete Analyser.
TKN as N By Discrete Analyser	EK061G	SOIL	In house: Referenced to APHA 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Total Nitrogen as N (TKN + NOx) By Discrete Analyser	EK062G	SOIL	In house: Referenced to APHA 4500 Norg/NO3- Total Nitrogen is determined as the sum of TKN and Oxidised Nitrrogen, each determined seperately as N.
Polychlorinated Biphenyls (PCB)	EP066	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 (2013) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction	EP071	SOIL	(USEPA SW 846 - 8015A) Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)

Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve.
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 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.
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate 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 (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Organic Carbon	EP002	WATER	In house: Referenced to APHA 5310 B. This method is compliant with NEPM (2013) Schedule B(3) . Samples are combusted at high termperature in the presence of an oxidative catalyst. The evolved carbon dioxide is quantified using an IR detector.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
Chemical Oxygen Demand (COD) (Spectrophotometric)	EP026SP	WATER	In house: Referenced to APHA 5220 D. Samples are digested with a known excess of an acidic potassium dichromate solution using silver sulfate as a catalyst. The chromium is reduced from the Cr (VI) oxidation state to the Cr (III) state by the oxygen present in the organic material. Both of these chromium species are coloued and absorb in the visible region of (400nm & 600nm) the spectrum. The oxidisable organic matter can be calculated in terms of oxygen equivalents.

Analytical Methods	Method	Matrix	Method Descriptions
Biochemical Oxygen Demand (BOD)	EP030	WATER	In house: Referenced to APHA 5210 B. The 5-Day BOD test provides an empirical measure of the oxygen consumption capacity of a given water. A portion of the sample is diluted into oxygenated, nutrient rich water, and a seed added to begin biological decay. The initial dissolved oxygen content is measured, then the bottle is sealed and incubated for five days. The remaining dissolved oxygen is measured, and from the difference, the demand for oxygen, by biological decay, is determined. This method is compliant with NEPM (2013) Schedule B(3)
Carbonaceous Biochemical Oxygen Demand (CBOD)	EP030C	WATER	In house: Referenced to APHA 5210 B. The 5-Day BOD test provides an empirical measure of the oxygen consumption capacity of a given water. A portion of the sample is diluted into oxygenated, nutrient rich water, a seed added to begin biological decay and an inhibitory chemical added to prevent the interference from nitrogenous demand. The initial dissolved oxygen content is measured, then the bottle is sealed and incubated for five days. The remaining dissolved oxygen is measured, and from the difference, the demand for oxygen, by biological decay, is determined. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	SOIL	APHA 4500 Norg- D; APHA 4500 P - H. Macro Kjeldahl digestion.
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	ORG17	SOIL	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
TKN/TP Digestion	EK061/EK067	WATER	APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	USEPA SW846-3005 Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)

CERTIFICATE OF ANALYSIS

Work Order	: **ES1536613**	Page	: 1 of 5
Client	: **EMGA MITCHELL MCLENNAN**	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Contact	:
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Telephone	: +61 02 9493 9500	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9493 9599	Facsimile	: +61-2-8784 8500
Project	: GCM	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: J14149	Date Samples Received	: 18-Nov-2015 17:45
C-O-C number	: ----	Date Analysis Commenced	: 18-Nov-2015
Sampler	: ----	Issue Date	: 27-Nov-2015 16:22
Site	: ----		
		No. of samples received	: 5
Quote number	: ----	No. of samples analysed	: 5

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

- EP080: Results for RINSATE confirmed by re-analysis, positive due to the presence of trihalomethanes.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Client sample ID	MP-3	MP-4	MP-5	GW-QA	RINSATE
				Client sampling date / time	[17-Nov-2015]	[17-Nov-2015]	[17-Nov-2015]	[17-Nov-2015]	[17-Nov-2015]
					ES1536613-001	ES1536613-002	ES1536613-003	ES1536613-006	ES1536613-007
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**6.47**	**7.89**	**4.07**	**6.42**	**7.72**
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		**9210**	**8780**	**932**	**8450**	**129**
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.40**	**0.06**	**7.83**	**0.40**	**0.01**
Arsenic	7440-38-2	0.001	mg/L		**0.007**	**0.010**	<0.001	**0.007**	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	**0.0041**	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.001**	**0.002**	**0.006**	<0.001	**0.129**
Nickel	7440-02-0	0.001	mg/L		**0.007**	**0.003**	**0.060**	**0.007**	<0.001
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	**0.002**	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		**0.037**	**0.065**	**0.920**	**0.036**	**0.024**
Manganese	7439-96-5	0.001	mg/L		**0.331**	**0.367**	**2.71**	**0.329**	**0.002**
Iron	7439-89-6	0.05	mg/L		**28.2**	**4.87**	**3.36**	**27.8**	<0.05
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**4.67**	**1.12**	**1.43**	**5.19**	**0.32**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	**0.02**
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.02**	**0.04**	**0.01**	**0.04**	**0.31**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.02**	**0.04**	**0.01**	**0.04**	**0.33**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**5.0**	**1.8**	**7.6**	**5.5**	**0.4**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ **Total Nitrogen as N**	----	0.1	mg/L		**5.0**	**1.8**	**7.6**	**5.5**	**0.7**
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		**29**	**14**	**94**	**27**	**4**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MP-3	MP-4	MP-5	GW-QA	RINSATE
				Client sampling date / time	[17-Nov-2015]	[17-Nov-2015]	[17-Nov-2015]	[17-Nov-2015]	[17-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1536613-001	ES1536613-002	ES1536613-003	ES1536613-006	ES1536613-007
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthene	83-32-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	207-08-9	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	**20**
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	**30**
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	**30**
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MP-3	MP-4	MP-5	GW-QA	RINSATE
				Client sampling date / time	[17-Nov-2015]	[17-Nov-2015]	[17-Nov-2015]	[17-Nov-2015]	[17-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1536613-001	ES1536613-002	ES1536613-003	ES1536613-006	ES1536613-007
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1	%		26.7	13.8	19.0	19.6	18.9
2-Chlorophenol-D4	93951-73-6	1	%		54.4	28.6	37.4	44.3	46.0
2.4.6-Tribromophenol	118-79-6	1	%		63.2	47.1	37.1	48.5	49.1
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1	%		69.2	45.0	45.2	57.9	63.9
Anthracene-d10	1719-06-8	1	%		113	95.7	85.5	95.5	106
4-Terphenyl-d14	1718-51-0	1	%		83.3	73.0	60.2	66.0	74.7
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		105	104	110	106	120
Toluene-D8	2037-26-5	2	%		92.0	90.5	96.7	94.9	86.4
4-Bromofluorobenzene	460-00-4	2	%		81.8	82.4	85.5	89.1	88.6

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1536613**	Page	: 1 of 8
Client	: **EMGA MITCHELL MCLENNAN**	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Contact	:
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E-mail	: npearsehawkins@emgamm.com	E-mail	:
Telephone	: +61 02 9493 9500	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9493 9599	Facsimile	: +61-2-8784 8500
Project	: GCM	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: J14149	Date Samples Received	: 18-Nov-2015
C-O-C number	: ----	Date Analysis Commenced	: 18-Nov-2015
Sampler	: ----	Issue Date	: 27-Nov-2015
Site	: ----	No. of samples received	: 5
Quote number	: ----	No. of samples analysed	: 5

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

This Quality Control Report contains the following information:

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

NATA WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA005P: pH by PC Titrator (QC Lot: 282325)									
ES1536522-005	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.23	7.18	0.694	0% - 20%
ES1536625-001	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	8.27	8.27	0.00	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 285621)									
ES1536613-001	MP-3	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	9210	8200	11.6	0% - 20%
ES1536703-025	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	644	644	0.00	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 284897)									
ES1536590-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.004	0.004	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.005	0.004	28.3	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.07	0.07	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.06	0.06	0.00	No Limit
ES1536682-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.098	0.094	3.68	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.011	0.009	22.9	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	2.11	2.08	1.37	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 284894)									
ES1536590-003	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES1536613-006	GW-QA	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 284161)									
ES1536581-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.05	0.07	28.8	No Limit
ES1536581-010	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.05	<0.05	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 284163)									
ES1536613-006	GW-QA	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	5.19	5.26	1.43	0% - 20%
ES1536708-008	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.12	0.12	0.00	0% - 50%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 282317)									
ES1536520-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1536520-010	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 284162)									
ES1536581-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.08	0.08	0.00	No Limit
ES1536581-010	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.08	0.08	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 284164)									
ES1536613-006	GW-QA	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.04	0.04	0.00	No Limit
ES1536708-008	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.10	0.10	0.00	0% - 50%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 284140)									
ES1536581-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.2	0.3	40.0	No Limit
ES1536581-011	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.2	<0.2	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 284141)									
ES1536613-006	GW-QA	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	5.5	4.6	17.1	0% - 20%
ES1536708-009	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.2	<0.2	0.00	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 283146)									
ES1536562-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	6	5	24.6	No Limit
ES1536613-007	RINSATE	EP005: Total Organic Carbon	----	1	mg/L	4	4	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 286106)									
ES1536521-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1536613-002	MP-4	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 286106)									
ES1536521-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1536613-002	MP-4	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 286106)									
ES1536521-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1536613-002	MP-4	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

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

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control 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: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 285621)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	88.3	87	109
				<10	293 mg/L	92.7	66	126
EG020F: Dissolved Metals by ICP-MS (QCLot: 284897)								
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	96.6	80	116
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.2	85	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.8	84	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.7	85	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	93.7	81	111
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.2	82	112
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	94.9	83	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	94.8	82	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.6	82	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.1	81	117
EG035F: Dissolved Mercury by FIMS (QCLot: 284894)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	92.7	83	105
EK055G: Ammonia as N by Discrete Analyser (QCLot: 284161)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	108	90	114
EK055G: Ammonia as N by Discrete Analyser (QCLot: 284163)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	110	90	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 282317)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	93.6	82	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 284162)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	91	113
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 284164)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	100	91	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 284140)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	94.7	69	101
				<0.1	1 mg/L	91.4	70	118
				<0.1	5 mg/L	104	74	118
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 284141)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	91.2	69	101
				<0.1	1 mg/L	93.2	70	118
				<0.1	5 mg/L	101	74	118

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP005: Total Organic Carbon (TOC) (QCLot: 283146)								
EP005: Total Organic Carbon	----	1	mg/L	<1	10 mg/L	91.5	72	120
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 284509)								
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	90.8	62	113
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	93.6	64	114
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	99.9	64	116
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	98.3	64	117
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	101	63	117
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	100	62	119
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	105	59	118
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	84.2	63	115
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	110	63	116
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	110	61	117
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	106	64	118
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	97.3	64	115
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	109	60	118
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	78.4	50	94
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	99.4	63	116
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	102	63	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 284508)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	101	76	116
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	96.3	83	109
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	98.4	75	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 286106)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	83.4	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 284508)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	99.4	76	114
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	97.0	81	111
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	100	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 286106)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	84.9	75	127
EP080: BTEXN (QCLot: 286106)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	95.2	70	122
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	77.2	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	83.8	69	121
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	92.4	70	120
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	81.6	72	122

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080: BTEXN (QCLot: 286106) - continued								
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	85.5	69	123

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG020F: Dissolved Metals by ICP-MS (QCLot: 284897)							
ES1536590-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	115	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	93.5	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	85.5	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	102	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	95.3	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	83.0	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	105	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	101	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 284894)							
ES1536590-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	96.0	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 284161)							
ES1536581-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	114	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 284163)							
ES1536613-006	GW-QA	EK055G: Ammonia as N	7664-41-7	1 mg/L	# Not Determined	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 282317)							
ES1536520-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	103	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 284162)							
ES1536581-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	102	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 284164)							
ES1536613-006	GW-QA	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	89.2	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 284140)							
ES1536581-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	86.6	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 284141)							
ES1536613-007	RINSATE	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	93.6	70	130
EP005: Total Organic Carbon (TOC) (QCLot: 283146)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP005: Total Organic Carbon (TOC) (QCLot: 283146) - continued							
ES1536562-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	86.7	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 286106)							
ES1536521-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	120	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 286106)							
ES1536521-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	126	70	130
EP080: BTEXN (QCLot: 286106)							
ES1536521-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	93.1	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	84.0	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	84.4	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	89.0	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	83.3	70	130
		EP080: Toluene	108-88-3	25 µg/L	76.6	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1536613**	Page	: 1 of 8
Client	: **EMGA MITCHELL MCLENNAN**	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Telephone	: +61-2-8784 8555
Project	: GCM	Date Samples Received	: 18-Nov-2015
Site	: ----	Issue Date	: 27-Nov-2015
Sampler	: ----	No. of samples received	: 5
Order number	: J14149	No. of samples analysed	: 5

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK055G: Ammonia as N by Discrete Analyser	ES1536613--006	GW-QA	**Ammonia as N**	7664-41-7	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural						
MP-3, MP-4, MP-5, GW-QA, RINSATE	----	----	----	19-Nov-2015	17-Nov-2015	**2**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	19	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	19	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P)							
MP-3, MP-4, MP-5, GW-QA, RINSATE	**17-Nov-2015**	**----**	----	----	**19-Nov-2015**	17-Nov-2015	×
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H)							
MP-3, MP-4, MP-5, GW-QA, RINSATE	**17-Nov-2015**	**----**	----	----	**21-Nov-2015**	24-Nov-2015	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
MP-3, MP-4, MP-5, GW-QA, RINSATE	**17-Nov-2015**	**----**	----	----	**20-Nov-2015**	15-May-2016	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
MP-3, MP-4, MP-5, GW-QA, RINSATE	**17-Nov-2015**	**----**	----	----	**23-Nov-2015**	15-Dec-2015	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
MP-3, MP-4, MP-5, GW-QA, RINSATE	**17-Nov-2015**	**----**	----	----	**20-Nov-2015**	15-Dec-2015	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
MP-3, MP-4, MP-5, GW-QA, RINSATE	**17-Nov-2015**	**----**	----	----	**18-Nov-2015**	19-Nov-2015	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
MP-3, MP-4, MP-5, GW-QA, RINSATE	**17-Nov-2015**	**----**	----	----	**20-Nov-2015**	15-Dec-2015	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
MP-3, MP-4, MP-5, GW-QA, RINSATE	**17-Nov-2015**	**20-Nov-2015**	15-Dec-2015	✓	**20-Nov-2015**	15-Dec-2015	✓

Matrix: **WATER**

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP005: Total Organic Carbon (TOC)							
Amber VOC Vial - Sulfuric Acid (EP005)							
MP-3, MP-4, MP-5, GW-QA, RINSATE	**17-Nov-2015**	**----**	----	----	**19-Nov-2015**	15-Dec-2015	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
MP-3, MP-4, MP-5, GW-QA, RINSATE	**17-Nov-2015**	**23-Nov-2015**	24-Nov-2015	✓	**24-Nov-2015**	02-Jan-2016	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
MP-3, MP-4, MP-5, GW-QA, RINSATE	**17-Nov-2015**	**23-Nov-2015**	24-Nov-2015	✓	**23-Nov-2015**	02-Jan-2016	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
MP-3, MP-4, MP-5, GW-QA, RINSATE	**17-Nov-2015**	**23-Nov-2015**	01-Dec-2015	✓	**23-Nov-2015**	01-Dec-2015	✓

Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	13	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	19	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	13	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	19	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of `filterable` residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1537982**	Page	: 1 of 5
Client	: **EMGA MITCHELL MCLENNAN**	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Contact	:
Address	: Ground Floor Suite 1 20 Chandos Street St Leonards NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: npearsehawkins@emgamm.com	E-mail	:
Telephone	: +61 02 9493 9500	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9493 9599	Facsimile	: +61-2-8784 8500
Project	: GCM	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: J14149	Date Samples Received	: 03-Dec-2015 04:20
C-O-C number	: ----	Date Analysis Commenced	: 09-Dec-2015
Sampler	: ----	Issue Date	: 15-Dec-2015 17:28
Site	: ----		
		No. of samples received	: 16
Quote number	: ----	No. of samples analysed	: 15

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Shobhna Chandra	Metals Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SD-7	SD-11	SD-14	SD-19	SD-9
			Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit	ES1537982-001	ES1537982-002	ES1537982-003	ES1537982-005	ES1537982-006
				Result	Result	Result	Result	Result
EA150: Particle Sizing								
+75µm	----	1	%	<1	7	<1	15	1
+150µm	----	1	%	<1	6	<1	1	<1
+300µm	----	1	%	<1	3	<1	<1	<1
+425µm	----	1	%	<1	1	<1	<1	<1
+600µm	----	1	%	<1	<1	<1	<1	<1
+1180µm	----	1	%	<1	<1	<1	<1	<1
+2.36mm	----	1	%	<1	<1	<1	<1	<1
+4.75mm	----	1	%	<1	<1	<1	<1	<1
+9.5mm	----	1	%	<1	<1	<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
EA150: Soil Classification based on Particle Size								
Fines (<75 µm)	----	1	%	100	93	100	85	99
Sand (>75 µm)	----	1	%	<1	7	<1	15	1
Gravel (>2mm)	----	1	%	<1	<1	<1	<1	<1
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WAT-4-1M	WAT-5-1M	WAT-6-1M	WAT-7-1M	WAT-8-1M
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1537982-007	ES1537982-008	ES1537982-009	ES1537982-010	ES1537982-011
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.01**	**0.02**	**0.28**	**0.02**	**0.27**
Arsenic	7440-38-2	0.001	mg/L		**0.003**	**0.003**	**0.004**	**0.003**	**0.004**
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.001**	**0.001**	<0.001	**0.004**	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.005**	**0.005**	**0.004**	**0.006**	**0.004**
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		**0.016**	**0.015**	**0.249**	**0.016**	**0.302**
Manganese	7439-96-5	0.001	mg/L		**0.370**	**0.369**	**0.507**	**0.342**	**0.458**
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	**0.19**	<0.05	**0.26**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WAT-4-2m	WAT-5-2m	WAT-6-2m	WAT-7-2m	WAT-8-2m
				Client sampling date / time	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]	[09-Nov-2015]
Compound	CAS Number	LOR	Unit		ES1537982-012	ES1537982-013	ES1537982-014	ES1537982-015	ES1537982-016
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		**0.27**	**0.01**	**0.08**	**0.08**	**0.30**
Arsenic	7440-38-2	0.001	mg/L		**0.004**	**0.003**	**0.002**	**0.002**	**0.005**
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	**0.001**
Copper	7440-50-8	0.001	mg/L		<0.001	**0.001**	<0.001	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.005**	**0.004**	**0.005**	**0.005**	**0.004**
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		**0.298**	**0.009**	**0.345**	**0.207**	**0.321**
Manganese	7439-96-5	0.001	mg/L		**0.470**	**0.361**	**0.442**	**0.363**	**0.551**
Iron	7439-89-6	0.05	mg/L		**0.36**	<0.05	**0.99**	**0.06**	**0.41**

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1537982**	Page	: 1 of 4
Client	: **EMGA MITCHELL MCLENNAN**	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Contact	:
Address	: Ground Floor Suite 1 20 Chandos Street St Leonards NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: npearsehawkins@emgamm.com	E-mail	:
Telephone	: +61 02 9493 9500	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 9493 9599	Facsimile	: +61-2-8784 8500
Project	: GCM	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: J14149	Date Samples Received	: 03-Dec-2015
C-O-C number	: ----	Date Analysis Commenced	: 09-Dec-2015
Sampler	: ----	Issue Date	: 15-Dec-2015
Site	: ----	No. of samples received	: 16
Quote number	: ----	No. of samples analysed	: 15

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

This Quality Control Report contains the following information:

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

NATA WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Shobhna Chandra	Metals Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

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

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

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

- **No Method Blank (MB) or Laboratory Control Spike (LCS) Results are required to be reported.**

Matrix Spike (MS) Report

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

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

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1537982**	Page	: 1 of 4
Client	: **EMGA MITCHELL MCLENNAN**	Laboratory	: Environmental Division Sydney
Contact	: MS NINA PEARSE-HAWKINS	Telephone	: +61-2-8784 8555
Project	: GCM	Date Samples Received	: 03-Dec-2015
Site	: ----	Issue Date	: 15-Dec-2015
Sampler	: ----	No. of samples received	: 16
Order number	: J14149	No. of samples analysed	: 15

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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

Analysis Holding Time Compliance

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

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

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

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA150: Soil Classification based on Particle Size							
Soil Glass Jar - Unpreserved (EA150)							
SD-7, SD-11, SD-14, SD-19, SD-9	**09-Nov-2015**	**----**	----	----	**11-Dec-2015**	07-May-2016	✓

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

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Natural (EG020A-F)							
WAT-4-1M, WAT-5-1M, WAT-6-1M, WAT-7-1M, WAT-8-1M	**09-Nov-2015**	**----**	----	----	**10-Dec-2015**	07-May-2016	✓
Clear Plastic Bottle - Natural (EG020A-F)							
WAT-4-2m, WAT-5-2m, WAT-6-2m, WAT-7-2m, WAT-8-2m	**09-Nov-2015**	**----**	----	----	**15-Dec-2015**	07-May-2016	✓

Quality Control Parameter Frequency Compliance

- **No Quality Control data available for this section.**

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
Particle Size Analysis (Sieving)	EA150	SOIL	Particle Size Analysis by Sieving according to AS1289.3.6.1 - 2009
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

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envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 137605

Client:
EMM
Ground Floor, Suite 1
20 Chaandos St
St Leonards
NSW

Attention: Nina Pearse-Hawkins

Sample log in details:

Your Reference:	**J14149**		
No. of samples:	1 water		
Date samples received / completed instructions received	18/11/15	/	18/11/15

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	25/11/15	/	24/11/15
Date of Preliminary Report:	Not Issued		

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

Results Approved By:

Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Water		
Our Reference:	UNITS	137605-1
Your Reference	----------	QA2
Date Sampled	----------	17/11/2015
Type of sample		water
Date extracted	-	19/11/2015
Date analysed	-	20/11/2015
$TRHC_6$ - C_9	µg/L	<10
$TRHC_6$ - C_{10}	µg/L	<10
$TRHC_6$ - C_{10} less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	105
Surrogate toluene-d8	%	101
Surrogate 4-BFB	%	99

svTRH (C10-C40) in Water		
Our Reference:	UNITS	137605-1
Your Reference	----------	QA2
Date Sampled	----------	17/11/2015
Type of sample		water
Date extracted	-	19/11/2015
Date analysed	-	19/11/2015
$TRHC_{10}$ - C_{14}	µg/L	<50
$TRHC_{15}$ - C_{28}	µg/L	<100
$TRHC_{29}$ - C_{36}	µg/L	<100
$TRH{>}C_{10}$ - C_{16}	µg/L	<50
$TRH{>}C_{10}$ - C_{16} less Naphthalene (F2)	µg/L	<50
$TRH{>}C_{16}$ - C_{34}	µg/L	<100
$TRH{>}C_{34}$ - C_{40}	µg/L	<100
Surrogate o-Terphenyl	%	107

HM in water - dissolved		
Our Reference:	UNITS	137605-1
Your Reference	----------	QA2
Date Sampled	----------	17/11/2015
Type of sample		water
Date prepared	-	19/11/2015
Date analysed	-	19/11/2015
Arsenic-Dissolved	µg/L	6
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	<1
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	5
Zinc-Dissolved	µg/L	36
Aluminium-Dissolved	µg/L	400
Iron-Dissolved	µg/L	32,000
Manganese-Dissolved	µg/L	350

Miscellaneous Inorganics		
Our Reference:	UNITS	137605-1
Your Reference	----------	QA2
Date Sampled	----------	17/11/2015
Type of sample		water
Date prepared	-	18/11/2015
Date analysed	-	18/11/2015
Ammonia as N in water	mg/L	4.5
Nitrate as N in water	mg/L	<0.005
Nitrite as N in water	mg/L	<0.005
TKN in water	mg/L	6.1
Total Nitrogen in water	mg/L	6.1

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Soils are analysed following a KCl extraction.
Inorg-055	Nitrate - determined colourimetrically. Soils are analysed following a water extraction.
Inorg-055	Nitrite - determined colourimetrically based on APHA latest edition NO2- B. Soils are analysed following a water extraction.
Inorg-062	TKN - determined colourimetrically based on APHA latest edition 4500 Norg.
Inorg-055/062	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			19/11/2015	[NT]	[NT]	LCS-W3	19/11/2015
Date analysed	-			20/11/2015	[NT]	[NT]	LCS-W3	20/11/2015
TRHC$_6$ - C$_9$	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W3	104%
TRHC$_6$ - C$_{10}$	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W3	104%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W3	105%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W3	105%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W3	102%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W3	103%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W3	105%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	106	[NT]	[NT]	LCS-W3	103%
Surrogate toluene-d8	%		Org-016	100	[NT]	[NT]	LCS-W3	100%
Surrogate 4-BFB	%		Org-016	98	[NT]	[NT]	LCS-W3	103%
QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			19/11/2015	[NT]	[NT]	LCS-W1	19/11/2015
Date analysed	-			19/11/2015	[NT]	[NT]	LCS-W1	19/11/2015
TRHC$_{10}$ - C$_{14}$	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	102%
TRHC$_{15}$ - C$_{28}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	88%
TRHC$_{29}$ - C$_{36}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	102%
TRH>C$_{10}$ - C$_{16}$	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	102%
TRH>C$_{16}$ - C$_{34}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	88%
TRH>C$_{34}$ - C$_{40}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	102%
Surrogate o-Terphenyl	%		Org-003	82	[NT]	[NT]	LCS-W1	124%
QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			19/11/2015	[NT]	[NT]	LCS-W3	19/11/2015
Date analysed	-			19/11/2015	[NT]	[NT]	LCS-W3	19/11/2015
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W3	94%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-W3	101%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W3	88%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W3	95%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W3	103%

QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	LCS-W3	93%
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W3	94%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W3	97%
Aluminium-Dissolved	µg/L	10	Metals-022 ICP-MS	<10	[NT]	[NT]	LCS-W3	85%
Iron-Dissolved	µg/L	10	Metals-022 ICP-MS	<10	[NT]	[NT]	LCS-W3	91%
Manganese-Dissolved	µg/L	5	Metals-022 ICP-MS	<5	[NT]	[NT]	LCS-W3	94%
QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			18/11/2015	[NT]	[NT]	LCS-W1	18/11/2015
Date analysed	-			18/11/2015	[NT]	[NT]	LCS-W1	18/11/2015
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	[NT]	[NT]	LCS-W1	93%
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	LCS-W1	103%
Nitrite as N in water	mg/L	0.005	Inorg-055	<0.005	[NT]	[NT]	LCS-W1	114%
TKN in water	mg/L	0.1	Inorg-062	<0.1	[NT]	[NT]	LCS-W1	102%
Total Nitrogen in water	mg/L	0.1	Inorg-055/062	<0.1	[NT]	[NT]	LCS-W1	102%

Report Comments:

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

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

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

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

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

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

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

Appendix C

Field sheets