GEOTECHNIQUE PTY LTD

Member of
Australian Contaminated
Land Consultants Association Inc

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ISO 9001
SAI GLOBAL

ABN 64 002 841 063

Job No: 12593/2
Our Ref: 12593/2-AA

21 February 2012

Mona Vale Golf Club Ltd
1 Golf Avenue
MONA VALE NSW 2103

Attention: Mr A Thompson

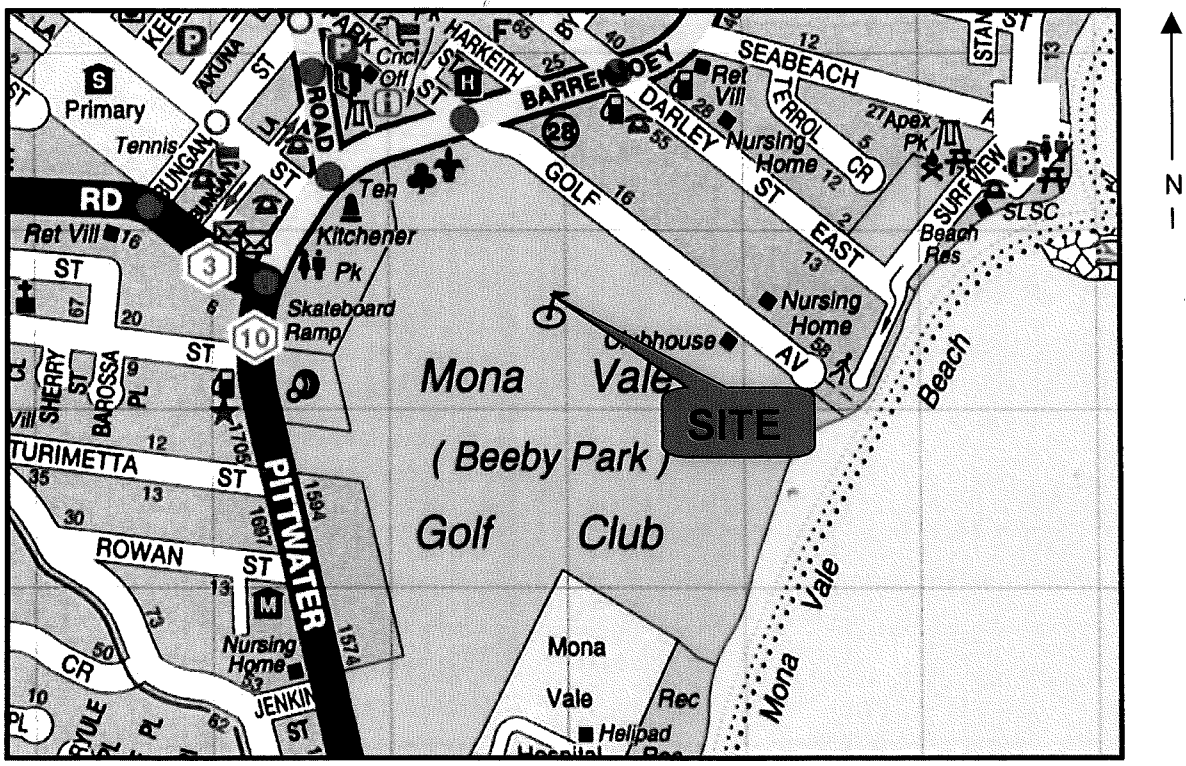
PITTWATER COUNCIL CONSTRUCTION CERTIFICATE
Number: CC0325/12
This is a copy of submitted plans, documents or Certificates associated with the issue of the Construction Certificate.
Endorsed by:
Date: 06 DEC 2012

Dear Sir

re: **Proposed Above Ground Fuel Storage Tank Installation**
Mona Vale Golf Club – 1 Golf Avenue, Mona Vale
Preliminary Contamination Assessment

Further to the Preliminary Contamination Report (PCA) dated ~~23 December 2011~~ 19 January 2012, prepared by Geotechnique Pty Ltd (Geotechnique) for the above site (indicated on Figure 1 below) and as requested, one additional soil sample was recovered from the area proposed for installation of above-ground fuel storage tank (AFST) as indicated on Drawing No 12593/2-AA1 in Attachment A.

FIGURE 1



The objective of sampling and testing was to assess the contamination status of the soil and determine whether the soil presents a risk of harm to human health and the environment for the proposed AFST development.

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FIELD WORK & LABORATORY TESTING

An Environmental Scientist (Mr A Nguyen) from Geotechnique, who was responsible for sampling and logging the materials at the sampling location, carried out the field work on 27 January 2012, in accordance with Geotechnique standard sampling procedures.

Based on the site inspection and sampling, the proposed area was all concrete covered. The soil sample recovered from below the concrete, BH101 (0.1-0.2m), indicated fill comprising sand, fine grain, yellow, brown. The recovered sample did not reveal any visual evidence of asbestos or other indicators of contamination, such as staining, odours or significant foreign matter. A calibrated Photo Ionization Detector (PID) was used to screen for the presence of potential volatile organic compounds (VOC) and the screening indicated no VOC within the soils.

The recovered sample was forwarded under COC conditions to the National Association of Testing Authorities (NATA) accredited laboratories, SGS Environmental Services (SGS) (primary) and Envirolab (Secondary). On receipt of the samples, the laboratories returned the Sample Receipt Advice, verifying the integrity of all the samples received.

LABORATORY ANALYSIS

The recovered sample was analysed for potential common contaminants (see Attached Table A), which include Metals, such as Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni) and Zinc (Zn), Total Petroleum Hydrocarbons (TPH), BTEX (Benzene, Toluene, Ethyl Benzene and Xylenes), Polycyclic Aromatic Hydrocarbons (PAH), Organochlorine Pesticides (OCP), Polychlorinated Biphenyls (PCB), Phenols and Cyanides.

FIELD AND LABORATORY QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Field Quality Assurance (QA)/ Quality Control (QC)

In order to ensure the integrity and reliability of the chemical analysis carried out, the following field QA/QC procedures were implemented for the sampling and analytical program.

Rinsate Sample

A rinsate water sample (Rinsate R1) was recovered on completion of field work in order to identify possible cross contamination between the sampling locations. A sample of the same water source used for cleaning the equipment (clean distilled water) was previously analysed by the primary laboratory, thus with known concentrations of the selected analytes. The concentrations of the analytes in the rinsate sample were then compared with the results of the original distilled water.

The test results are summarised in Table E. The analyte concentrations of the rinsate blank samples were not significantly different from the clean distilled water sample, which indicates that adequate decontamination had been carried out in the field.

Trip Spike

A trip spike sample is obtained from the laboratory on a regular basis, prior to conducting field sampling where volatile substances are suspected. The sample was held in the Penrith office of Geotechnique, at less than 4 degrees Celsius, for a period of not more than seven days. During the field work, the trip spike sample is kept in the chilled container with soil samples recovered from the site. The trip spike sample is then forwarded to the primary laboratory together with the soil samples recovered from the site.

The laboratory prepares the trip spike by adding a known amount of pure petrol standard to a clean sand sample. The sample is mixed thoroughly to ensure a relatively homogenous distribution of the spike throughout the sample. When the sample is submitted for analysis, the same procedure is adopted for testing as for the soil samples being analysed from the site

The purpose of the trip spike is to detect any loss, or potential loss, of volatiles from the soil samples, during field work, transportation, sample extraction or testing.

A trip spike sample (TS1) was forwarded to the primary analytical laboratory with the samples collected from the site, and was tested for BTEX. The test results for the trip spike sample, reported as a percentage recovery of the applied and known spike concentrations, are shown in Table F.

As indicated in Table F, the results show a good recovery of the spike concentrations, ranging between 97% and 99%.

Based on the above, it is considered that any loss of volatiles from the recovered samples that might have occurred would not affect the outcome / conclusions of this report.

Duplicate Sample

The duplicate frequency adopted complies with the National Environmental Protection Measure (NEPM), which recommends a duplicate frequency of at least 5%.

The laboratory test results certificates from SGS are included in Attachment C. The duplicate sample results are summarised in Table G.

A comparison was made of the laboratory test results for the duplicate sample with the original sample and the Relative Percentage Differences (RPD) were computed, in order to assess the accuracy of the laboratory test procedures. RPD within 50% are generally considered acceptable. However, this variation can be higher for organic analysis than for inorganics and for low concentrations of analytes.

As shown in Table G, the comparisons between the duplicate and corresponding original sample indicated acceptable RPD overall, with the exception of relatively high RPD (67%) for total phenols. Due to the low concentrations, this result is not considered critical.

Based on the duplicate sample number and comparisons, it is concluded that the test results provided by SGS can be relied upon for this assessment.

Split Sample

A split sample provides a check on the analytical performance of the primary laboratory. The split sample was prepared based on sample numbers recovered during field work and the analyses undertaken by the primary laboratory.

The split sample frequency adopted complies with the NEPM, which recommends a frequency of 5%.

The laboratory test results certificates from Envirolab are included in Attachment C. The split sample results are summarised in Table H.

Based on Schedule B (3) of the NEPM, the difference in the results between the split samples should generally be within 30% of the mean concentration determined by both laboratories, i.e., RPD should be within 30%. However, this variation can be expected to be higher for organic analysis than for inorganics and for low concentrations of analytes.

As shown in Table H, comparisons between the splits and corresponding original samples indicated generally acceptable RPD overall, with the exception of some higher RPDs for metals. Due to the relatively low concentrations, these results are not considered critical.

Based on the overall split sample number and comparisons, it is concluded that the test results provided by the primary laboratory may be relied upon for this assessment.

LABORATORY QA/QC

Only laboratories accredited by the NATA for chemical analyses were used for analysis of samples recovered as part of this assessment. The laboratory must also incorporate quality laboratory management systems to ensure that trained analysts, using validated methods and suitably calibrated equipment, produce reliable results.

In addition to the quality control samples, the laboratory must also ensure that all analysts receive certification as to their competence in carrying out the analysis and participate in national and international proficiency studies. SGS and Envirolab, the two laboratories used for this assessment, are both accredited by NATA. The two laboratories also operate Quality Systems that are designed to comply with ISO/IEC 17025.

We have checked the QA/QC procedures and results adopted by the laboratories against the appropriate guidelines. The quality control sample numbers adopted by SGS and Envirolab are considered adequate for the analyses undertaken and generally conform to recommendations provided in the NEPM 1999 "*Guideline on Laboratory Analysis of Potentially Contaminated Soils*" (Reference 2) and Australian and New Zealand Environment and Conservation Council (ANZECC) -1996 "*Guidelines for the Laboratory Analysis of Contaminated Soils*".

Overall, it is considered that the quality assurance and quality control data quality indicators have been complied with, both in the field and in the laboratory. As such, it is concluded that the laboratory test data obtained as part of this assessment is reliable and useable for this assessment

ASSESSMENT CRITERIA

The assessment criteria adopted were the available Health-based Investigation Levels (HBILs) / Health Investigation Levels (HILs) for *parks, recreational open space and playing fields* development (NEHF 'E' / HILs 'E'), the provisional phytotoxicity based investigation levels (PPBILs) / Ecological Investigation Levels (EILs) and the suggested Levels in the EPA service station guidelines.

LABORATORY TEST RESULTS, ASSESSMENT & DISCUSSION

Reference may be made to the attached laboratory analytical report from SGS and Envirolab. The test results, including schedule of testing are also presented in Tables A to D, together with the assessment criteria adopted. A discussion of the test results is presented in the following sub-sections.

Metals (As, Cd, Cr, Cu, Pb, Hg, Ni & Zn)

The metals test results are presented in Table B. The concentrations of metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn) for the analysed sample were well below the relevant PPBIL and NEHF 'E' adopted.

TPH and BTEX

The TPH and BTEX test results are presented in Table C.

As indicated, the concentrations of TPH/BTEX were less than the relevant EPA Level adopted.

Polycyclic Aromatic Hydrocarbons (PAH)

As shown in Table D, the concentrations of benzo(a)pyrene and Total PAH for the analysed soil samples were well below the NEHF 'E' adopted.

Organochlorine Pesticides (OCP), Polychlorinated Biphenyls (PCB), Total Phenols and Total Cyanides

The OCP, PCB, total Phenols and total Cyanides test results are presented in Table D and as shown, the concentrations of the analysed soil sample were well below the relevant NEHF 'E' adopted.

CONCLUSION AND LIMITATIONS

Based on the test results of sample BH101, the fill (sand) in the area proposed for above-ground storage tank, at 1 Golf Avenue, Mona Vale Golf Club, Mona Vale, is assessed not to pose a risk of harm to human health and environment for the proposed development.

This report has been prepared for the purpose stated within. This report may be relied upon by relevant authorities for development. Any reliance on this report by other parties shall be at such parties' sole risk, as the report might not contain sufficient information for other purposes.

This report shall only be presented in full and may not be used to support any other objective than those set out in the report, except where written approval is provided by Geotechnique.

The information in this report is considered accurate at completion of field sampling on 27 January 2012. Any variations to the site beyond this date might nullify the conclusions stated. If there are any variations in site conditions beyond this date, such as imported fill, chemical spillage, illegal dumping, etc., further assessment will be required and the conclusion stated herein could be nullified.

If any suspect materials (identified by unusual staining, odour, discolouration or inclusions such as building rubble, asbestos sheets/pieces, ash material, etc) are encountered during any stage of future earthworks/site preparation, we recommend that this office is contacted for assessment. In the event of contamination, detailed assessment, remediation and validation will be necessary.

Reference should be made to the "Environmental Notes" in Attachment D, for details of the limitations of this assessment.

If you have any questions, please do not hesitate to contact the undersigned.

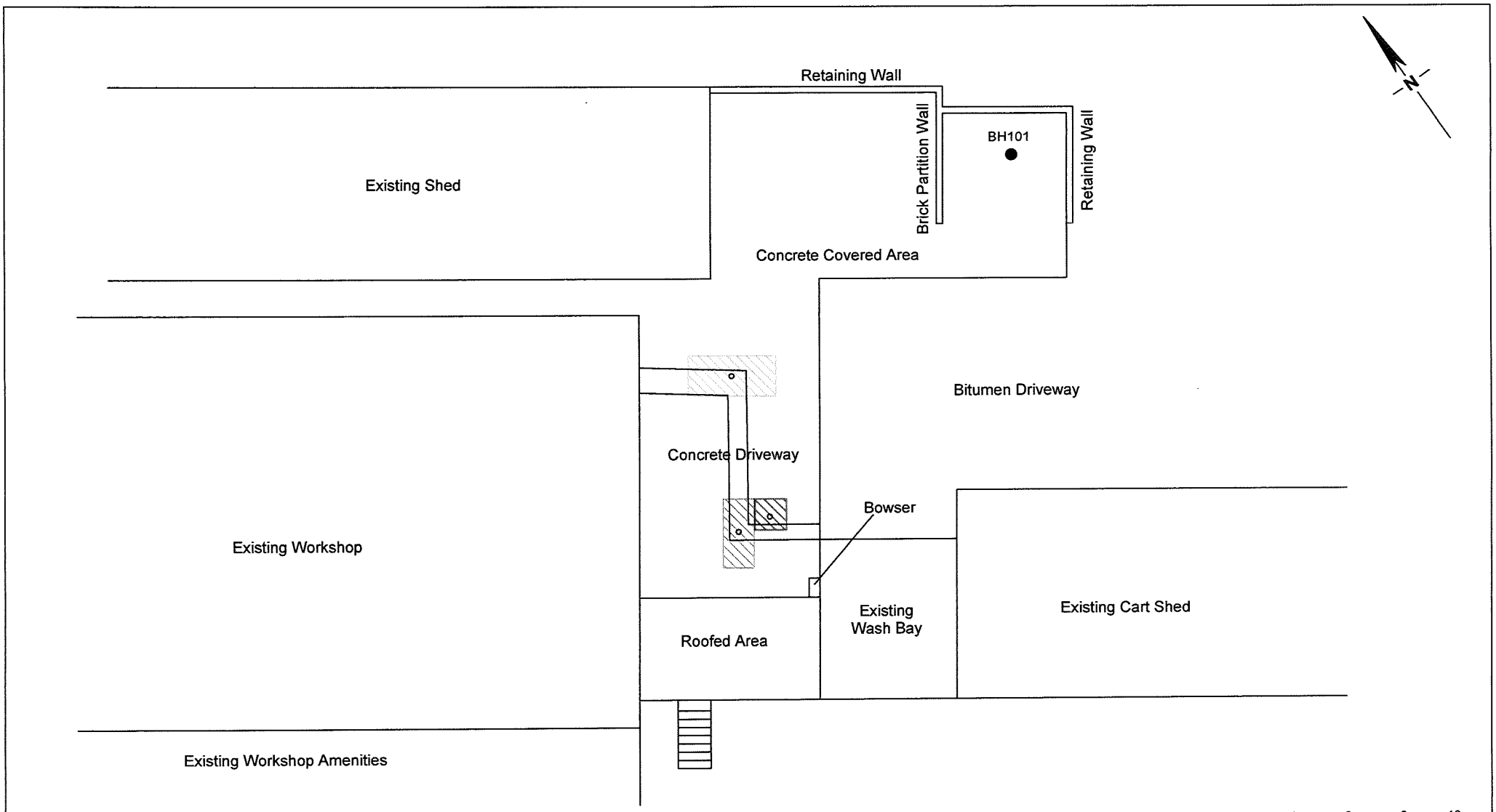
Yours faithfully
GEOTECHNIQUE PTY LTD

DANDA SAPKOTA
Senior Environmental Engineer

Attachment A	Drawing Nos 12593/2-AA1
Attachment B	Attached Schedule of testing and Laboratory Test Results Summary Tables (A-H)
Attachment C:	Laboratory Test Report /Certificate of Analysis
Attachment D:	Environmental Notes

ATTACHMENT A

Drawing No 12593/2-AA1 *Sample Location*



LEGEND

● Borehole

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NOTES

1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing

The Mona Vale Golf Club Limited
Mona Vale Golf Club
1 Golf Avenue
Mona Vale

Additional Borehole Location

Drawing No: 12593/2-AA1
Job No: 12593/2
Drawn By: MH
Date: 20 February 2012
Checked By: JX

File No: 12593-2
Layers: 0, AA1

ATTACHMENT B

TABLE A	*Laboratory Testing Schedule*
TABLE B	*Heavy Metals Test Results*
TABLE C	*Total Petroleum Hydrocarbons (TPH) and BTEX Test Results*
TABLE D	*Benzo(a)Pyrene, Polycyclic Aromatic Hydrocarbons, Organochlorine Pesticides, Polychlorinated Biphenyls, Phenols and Cyanides Test Results*
TABLE E	*Rinsate Sample*
TABLE F	*Trip Spike Sample*
TABLE G	*Duplicate Sample*
TABLE H	*Split Sample*

TABLE A
SCHEDULE OF LABORATORY TESTING
(Ref No: 12593/2-AA)

Analyte / Analyte Group / Sample	Depth (m)	TYPE	SAMPLING DATE	DUPLICATE	SPLIT	METALS	TPH & BTEX	PAH	OCP	PCB	PHENOLS	CYANIDES
BH101	0.1-0.2	F	27/01/2012	D101	S101	✔	✔	✔	✔	✔	✔	✔
Rinsate R1			27/01/2012			✔	✔	✔				

Notes
METALS: arsenic, cadmium, chromium, copper, lead, mercury, nickel & zinc
TPH: Total Petroleum Hydrocarbons
BTEX: Benzene, Toluene, Ethyl Benzene, total Xylenes
F: Fill
PAH: Polycyclic Aromatic Hydrocarbons
OCP: Organochlorine Pesticides
PCB: Polychlorinated Biphenyls

TABLE B
HEAVY METALS TEST RESULTS
DISCRETE SAMPLE
(Ref No: 12593/2-AA)

Analyte / Sample Location	Depth (m)	HEAVY METALS (mg/kg) ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	NICKEL	ZINC
BH101	0.1-0.2	4	<0.3	5.8	3.1	3	<0.05	1.9	5.2
Limits of Reporting (LOR)		3	0.3	0.3	0.5	1	0.05	0.5	0.5
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006)									
Provisional Phytotoxity-Based Investigation Levels		20	3	400/1 [b]	100	600	1	60	200
Health-Based Investigation Levels [a] (NEHF E)		200	40	24%/200 [c]	2000	600	20/30 [d]	600	14000

Notes
a: Parks, recreational open space, playing fields and secondary schools.
b: 400mg/kg for Chromium (+3) and 1mg/kg for Chromium (+6). Chromium (Cr) may exist in a number of states. Cr (+6) is easily reduced to form the most stable Cr (+3) whenever exposed to the atmosphere. Therefore Cr (+3) is adopted for this assessment.
c: 24% (240000mg/kg) for Chromium (+3) and 200mg/kg for Chromium (+6).
d: 20mg/kg for Methyl Mercury and 30mg/kg for Inorganic Mercury.

TABLE C
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS
DISCRETE SAMPLE
(Ref No: 12593/2-AA)

Analyte / Sample Location	Depth (m)	TPH (mg/kg) C6-C9	C10-C14	C15-C28	C29-C40	C10-C40 [a]	BTEX (mg/kg) BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES
BH101	0.1-0.2	<20	<20	<50	<150	220	<0.1	<0.1	<0.1	<0.3
LOR		20	20	50	150	NA	0.1	0.1	0.1	0.3
EPA Levels [b]		65	C10-C40 =1000				1	1.4	3.1	14

Notes
a: C10-C40 = (C10-C14) + (C15-C28) + (C29-C40); concentrations less than PQL are assumed equal to PQL.
b: Contaminated Sites: "Guidelines for Assessing Service Station Sites", 1994, EPA
NA: Not Applicable

TABLE D
BENZO(a)PYRENE, POLYCYCLIC AROMATIC HYDROCARBONS (PAH), ORGANOCHLORINE PESTICIDES (OCP), POLYCHLORINATED BIPHENYLS (PCB), PHENOLS AND CYANIDES TEST RESULTS
DISCRETE SAMPLE
(Ref No: 12593/2AA)

Analyte / Sample Location	Depth (m)	PAH (mg/kg)		Organochlorine Pesticides (mg/kg)							TOTAL PCB (mg/kg)	TOTAL PHENOLS (mg/kg)	TOTAL CYANIDES (mg/kg)
		BENZO(a)PYRENE (mg/kg)	TOTAL PAH (mg/kg)	HEPTACHLOR	ALDRIN	DIELDRIN	DDD	DDE	DDT	CHLORDANE (trans & cis)			
BH101	0.1-0.2	<0.1	<0.8	<0.1	<0.1	<0.05	<0.2	<0.2	<0.2	<0.2	<1	0.2	<0.1
LOR		0.05	NA	0.1	0.1	0.05	0.2	0.2	0.2	0.2	1	0.1	0.1
GUIDELINES FOR THE NSW SITE AUDITOR SCHEME (2006) Health-Based Investigation Level [a] (NEHF E)		2	40	20	20 [b]	20 [b]	400 [c]			100	20	17000	500 [d] / 1000 [e]

Notes
a: Parks, recreational open space, playing fields and secondary schools.
b: Aldrin + Dieldrin
c: Total of DDD + DDE + DDT
d: Cyanide (free)
e: Cyanide (complex)
NA: Not Applicable

TABLE E
RINSATE SAMPLE
(Ref No: 12593/2-AA)

ANALYTE	RINSATE R1 (mg/L)	CLEAN DISTILLED WATER (mg/L)
HEAVY METALS		
Arsenic	<0.05	<0.05
Cadmium	<0.005	<0.002
Chromium	<0.005	<0.005
Copper	<0.01	<0.01
Lead	<0.02	<0.02
Mercury	<0.0001	<0.0005
Nickel	<0.01	<0.009
Zinc	<0.01	<0.006
TOTAL PETROLEUM HYDROCARBONS (TPH)		
C6 - C9	0.099	<0.04
C10 - C14	<0.1	<0.10
C15 - C28	<0.2	<0.20
C29 - C40	<0.4	<0.20
BTEX		
Benzene	<0.0005	<0.001
Toluene	<0.0005	<0.001
Ethyl Benzene	<0.0005	<0.001
Total Xylenes	<0.0015	<0.003
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)		
Benzo(a)Pyrene	<0.0001	<0.0005
Total PAH	<0.001	0.008

TABLE F
TRIP SPIKE SAMPLE
(Ref No: 12593/2-AA)

ANALYTE	TRIP SPIKE TS1
BTEX	
Benzene	99%
Toluene	97%
Ethyl Benzene	97%
Total Xylenes	98%

Note : results are reported as percentage recovery of known spike concentration

TABLE G
DUPLICATE SAMPLE
(Ref No: 12593/2-AA)

ANALYTE	BH101 0.1-0.2m mg/kg	DUPLICATE D101 mg/kg	RELATIVE PERCENTAGE DIFFERENCE %
HEAVY METALS			
Arsenic	4	3	29
Cadmium	<0.3	<0.3	-
Chromium	5.8	4.5	25
Copper	3.1	5.1	49
Lead	3	2	40
Mercury	<0.05	<0.05	-
Nickel	1.9	2.6	31
Zinc	5.2	7.3	34
TOTAL PETROLEUM HYDROCARBONS (TPH)			
C6 - C9	<20	<20	-
C10 - C14	<20	<20	-
C15 - C28	<50	<50	-
C29 - C40	<150	<150	-
BTEX			
Benzene	<0.1	<0.1	-
Toluene	<0.1	<0.1	-
Ethyl Benzene	<0.1	<0.1	-
Total Xylenes	<0.3	<0.3	-
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)			
BENZO(a)PYRENE	<0.1	<0.1	-
Total PAH	<0.8	<0.8	-
ORGANOCHLORINE PESTICIDES (OCP)			
Heptachlor	<0.1	<0.1	-
Aldrin	<0.1	<0.1	-
Dieldrin	<0.05	<0.05	-
DDD	<0.2	<0.2	-
DDE	<0.2	<0.2	-
DDT	<0.2	<0.2	-
Chlordane (trans & cis)	<0.2	<0.2	-
POLYCHLORINATED BIPHENYLS (PCB)			
Total PCB	<1	<1	-
PHENOLS & CYANIDES			
Total Phenols	0.2	0.1	67
Total Cyanides	<0.1	<0.1	-

TABLE H
SPLIT SAMPLE
(Ref No: 12593/2-AA)

ANALYTE	BH101 0.1-0.2m mg/kg (SGS)	SPLIT SAMPLE S101 mg/kg (ENVIROLAB)	RELATIVE PERCENTAGE DIFFERENCE %
HEAVY METALS			
Arsenic	4	<4	-
Cadmium	<0.3	<0.5	-
Chromium	5.8	5	15
Copper	3.1	5	47
Lead	3	2	40
Mercury	<0.05	<0.1	-
Nickel	1.9	3	45
Zinc	5.2	5	4
TOTAL PETROLEUM HYDROCARBONS (TPH)			
C6 - C9	<20	<25	-
C10 - C14	<20	<50	-
C15 - C28	<50	<100	-
C29 - C40 or *** C29-C36 for Envirolab***	<150	<100	-
BTEX			
Benzene	<0.1	<0.2	-
Toluene	<0.1	<0.5	-
Ethyl Benzene	<0.1	<1	-
Total Xylenes	<0.3	<3	-
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)			
Benzo(a)Pyrene	<0.1	<0.05	-
Total PAH	<0.8	<1.55	-
ORGANOCHLORINE PESTICIDES (OCP)			
Heptachlor	<0.1	<0.1	-
Aldrin	<0.1	<0.1	-
Dieldrin	<0.05	<0.1	-
DDD	<0.2	<0.2	-
DDE	<0.2	<0.2	-
DDT	<0.2	<0.2	-
Chlordane (trans & cis)	<0.2	<0.2	-
POLYCHLORINATED BIPHENYLS (PCB)			
Total PCB	<1	<0.7	-
PHENOLS & CYANIDES			
Total Phenols	0.2	<5	-
Total Cyanides	<0.1	<0.5	-

ATTACHMENT C

SGS ANALYTICAL REPORT AND ENVIROLAB CERTIFICATE OF ANALYSIS

ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS

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Project	**12593/2 - Mona Vale**
Order Number	(Not specified)
Samples	4

LABORATORY DETAILS

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SGS Reference	SE105013 R0
Report Number	0000017500
Date Reported	07 Feb 2012
Date Received	27 Jan 2012

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Andy Sutton
Organics Chemist

Dong Liang
Inorganics Metals Team Leader

Edward Ibrahim
Business Manager

Huong Crawford
Laboratory Manager

Ly Kim Ha
Organics Supervisor

Parameter	Units	LOR	Sample Number: SE105013.001 Sample Matrix: Soil Sample Date: 27 Jan 2012 Sample Name: BH101_0.1-0.2	SE105013.002 Soil 27 Jan 2012 Duplicate D101	SE105013.003 Water 27 Jan 2012 Rinsate R1	SE105013.004 Soil 27 Jan 2012 Tripspike TS1
VOC's in Soil Method: AN433/AN434						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	<0.1	<0.1	-	[99%]
Toluene	mg/kg	0.1	<0.1	<0.1	-	[97%]
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	-	[97%]
m/p-xylene	mg/kg	0.2	<0.2	<0.2	-	[99%]
o-xylene	mg/kg	0.1	<0.1	<0.1	-	[98%]
Oxygenated Compounds						
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1	<0.1	-	<0.1
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	100	95	-	98
d4-1,2-dichloroethane (Surrogate)	%	-	101	97	-	95
d8-toluene (Surrogate)	%	-	104	102	-	99
Bromofluorobenzene (Surrogate)	%	-	105	106	-	119
Totals						
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	-	-
Total BTEX*	mg/kg	-	0	0	-	-
Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434						
TRH C6-C9	mg/kg	20	<20	<20	-	-
Surrogates						
Trifluorotoluene (Surrogate)	%	-	76	87	-	-
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403						
TRH C10-C14	mg/kg	20	<20	<20	-	-
TRH C15-C28	mg/kg	50	<50	<50	-	-
TRH C29-C40	mg/kg	150	<150	<150	-	-
Surrogates						
TRH (Surrogate)	%	-	-	-	-	-
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420						
Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	-	-
Acenaphthene	mg/kg	0.1	<0.1	<0.1	-	-
Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
Phenanthrene	mg/kg	0.1	<0.1	<0.1	-	-
Anthracene	mg/kg	0.1	<0.1	<0.1	-	-
Fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
Pyrene	mg/kg	0.1	<0.1	<0.1	-	-
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
Benzo(b)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	-	-

Parameter	Units	LOR	Sample Number: SE105013.001 Sample Matrix: Soil Sample Date: 27 Jan 2012 Sample Name: BH101_0.1-0.2	SE105013.002 Soil 27 Jan 2012 Duplicate D101	SE105013.003 Water 27 Jan 2012 Rinsate R1	SE105013.004 Soil 27 Jan 2012 Tripspike TS1
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 (continued)						
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
Total PAH	mg/kg	0.8	<0.8	<0.8	-	-
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	87	101	-	-
2-fluorobiphenyl (Surrogate)	%	-	99	110	-	-
d14-p-terphenyl (Surrogate)	%	-	104	110	-	-
OC Pesticides in Soil Method: AN400/AN420						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	-	-
Alpha BHC	mg/kg	0.1	<0.1	<0.1	-	-
Lindane	mg/kg	0.1	<0.1	<0.1	-	-
Heptachlor	mg/kg	0.1	<0.1	<0.1	-	-
Aldrin	mg/kg	0.1	<0.1	<0.1	-	-
Beta BHC	mg/kg	0.1	<0.1	<0.1	-	-
Delta BHC	mg/kg	0.1	<0.1	<0.1	-	-
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	-	-
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	-	-
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
Dieldrin	mg/kg	0.05	<0.05	<0.05	-	-
Endrin	mg/kg	0.2	<0.2	<0.2	-	-
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	-
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	-
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	-	-
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	-	-
Methoxychlor	mg/kg	0.1	<0.1	<0.1	-	-
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	-	-

Parameter	Units	LOR	Sample Number: SE105013.001 Sample Matrix: Soil Sample Date: 27 Jan 2012 Sample Name: BH101_0.1-0.2	SE105013.002 Soil 27 Jan 2012 Duplicate D101	SE105013.003 Water 27 Jan 2012 Rinsate R1	SE105013.004 Soil 27 Jan 2012 Tripspike TS1
OC Pesticides in Soil Method: AN400/AN420 (continued)						
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	128	128	-	-
PCBs in Soil Method: AN400/AN420						
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-	-
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-	-
Total PCBs (Arochlors)	mg/kg	1	<1	<1	-	-
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	128	128	-	-
Total Phenolics in Soil Method: AN289						
Total Phenols	mg/kg	0.1	0.2	0.1	-	-
Total Cyanide in soil by Discrete Analyser (Aquakem) Method: AN077/AN287						
Total Cyanide	mg/kg	0.1	<0.1	<0.1	-	-
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320						
Arsenic, As	mg/kg	3	4	3	-	-
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	-	-
Chromium, Cr	mg/kg	0.3	5.8	4.5	-	-
Copper, Cu	mg/kg	0.5	3.1	5.1	-	-
Lead, Pb	mg/kg	1	3	2	-	-
Nickel, Ni	mg/kg	0.5	1.9	2.6	-	-
Zinc, Zn	mg/kg	0.5	5.2	7.3	-	-
Mercury in Soil Method: AN312						
Mercury	mg/kg	0.05	<0.05	<0.05	-	-
VOCs in Water Method: AN433/AN434						
Monocyclic Aromatic Hydrocarbons						
Benzene	µg/L	0.5	-	-	<0.5	-
Toluene	µg/L	0.5	-	-	<0.5	-
Ethylbenzene	µg/L	0.5	-	-	<0.5	-
m/p-xylene	µg/L	1	-	-	<1	-
o-xylene	µg/L	0.5	-	-	<0.5	-

Parameter	Units	LOR	Sample Number	SE105013.001	SE105013.002	SE105013.003	SE105013.004
			Sample Matrix	Soil	Soil	Water	Soil
			Sample Date	27 Jan 2012	27 Jan 2012	27 Jan 2012	27 Jan 2012
			Sample Name	BH101_0.1-0.2	Duplicate D101	Rinsate R1	Tripspike TS1
VOCs in Water Method: AN433/AN434 (continued)							
Oxygenated Compounds							
MtBE (Methyl-tert-butyl ether)	µg/L	0.5		-	-	<0.5	-
Surrogates							
Dibromofluoromethane (Surrogate)	%	-		-	-	96	-
d4-1,2-dichloroethane (Surrogate)	%	-		-	-	99	-
d8-toluene (Surrogate)	%	-		-	-	96	-
Bromofluorobenzene (Surrogate)	%	-		-	-	100	-
Totals							
Total Xylenes	µg/L	1.5		-	-	<1.5	-
Total BTEX	µg/L	3		-	-	<3	-
Volatile Petroleum Hydrocarbons in Water Method: AN433/AN434							
TRH C6-C9	µg/L	40		-	-	99	-
Surrogates							
Trifluorotoluene (Surrogate)	%	-		-	-	96	-
Dibromofluoromethane (Surrogate)	%	-		-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-		-	-	-	-
d8-toluene (Surrogate)	%	-		-	-	-	-
Bromofluorobenzene (Surrogate)	%	-		-	-	-	-
TRH (Total Recoverable Hydrocarbons) in Water Method: AN403							
TRH C10-C14	µg/L	100		-	-	<100	-
TRH C15-C28	µg/L	200		-	-	<200	-
TRH C29-C40	µg/L	400		-	-	<400	-
Surrogates							
TRH (Surrogate)	%	-		-	-	-	-
PAH (Polynuclear Aromatic Hydrocarbons) in Water Method: AN420							
Naphthalene	µg/L	0.1		-	-	<0.1	-
2-methylnaphthalene	µg/L	0.1		-	-	<0.1	-
1-methylnaphthalene	µg/L	0.1		-	-	<0.1	-
Acenaphthylene	µg/L	0.1		-	-	<0.1	-
Acenaphthene	µg/L	0.1		-	-	<0.1	-
Fluorene	µg/L	0.1		-	-	<0.1	-
Phenanthrene	µg/L	0.1		-	-	<0.1	-
Anthracene	µg/L	0.1		-	-	<0.1	-
Fluoranthene	µg/L	0.1		-	-	<0.1	-
Pyrene	µg/L	0.1		-	-	<0.1	-
Benzo(a)anthracene	µg/L	0.1		-	-	<0.1	-
Chrysene	µg/L	0.1		-	-	<0.1	-
Benzo(b)fluoranthene	µg/L	0.1		-	-	<0.1	-
Benzo(k)fluoranthene	µg/L	0.1		-	-	<0.1	-
Benzo(a)pyrene	µg/L	0.1		-	-	<0.1	-
Indeno(1,2,3-cd)pyrene	µg/L	0.1		-	-	<0.1	-
Dibenzo(a&h)anthracene	µg/L	0.1		-	-	<0.1	-
Benzo(ghi)perylene	µg/L	0.1		-	-	<0.1	-
Total PAH (18)	µg/L	1		-	-	<1	-

Parameter	Units	LOR	Sample Number: SE105013.001 Sample Matrix: Soil Sample Date: 27 Jan 2012 Sample Name: BH101_0.1-0.2	SE105013.002 Soil 27 Jan 2012 Duplicate D101	SE105013.003 Water 27 Jan 2012 Rinsate R1	SE105013.004 Soil 27 Jan 2012 Tripspike TS1
PAH (Polynuclear Aromatic Hydrocarbons) in Water Method: AN420 (continued)						
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	-	-	71	-
2-fluorobiphenyl (Surrogate)	%	-	-	-	79	-
d14-p-terphenyl (Surrogate)	%	-	-	-	106	-
Metals in Water (Dissolved) by ICPOES Method: AN320/AN321						
Arsenic, As	mg/L	0.05	-	-	<0.05	-
Cadmium, Cd	mg/L	0.005	-	-	<0.005	-
Chromium, Cr	mg/L	0.005	-	-	<0.005	-
Copper, Cu	mg/L	0.01	-	-	<0.01	-
Lead, Pb	mg/L	0.02	-	-	<0.02	-
Nickel, Ni	mg/L	0.01	-	-	<0.01	-
Zinc, Zn	mg/L	0.01	-	-	<0.01	-
Mercury (dissolved) in Water Method: AN311/AN312						
Mercury	mg/L	0.0001	-	-	<0.0001	-
Moisture Content Method: AN234						
% Moisture	%	0.5	22	14	-	-

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Mercury (dissolved) in Water Method: ME-(AU)-[ENV]AN311/AN312

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB013240	mg/L	0.0001	<0.0001	0%	115%	109%

Mercury in Soil Method: ME-(AU)-[ENV]AN312

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB013289	mg/kg	0.05	<0.05	0%	106%	93%

Metals in Water (Dissolved) by ICPOES Method: ME-(AU)-[ENV]AN320/AN321

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Arsenic, As	LB013223	mg/L	0.05	<0.05	0%	96%
Cadmium, Cd	LB013223	mg/L	0.005	<0.005	0%	99%
Chromium, Cr	LB013223	mg/L	0.005	<0.005	0%	97%
Copper, Cu	LB013223	mg/L	0.01	<0.01	0%	97%
Lead, Pb	LB013223	mg/L	0.02	<0.02	0%	98%
Nickel, Ni	LB013223	mg/L	0.01	<0.01	0%	98%
Zinc, Zn	LB013223	mg/L	0.01	<0.01	0%	99%

Moisture Content Method: ME-(AU)-[ENV]AN234

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB013245	%	0.5	2 - 7%

OC Pesticides in Soil Method: ME-(AU)-[ENV]AN400/AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Hexachlorobenzene (HCB)	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
Alpha BHC	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
Lindane	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
Heptachlor	LB013151	mg/kg	0.1	<0.1	0%	120%	75%
Aldrin	LB013151	mg/kg	0.1	<0.1	0%	130%	75%
Beta BHC	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
Delta BHC	LB013151	mg/kg	0.1	<0.1	0%	120%	70%
Heptachlor epoxide	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
o,p'-DDE	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
Alpha Endosulfan	LB013151	mg/kg	0.2	<0.2	0%	NA	NA
Gamma Chlordane	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
Alpha Chlordane	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
trans-Nonachlor	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
p,p'-DDE	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
Dieldrin	LB013151	mg/kg	0.05	<0.05	0%	120%	70%
Endrin	LB013151	mg/kg	0.2	<0.2	0%	120%	80%
o,p'-DDD	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
o,p'-DDT	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
Beta Endosulfan	LB013151	mg/kg	0.2	<0.2	0%	NA	NA
p,p'-DDD	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
p,p'-DDT	LB013151	mg/kg	0.1	<0.1	0%	80%	85%
Endosulfan sulphate	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
Endrin Aldehyde	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
Methoxychlor	LB013151	mg/kg	0.1	<0.1	0%	NA	NA
Endrin Ketone	LB013151	mg/kg	0.1	<0.1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB013151	%	-	125%	0 - 15%	95%	73%

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB013154	mg/kg	0.1	<0.1	0%	113%	110%
2-methylnaphthalene	LB013154	mg/kg	0.1	<0.1	0%	NA	NA
1-methylnaphthalene	LB013154	mg/kg	0.1	<0.1	0%	NA	NA
Acenaphthylene	LB013154	mg/kg	0.1	<0.1	0%	114%	113%
Acenaphthene	LB013154	mg/kg	0.1	<0.1	0%	120%	125%
Fluorene	LB013154	mg/kg	0.1	<0.1	0%	NA	NA
Phenanthrene	LB013154	mg/kg	0.1	<0.1	0 - 86%	116%	115%
Anthracene	LB013154	mg/kg	0.1	<0.1	0%	123%	122%
Fluoranthene	LB013154	mg/kg	0.1	<0.1	46 - 52%	120%	113%
Pyrene	LB013154	mg/kg	0.1	<0.1	43 - 57%	124%	104%
Benzo(a)anthracene	LB013154	mg/kg	0.1	<0.1	0 - 43%	NA	NA
Chrysene	LB013154	mg/kg	0.1	<0.1	0 - 31%	NA	NA
Benzo(b)fluoranthene	LB013154	mg/kg	0.1	<0.1	24 - 26%	NA	NA
Benzo(k)fluoranthene	LB013154	mg/kg	0.1	<0.1	0 - 40%	NA	NA
Benzo(a)pyrene	LB013154	mg/kg	0.1	<0.1	0 - 27%	119%	116%
Indeno(1,2,3-cd)pyrene	LB013154	mg/kg	0.1	<0.1	0 - 24%	NA	NA
Dibenzo(a&h)anthracene	LB013154	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(ghi)perylene	LB013154	mg/kg	0.1	<0.1	0 - 27%	NA	NA
Total PAH	LB013154	mg/kg	0.8	<0.8	0 - 41%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d5-nitrobenzene (Surrogate)	LB013154	%	-	95%	1 - 4%	98%	126%
2-fluorobiphenyl (Surrogate)	LB013154	%	-	109%	2 - 3%	111%	109%
d14-p-terphenyl (Surrogate)	LB013154	%	-	115%	0 - 6%	114%	118%

PAH (Polynuclear Aromatic Hydrocarbons) in Water Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Naphthalene	LB013144	µg/L	0.1	<0.1	91%
2-methylnaphthalene	LB013144	µg/L	0.1	<0.1	NA
1-methylnaphthalene	LB013144	µg/L	0.1	<0.1	NA
Acenaphthylene	LB013144	µg/L	0.1	<0.1	103%
Acenaphthene	LB013144	µg/L	0.1	<0.1	113%
Fluorene	LB013144	µg/L	0.1	<0.1	NA
Phenanthrene	LB013144	µg/L	0.1	<0.1	121%
Anthracene	LB013144	µg/L	0.1	<0.1	109%
Fluoranthene	LB013144	µg/L	0.1	<0.1	119%
Pyrene	LB013144	µg/L	0.1	<0.1	120%
Benzo(a)anthracene	LB013144	µg/L	0.1	<0.1	NA
Chrysene	LB013144	µg/L	0.1	<0.1	NA
Benzo(b)fluoranthene	LB013144	µg/L	0.1	<0.1	NA
Benzo(k)fluoranthene	LB013144	µg/L	0.1	<0.1	NA
Benzo(a)pyrene	LB013144	µg/L	0.1	<0.1	118%
Indeno(1,2,3-cd)pyrene	LB013144	µg/L	0.1	<0.1	NA
Dibenzo(a&h)anthracene	LB013144	µg/L	0.1	<0.1	NA
Benzo(ghi)perylene	LB013144	µg/L	0.1	<0.1	NA
Total PAH (18)	LB013144	µg/L	1	<1	

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
d5-nitrobenzene (Surrogate)	LB013144	%	-	108%	98%
2-fluorobiphenyl (Surrogate)	LB013144	%	-	101%	101%
d14-p-terphenyl (Surrogate)	LB013144	%	-	112%	116%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

PCBs in Soil Method: ME-(AU)-[ENV]AN400/AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arochlor 1016	LB013151	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1221	LB013151	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1232	LB013151	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1242	LB013151	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1248	LB013151	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1254	LB013151	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1260	LB013151	mg/kg	0.2	<0.2	0%	129%	78%
Arochlor 1262	LB013151	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1268	LB013151	mg/kg	0.2	<0.2	0%	NA	NA
Total PCBs (Arochlors)	LB013151	mg/kg	1	<1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB013151	%	-	125%	0 - 15%	72%	73%

Total Cyanide in soil by Discrete Analyser (Aquakem) Method: ME-(AU)-[ENV]AN077/AN287

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery	MSD %RPD
Total Cyanide	LB013182	mg/kg	0.1	<0.1	97%	NA

Total Phenolics in Soil Method: ME-(AU)-[ENV]AN289

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MSD %RPD
Total Phenols	LB013123	mg/kg	0.1	<0.1	18%	90%	NA

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: ME-(AU)-[ENV]AN040/AN320

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB013286	mg/kg	3	<3	0 - 12%	98%	72%
Cadmium, Cd	LB013286	mg/kg	0.3	<0.3	0%	103%	81%
Chromium, Cr	LB013286	mg/kg	0.3	<0.3	0 - 1%	100%	75%
Copper, Cu	LB013286	mg/kg	0.5	<0.5	1 - 12%	102%	81%
Lead, Pb	LB013286	mg/kg	1	<1	6 - 9%	102%	69%
Nickel, Ni	LB013286	mg/kg	0.5	<0.5	0 - 7%	102%	79%
Zinc, Zn	LB013286	mg/kg	0.5	<0.5	3 - 4%	102%	78%

TRH (Total Recoverable Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
TRH C10-C14	LB013149	mg/kg	20	<20	103%
TRH C15-C28	LB013149	mg/kg	50	<50	98%
TRH C29-C40	LB013149	mg/kg	150	<150	NA

TRH (Total Recoverable Hydrocarbons) in Water Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
TRH C10-C14	LB013144	µg/L	100	<100	93%
TRH C15-C28	LB013144	µg/L	200	<200	94%
TRH C29-C40	LB013144	µg/L	400	<400	NA

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

VOC's in Soil Method: ME-(AU)-[ENV]AN433/AN434

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Benzene	LB013141	mg/kg	0.1	<0.1	90%
Toluene	LB013141	mg/kg	0.1	<0.1	90%
Ethylbenzene	LB013141	mg/kg	0.1	<0.1	90%
m/p-xylene	LB013141	mg/kg	0.2	<0.2	92%
o-xylene	LB013141	mg/kg	0.1	<0.1	96%

Oxygenated Compounds

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
MIBE (Methyl-tert-butyl ether)	LB013141	mg/kg	0.1	<0.1	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Dibromofluoromethane (Surrogate)	LB013141	%	-	103%	102%
d4-1,2-dichloroethane (Surrogate)	LB013141	%	-	106%	103%
d8-toluene (Surrogate)	LB013141	%	-	101%	101%
Bromofluorobenzene (Surrogate)	LB013141	%	-	96%	108%

Totals

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Total Xylenes*	LB013141	mg/kg	0.3	<0.3	NA
Total BTEX*	LB013141	mg/kg	-	0	NA

VOCs in Water Method: ME-(AU)-[ENV]AN433/AN434

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Benzene	LB013388	µg/L	0.5	<0.5	98%
Toluene	LB013388	µg/L	0.5	<0.5	93%
Ethylbenzene	LB013388	µg/L	0.5	<0.5	93%
m/p-xylene	LB013388	µg/L	1	<1	89%
o-xylene	LB013388	µg/L	0.5	<0.5	97%

Oxygenated Compounds

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
MIBE (Methyl-tert-butyl ether)	LB013388	µg/L	0.5	<0.5	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Dibromofluoromethane (Surrogate)	LB013388	%	-	96%	99%
d4-1,2-dichloroethane (Surrogate)	LB013388	%	-	93%	101%
d8-toluene (Surrogate)	LB013388	%	-	98%	99%
Bromofluorobenzene (Surrogate)	LB013388	%	-	83%	111%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Volatile Petroleum Hydrocarbons in Soil Method: ME-(AU)-[ENV]AN433/AN434

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
TRH C6-C9	LB013141	mg/kg	20	<20	111%

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Trifluorotoluene (Surrogate)	LB013141	%	-	101%	90%

Volatile Petroleum Hydrocarbons in Water Method: ME-(AU)-[ENV]AN433/AN434

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
TRH C6-C9	LB013388	µg/L	40	<40	102%

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Trifluorotoluene (Surrogate)	LB013388	%	-	98%	71%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analsysis by ASS or ICP as per USEPA Method 200.8.
AN083	Separatory funnels are used for aqueous samples and extracted by transferring an appropriate volume (mass) of liquid into a separatory funnel and adding 3 serial aliquots of dichloromethane. Samples receive a single extraction at pH 7 to recover base / neutral analytes and two extractions at pH < 2 to recover acidic analytes. QC samples are prepared by spiking organic free water with target analytes and extracting as per samples.
AN088	Orbital rolling for Organic pollutants are extracted from soil/sediment by transferring an appropriate mass of sample to a clear soil jar and extracting with 1:1 Dichloromethane/Acetone. Orbital Rolling method is intended for the extraction of semi-volatile organic compounds from soil/sediment samples, and is based somewhat on USEPA method 3570 (Micro Organic extraction and sample preparation). Method 3700.
AN234	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN311/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN320/AN321	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components.
AN320/AN321	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with diffential polarity of the elluent solvents.

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependant on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433/AN434	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

IS	Insufficient sample for analysis.	QFH	QC result is above the upper tolerance
LNR	Sample listed, but not received.	QFL	QC result is below the lower tolerance
*	This analysis is not covered by the scope of accreditation.	-	The sample was not analysed for this analyte
^	Performed by outside laboratory.	NVL	Not Validated
LOR	Limit of Reporting		
↑↓	Raised or Lowered Limit of Reporting		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

STATEMENT OF QA/QC PERFORMANCE

SE105013 R0

CLIENT DETAILS

Contact	John Xu
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Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12593/2 - Mona Vale**
Order Number	(Not specified)
Samples	4

LABORATORY DETAILS

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SGS Reference	SE105013 R0
Report Number	0000017501
Date Reported	07 Feb 2012

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS Environmental Services' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Matrix Spike	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest	1 item

SAMPLE SUMMARY

Sample counts by matrix	3 Soils, 1 Water	Type of documentation received	COC
Date documentation received	30/1/12@3:18pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	3.9°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE105013 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Mercury (dissolved) in Water — Method: ME-(AU)-[ENV]AN311/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE105013.003	LB013240	27 Jan 2012	27 Jan 2012	24 Feb 2012	01 Feb 2012	24 Feb 2012	02 Feb 2012

Mercury in Soil — Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE105013.001	LB013289	27 Jan 2012	27 Jan 2012	24 Feb 2012	02 Feb 2012	24 Feb 2012	02 Feb 2012
Duplicate D101	SE105013.002	LB013289	27 Jan 2012	27 Jan 2012	24 Feb 2012	02 Feb 2012	24 Feb 2012	02 Feb 2012

Metals in Water (Dissolved) by ICPOES — Method: ME-(AU)-[ENV]AN320/AN321

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE105013.003	LB013223	27 Jan 2012	27 Jan 2012	25 Jul 2012	01 Feb 2012	25 Jul 2012	01 Feb 2012

Moisture Content — Method: ME-(AU)-[ENV]AN234

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE105013.001	LB013245	27 Jan 2012	27 Jan 2012	10 Feb 2012	01 Feb 2012	06 Feb 2012	02 Feb 2012
Duplicate D101	SE105013.002	LB013245	27 Jan 2012	27 Jan 2012	10 Feb 2012	01 Feb 2012	06 Feb 2012	02 Feb 2012

OC Pesticides in Soil — Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE105013.001	LB013151	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	03 Feb 2012
Duplicate D101	SE105013.002	LB013151	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	03 Feb 2012

PAH (Polynuclear Aromatic Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE105013.001	LB013154	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	03 Feb 2012
Duplicate D101	SE105013.002	LB013154	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	03 Feb 2012

PAH (Polynuclear Aromatic Hydrocarbons) in Water — Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE105013.003	LB013144	27 Jan 2012	27 Jan 2012	03 Feb 2012	31 Jan 2012	11 Mar 2012	03 Feb 2012

PCBs in Soil — Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE105013.001	LB013151	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	03 Feb 2012
Duplicate D101	SE105013.002	LB013151	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	03 Feb 2012

Total Cyanide in soil by Discrete Analyser (Aquakem) — Method: ME-(AU)-[ENV]AN077/AN287

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE105013.001	LB013182	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	10 Feb 2012	01 Feb 2012
Duplicate D101	SE105013.002	LB013182	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	10 Feb 2012	01 Feb 2012

Total Phenolics in Soil — Method: ME-(AU)-[ENV]AN280

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE105013.001	LB013123	27 Jan 2012	27 Jan 2012	24 Feb 2012	31 Jan 2012	24 Feb 2012	31 Jan 2012
Duplicate D101	SE105013.002	LB013123	27 Jan 2012	27 Jan 2012	24 Feb 2012	31 Jan 2012	24 Feb 2012	31 Jan 2012

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest — Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE105013.001	LB013286	27 Jan 2012	27 Jan 2012	25 Jul 2012	02 Feb 2012	25 Jul 2012	03 Feb 2012
Duplicate D101	SE105013.002	LB013286	27 Jan 2012	27 Jan 2012	25 Jul 2012	02 Feb 2012	25 Jul 2012	03 Feb 2012

TRH (Total Recoverable Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE105013.001	LB013149	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	03 Feb 2012
Duplicate D101	SE105013.002	LB013149	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	03 Feb 2012

TRH (Total Recoverable Hydrocarbons) in Water — Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE105013.003	LB013144	27 Jan 2012	27 Jan 2012	03 Feb 2012	31 Jan 2012	11 Mar 2012	03 Feb 2012

VOC's in Soil — Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref

HOLDING TIME SUMMARY

SE105013 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or Red with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

VOC's in Soil (continued) — Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE105013.001	LB013141	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	07 Feb 2012
Duplicate D101	SE105013.002	LB013141	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	07 Feb 2012
Tripspike TS1	SE105013.004	LB013141	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	07 Feb 2012

VOCs in Water — Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE105013.003	LB013388	27 Jan 2012	27 Jan 2012	03 Feb 2012	03 Feb 2012	14 Mar 2012	03 Feb 2012

Volatile Petroleum Hydrocarbons in Soil — Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH101_0.1-0.2	SE105013.001	LB013141	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	07 Feb 2012
Duplicate D101	SE105013.002	LB013141	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	07 Feb 2012
Tripspike TS1	SE105013.004	LB013141	27 Jan 2012	27 Jan 2012	10 Feb 2012	31 Jan 2012	11 Mar 2012	07 Feb 2012

Volatile Petroleum Hydrocarbons in Water — Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate R1	SE105013.003	LB013388	27 Jan 2012	27 Jan 2012	03 Feb 2012	03 Feb 2012	14 Mar 2012	03 Feb 2012

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or Red with an appended dagger symbol (†) when outside suggested criteria.

OC Pesticides in Soil — Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH101_0.1-0.2	SE105013.001	%	60 - 130%	128
	Duplicate D101	SE105013.002	%	60 - 130%	128

PAH (Polynuclear Aromatic Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH101_0.1-0.2	SE105013.001	%	60 - 130%	99
	Duplicate D101	SE105013.002	%	60 - 130%	110
d14-p-terphenyl (Surrogate)	BH101_0.1-0.2	SE105013.001	%	60 - 130%	104
	Duplicate D101	SE105013.002	%	60 - 130%	110
d5-nitrobenzene (Surrogate)	BH101_0.1-0.2	SE105013.001	%	60 - 130%	87
	Duplicate D101	SE105013.002	%	60 - 130%	101

PAH (Polynuclear Aromatic Hydrocarbons) in Water — Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	Rinsate R1	SE105013.003	%	40 - 130%	79
d14-p-terphenyl (Surrogate)	Rinsate R1	SE105013.003	%	40 - 130%	106
d5-nitrobenzene (Surrogate)	Rinsate R1	SE105013.003	%	40 - 130%	71

PCBs in Soil — Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH101_0.1-0.2	SE105013.001	%	60 - 130%	128
	Duplicate D101	SE105013.002	%	60 - 130%	128

VOC's in Soil — Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH101_0.1-0.2	SE105013.001	%	60 - 130%	105
	Duplicate D101	SE105013.002	%	60 - 130%	106
	Tripspike TS1	SE105013.004	%	60 - 130%	119
d4-1,2-dichloroethane (Surrogate)	BH101_0.1-0.2	SE105013.001	%	60 - 130%	101
	Duplicate D101	SE105013.002	%	60 - 130%	97
	Tripspike TS1	SE105013.004	%	60 - 130%	95
d8-toluene (Surrogate)	BH101_0.1-0.2	SE105013.001	%	60 - 130%	104
	Duplicate D101	SE105013.002	%	60 - 130%	102
	Tripspike TS1	SE105013.004	%	60 - 130%	99
Dibromofluoromethane (Surrogate)	BH101_0.1-0.2	SE105013.001	%	60 - 130%	100
	Duplicate D101	SE105013.002	%	60 - 130%	95
	Tripspike TS1	SE105013.004	%	60 - 130%	98

VOCs in Water — Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	Rinsate R1	SE105013.003	%	60 - 130%	100
d4-1,2-dichloroethane (Surrogate)	Rinsate R1	SE105013.003	%	40 - 130%	99
d8-toluene (Surrogate)	Rinsate R1	SE105013.003	%	60 - 130%	96
Dibromofluoromethane (Surrogate)	Rinsate R1	SE105013.003	%	60 - 130%	96

Volatile Petroleum Hydrocarbons in Soil — Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Trifluorotoluene (Surrogate)	BH101_0.1-0.2	SE105013.001	%	60 - 130%	76
	Duplicate D101	SE105013.002	%	60 - 130%	87

Volatile Petroleum Hydrocarbons in Water — Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Trifluorotoluene (Surrogate)	Rinsate R1	SE105013.003	%	40 - 130%	96

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or Red with an appended dagger symbol (†) when outside suggested criteria.

Mercury (dissolved) in Water — Method: ME-(AU)-[ENV]AN311/AN312

Sample Number	Parameter	Units	LOR	Result
LB013240.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil — Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB013289.001	Mercury	mg/kg	0.05	<0.05

Metals in Water (Dissolved) by ICPOES — Method: ME-(AU)-[ENV]AN320/AN321

Sample Number	Parameter	Units	LOR	Result
LB013223.001	Arsenic, As	mg/L	0.05	<0.05
	Cadmium, Cd	mg/L	0.005	<0.005
	Chromium, Cr	mg/L	0.005	<0.005
	Copper, Cu	mg/L	0.01	<0.01
	Lead, Pb	mg/L	0.02	<0.02
	Nickel, Ni	mg/L	0.01	<0.01
	Zinc, Zn	mg/L	0.01	<0.01

OC Pesticides in Soil — Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result
LB013151.001	Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
	Alpha BHC	mg/kg	0.1	<0.1
	Lindane	mg/kg	0.1	<0.1
	Heptachlor	mg/kg	0.1	<0.1
	Aldrin	mg/kg	0.1	<0.1
	Beta BHC	mg/kg	0.1	<0.1
	Delta BHC	mg/kg	0.1	<0.1
	Heptachlor epoxide	mg/kg	0.1	<0.1
	Alpha Endosulfan	mg/kg	0.2	<0.2
	Gamma Chlordane	mg/kg	0.1	<0.1
	Alpha Chlordane	mg/kg	0.1	<0.1
	p,p'-DDE	mg/kg	0.1	<0.1
	Dieldrin	mg/kg	0.05	<0.05
	Endrin	mg/kg	0.2	<0.2
	Beta Endosulfan	mg/kg	0.2	<0.2
	p,p'-DDD	mg/kg	0.1	<0.1
	p,p'-DDT	mg/kg	0.1	<0.1
	Endosulfan sulphate	mg/kg	0.1	<0.1
	Endrin Aldehyde	mg/kg	0.1	<0.1
	Methoxychlor	mg/kg	0.1	<0.1
	Endrin Ketone	mg/kg	0.1	<0.1
Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	125

PAH (Polynuclear Aromatic Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN42

Sample Number	Parameter	Units	LOR	Result
LB013154.001	Naphthalene	mg/kg	0.1	<0.1
	2-methylnaphthalene	mg/kg	0.1	<0.1
	1-methylnaphthalene	mg/kg	0.1	<0.1
	Acenaphthylene	mg/kg	0.1	<0.1
	Acenaphthene	mg/kg	0.1	<0.1
	Fluorene	mg/kg	0.1	<0.1
	Phenanthrene	mg/kg	0.1	<0.1
	Anthracene	mg/kg	0.1	<0.1
	Fluoranthene	mg/kg	0.1	<0.1
	Pyrene	mg/kg	0.1	<0.1
	Benzo(a)anthracene	mg/kg	0.1	<0.1
	Chrysene	mg/kg	0.1	<0.1
	Benzo(a)pyrene	mg/kg	0.1	<0.1
	Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
	Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1
	Benzo(ghi)perylene	mg/kg	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in Green when within suggested criteria or Red with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB013154.001		Total PAH	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	95
		2-fluorobiphenyl (Surrogate)	%	-	109
		d14-p-terphenyl (Surrogate)	%	-	115

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB013144.001		Naphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Acenaphthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1
		Pyrene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Benzo(a)pyrene	µg/L	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		Dibenzo(a&h)anthracene	µg/L	0.1	<0.1
		Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	108
		2-fluorobiphenyl (Surrogate)	%	-	101
		d14-p-terphenyl (Surrogate)	%	-	112

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB013151.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	125

Total Cyanide in soil by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Number	Parameter	Units	LOR	Result
LB013182.001	Total Cyanide	mg/kg	0.1	<0.1

Total Phenolics in Soil

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result
LB013123.001	Total Phenols	mg/kg	0.1	<0.1

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB013286.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in Green when within suggested criteria or Red with an appended dagger symbol (†) when outside suggested criteria.

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB013149.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	50	<50

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB013144.001	TRH C10-C14	µg/L	100	<100
	TRH C15-C28	µg/L	200	<200

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result
LB013141.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Oxygenated Compounds	MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	103
		d4-1,2-dichloroethane (Surrogate)	%	-	106
		d8-toluene (Surrogate)	%	-	101
		Bromofluorobenzene (Surrogate)	%	-	96
	Totals	Total BTEX*	mg/kg	-	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result
LB013141.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Trifluorotoluene (Surrogate)	%	-	101

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result
LB013388.001		TRH C6-C9	µg/L	40	<40
	Surrogates	Trifluorotoluene (Surrogate)	%	-	98

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or Red with an appended dagger symbol (†) when outside suggested criteria.

Mercury (dissolved) in Water — Method: ME-(AU)-[ENV]AN311/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE105013.003	LB013240.013	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	0

Mercury in Soil — Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE105002.015	LB013289.014	Mercury	mg/kg	0.05	<0.05	<0.05	147	0
SE105046A.029	LB013289.023	Mercury	mg/kg	0.05	<0.05	<0.05	200	0

Metals in Water (Dissolved) by ICPOES — Method: ME-(AU)-[ENV]AN320/AN321

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE105013.003	LB013223.011	Arsenic, As	mg/L	0.05	<0.05	<0.05	200	0
		Cadmium, Cd	mg/L	0.005	<0.005	<0.005	200	0
		Chromium, Cr	mg/L	0.005	<0.005	<0.005	200	0
		Copper, Cu	mg/L	0.01	<0.01	<0.01	200	0
		Lead, Pb	mg/L	0.02	<0.02	<0.02	200	0
		Nickel, Ni	mg/L	0.01	<0.01	<0.01	200	0
		Zinc, Zn	mg/L	0.01	<0.01	<0.01	200	0

Moisture Content — Method: ME-(AU)-[ENV]AN234

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE105035.002	LB013245.011	% Moisture	%	0.5	4.90654205605	5.2427184466	40	7
SE105040.002	LB013245.022	% Moisture	%	0.5	22.458270106	22.9074889867	32	2
SE105040.003	LB013245.024	% Moisture	%	0.5	15.0375939849	5.2777777777	33	2

OC Pesticides in Soil — Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE104976.009	LB013151.004		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Lindane	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor	mg/kg	0.1	<0.1	<0.1	200	0
			Aldrin	mg/kg	0.1	<0.1	<0.1	200	0
			Beta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Delta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Dieldrin	mg/kg	0.05	<0.2	<0.2	200	0
			Endrin	mg/kg	0.2	<0.2	<0.2	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	200	0
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	130	130	30	0
SE105002.011	LB013151.016		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Lindane	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor	mg/kg	0.1	<0.1	<0.1	200	0
			Aldrin	mg/kg	0.1	<0.1	<0.1	200	0
			Beta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Delta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or Red with an appended dagger symbol (†) when outside suggested criteria.

OC Pesticides in Soil (continued) — Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE105002.011	LB013151.016	o,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
		Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
		Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
		Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
		trans-Nonachlor	mg/kg	0.1	0	0	200	0
		p,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
		Dieldrin	mg/kg	0.05	<0.2	<0.2	200	0
		Endrin	mg/kg	0.2	<0.2	<0.2	200	0
		o,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
		o,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
		Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
		p,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
		p,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
		Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	200	0
		Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	200	0
		Methoxychlor	mg/kg	0.1	<0.1	<0.1	200	0
		Endrin Ketone	mg/kg	0.1	0	0	200	0
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	130	110	30	15

PAH (Polynuclear Aromatic Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE105001.001	LB013154.004	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
		Phenanthrene	mg/kg	0.1	0.1	0.3	87	86
		Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluoranthene	mg/kg	0.1	0.4	0.6	52	46
		Pyrene	mg/kg	0.1	0.4	0.6	51	43
		Benzo(a)anthracene	mg/kg	0.1	0.2	0.3	73	43
		Chrysene	mg/kg	0.1	0.2	0.3	74	31
		Benzo(b)fluoranthene	mg/kg	0.1	0.3	0.4	60	24
		Benzo(k)fluoranthene	mg/kg	0.1	0.1	0.2	97	40
		Benzo(a)pyrene	mg/kg	0.1	0.3	0.3	63	27
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.2	0.2	89	24
		Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(ghi)perylene	mg/kg	0.1	0.2	0.3	75	27
		Total PAH	mg/kg	0.8	1.8	2.7	65	41
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	94.0	95.0	30	1
		2-fluorobiphenyl (Surrogate)	%	-	109.0	106.0	30	3
		d14-p-terphenyl (Surrogate)	%	-	108.0	102.0	30	6
SE105002.013	LB013154.016	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
		Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
		Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluoranthene	mg/kg	0.1	<0.1	0.2	107	52
		Pyrene	mg/kg	0.1	0.1	0.2	101	57
		Benzo(a)anthracene	mg/kg	0.1	<0.1	0.1	200	0
		Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(b)fluoranthene	mg/kg	0.1	<0.1	0.1	125	26
		Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)pyrene	mg/kg	0.1	<0.1	0.1	200	0
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or Red with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued) — Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE105002.013	LB013154.016		Total PAH	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	%	-	98.0	94.0	30	4
			2-fluorobiphenyl (Surrogate)	%	-	108.0	106.0	30	2
			d14-p-terphenyl (Surrogate)	%	-	109.0	109.0	30	0

PCBs in Soil — Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE104976.009	LB013151.004		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	130	130	30	0
SE105002.011	LB013151.016		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	130	110	30	15

Total Phenolics in Soil — Method: ME-(AU)-[ENV]AN289

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE104939.001	LB013123.006	Total Phenols	mg/kg	0.1	0.2	0.2	63	18

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest — Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE105013.001	LB013286.014	Arsenic, As	mg/kg	3	4	3	117	12
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	5.8	5.7	35	1
		Copper, Cu	mg/kg	0.5	3.1	3.5	45	12
		Lead, Pb	mg/kg	1	3	3	63	9
		Nickel, Ni	mg/kg	0.5	1.9	2.1	55	7
		Zinc, Zn	mg/kg	0.5	5.2	5.4	39	4
SE105063.001	LB013286.024	Arsenic, As	mg/kg	3	13.2863211063	3.2566970595	53	0
		Cadmium, Cd	mg/kg	0.3	0.04056548530	0.0448060511	200	0
		Chromium, Cr	mg/kg	0.3	3.21299290963	2.2308096020	39	0
		Copper, Cu	mg/kg	0.5	0.62501362460	0.6187636420	110	1
		Lead, Pb	mg/kg	1	1.29244827021	1.3775617165	105	6
		Nickel, Ni	mg/kg	0.5	2.18365328912	1.8562737210	53	0
		Zinc, Zn	mg/kg	0.5	2.53213654792	2.4468310702	50	3

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or Red with an appended dagger symbol (†) when outside suggested criteria.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013240.002	Mercury	mg/L	0.0001	0.0092	0.008	80 - 120	115

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013289.002	Mercury	mg/kg	0.05	0.21	0.2	70 - 130	106

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320/AN321

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013223.002	Arsenic, As	mg/L	0.05	1.9	2	80 - 120	96
	Cadmium, Cd	mg/L	0.005	2.0	2	80 - 120	99
	Chromium, Cr	mg/L	0.005	1.9	2	80 - 120	97
	Copper, Cu	mg/L	0.01	1.9	2	80 - 120	97
	Lead, Pb	mg/L	0.02	2.0	2	80 - 120	98
	Nickel, Ni	mg/L	0.01	2.0	2	80 - 120	98
	Zinc, Zn	mg/L	0.01	2.0	2	80 - 120	99

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013151.002	Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	120
	Aldrin	mg/kg	0.1	0.3	0.2	60 - 140	130
	Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	120
	Dieldrin	mg/kg	0.05	0.24	0.2	60 - 140	120
	Endrin	mg/kg	0.2	0.2	0.2	60 - 140	120
	p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	80
Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	95	100	60 - 140	95

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013154.002	Naphthalene	mg/kg	0.1	4.5	4	60 - 140	113
	Acenaphthylene	mg/kg	0.1	4.6	4	60 - 140	114
	Acenaphthene	mg/kg	0.1	4.8	4	60 - 140	120
	Phenanthrene	mg/kg	0.1	4.6	4	60 - 140	116
	Anthracene	mg/kg	0.1	4.9	4	60 - 140	123
	Fluoranthene	mg/kg	0.1	4.8	4	60 - 140	120
	Pyrene	mg/kg	0.1	5.0	4	60 - 140	124
	Benzo(a)pyrene	mg/kg	0.1	4.7	4	60 - 140	119
Surrogates	d5-nitrobenzene (Surrogate)	%	-	98.0	100	60 - 140	98
	2-fluorobiphenyl (Surrogate)	%	-	111.0	100	60 - 140	111
	d14-p-terphenyl (Surrogate)	%	-	114.0	100	60 - 140	114

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN42

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013144.002	Naphthalene	µg/L	0.1	36	40	60 - 140	91
	Acenaphthylene	µg/L	0.1	41	40	60 - 140	103
	Acenaphthene	µg/L	0.1	45	40	60 - 140	113
	Phenanthrene	µg/L	0.1	49	40	60 - 140	121
	Anthracene	µg/L	0.1	44	40	60 - 140	109
	Fluoranthene	µg/L	0.1	48	40	60 - 140	119
	Pyrene	µg/L	0.1	48	40	60 - 140	120
	Benzo(a)pyrene	µg/L	0.1	47	40	60 - 140	118
Surrogates	d5-nitrobenzene (Surrogate)	%	-	98.0	100	60 - 140	98
	2-fluorobiphenyl (Surrogate)	%	-	101.0	100	60 - 140	101
	d14-p-terphenyl (Surrogate)	%	-	116.0	100	60 - 140	116

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN4

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013151.002	Arochlor 1260	mg/kg	0.2	0.5	0.4	60 - 140	129
Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	72	100	60 - 140	72

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or Red with an appended dagger symbol (†) when outside suggested criteria.

Total Cyanide in soil by Discrete Analyser (Aquakem) — Method: ME-(AU)-[ENV]AN077/AN287

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013182.002	Total Cyanide	mg/kg	0.1	0.2	0.25	70 - 130	97

Total Phenolics in Soil — Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013123.002	Total Phenols	mg/kg	0.1	2.3	2.5	70 - 130	90

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest — Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013286.002	Arsenic, As	mg/kg	3	49	50	80 - 120	98
	Cadmium, Cd	mg/kg	0.3	51	50	80 - 120	103
	Chromium, Cr	mg/kg	0.3	50	50	80 - 120	100
	Copper, Cu	mg/kg	0.5	51	50	80 - 120	102
	Lead, Pb	mg/kg	1	51	50	80 - 120	102
	Nickel, Ni	mg/kg	0.5	51	50	80 - 120	102
	Zinc, Zn	mg/kg	0.5	51	50	80 - 120	102

TRH (Total Recoverable Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013149.002	TRH C10-C14	mg/kg	20	41	40	60 - 140	103
	TRH C15-C28	mg/kg	50	<50	40	60 - 140	98

TRH (Total Recoverable Hydrocarbons) in Water — Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013144.002	TRH C10-C14	µg/L	100	1100	1200	60 - 140	93
	TRH C15-C28	µg/L	200	1100	1200	60 - 140	94

VOC's in Soil — Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013141.002	Monocyclic Aromatic	Benzene	mg/kg	0.1	2.7	3	60 - 140	90
		Toluene	mg/kg	0.1	2.7	3	60 - 140	90
		Ethylbenzene	mg/kg	0.1	2.7	3	60 - 140	90
		m/p-xylene	mg/kg	0.2	5.4	5.9	60 - 140	92
		o-xylene	mg/kg	0.1	2.8	2.9	60 - 140	96
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	102.0	100	60 - 140	102
		d4-1,2-dichloroethane (Surrogate)	%	-	103.0	100	60 - 140	103
		d8-toluene (Surrogate)	%	-	101.0	100	60 - 140	101
		Bromofluorobenzene (Surrogate)	%	-	108.0	100	60 - 140	108

VOCs in Water — Method: ME-(AU)-[ENV]AN433/AN43

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013388.002	Monocyclic Aromatic	Benzene	µg/L	0.5	44	45.45	60 - 140	98
		Toluene	µg/L	0.5	42	45.45	60 - 140	93
		Ethylbenzene	µg/L	0.5	42	45.45	60 - 140	93
		m/p-xylene	µg/L	1	81	90.9	60 - 140	89
		o-xylene	µg/L	0.5	44	45.45	60 - 140	97

Volatile Petroleum Hydrocarbons in Soil — Method: ME-(AU)-[ENV]AN433/AN43

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013141.002	TRH C6-C9	mg/kg	20	27	24.4	60 - 140	111

Volatile Petroleum Hydrocarbons in Water — Method: ME-(AU)-[ENV]AN433/AN43

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB013388.002	TRH C6-C9	µg/L	40	840	827	60 - 140	102

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub -sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE104964.001	LB013240.004	Mercury	mg/L	0.0001	0.0087	0.0078	0.008	109

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE105002.006	LB013289.004	Mercury	mg/kg	0.05	0.23	<0.05	0.2	93

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE104976.021	LB013151.006	Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	-	-
		Alpha BHC	mg/kg	0.1	<0.1	<0.1	-	-
		Lindane	mg/kg	0.1	<0.1	<0.1	-	-
		Heptachlor	mg/kg	0.1	0.2	<0.1	0.2	75
		Aldrin	mg/kg	0.1	0.2	<0.1	0.2	75
		Beta BHC	mg/kg	0.1	<0.1	<0.1	-	-
		Delta BHC	mg/kg	0.1	0.1	<0.1	0.2	70
		Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	-	-
		o,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
		Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
		Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
		Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
		trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	-	-
		p,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
		Dieldrin	mg/kg	0.05	0.14	<0.2	0.2	70
		Endrin	mg/kg	0.2	<0.2	<0.2	0.2	80
		o,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
		o,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	-
		Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
		p,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
		p,p'-DDT	mg/kg	0.1	0.2	<0.1	0.2	85
		Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	-	-
		Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	-	-
		Methoxychlor	mg/kg	0.1	<0.1	<0.1	-	-
		Endrin Ketone	mg/kg	0.1	<0.1	<0.1	-	-
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	73	130	100	73

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN42

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE105001.003	LB013154.007	Naphthalene	mg/kg	0.1	4.4	<0.1	4	110
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Acenaphthylene	mg/kg	0.1	4.5	<0.1	4	113
		Acenaphthene	mg/kg	0.1	5.0	<0.1	4	125
		Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
		Phenanthrene	mg/kg	0.1	4.7	0.1	4	115
		Anthracene	mg/kg	0.1	4.9	<0.1	4	122
		Fluoranthene	mg/kg	0.1	4.9	0.4	4	113
		Pyrene	mg/kg	0.1	4.5	0.4	4	104
		Benzo(a)anthracene	mg/kg	0.1	<0.1	0.2	-	-
		Chrysene	mg/kg	0.1	<0.1	0.2	-	-
		Benzo(b)fluoranthene	mg/kg	0.1	<0.1	0.3	-	-
		Benzo(k)fluoranthene	mg/kg	0.1	<0.1	0.2	-	-
		Benzo(a)pyrene	mg/kg	0.1	4.9	0.3	4	116
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0.2	-	-
		Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
		Benzo(ghi)perylene	mg/kg	0.1	<0.1	0.2	-	-
		Total PAH	mg/kg	0.8	38	1.9	-	-
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	126.0	99.0	100	126
		2-fluorobiphenyl (Surrogate)	%	-	109.0	105.0	100	109

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub -sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or Red with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued) — Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE105001.003	LB013154.007	Surrogates	d14-p-terphenyl (Surrogate)	%	-	118.0	103.0	100	118

PCBs in Soil — Method: ME-(AU)-[ENV]AN400/AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE104976.022	LB013151.007		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1260	mg/kg	0.2	0.3	<0.2	0.4	78
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-	-
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	73	71	100	73

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest — Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE105002.013	LB013286.004		Arsenic, As	mg/kg	3	40	4	50	72
			Cadmium, Cd	mg/kg	0.3	41	<0.3	50	81
			Chromium, Cr	mg/kg	0.3	65	27	50	75
			Copper, Cu	mg/kg	0.5	51	11	50	81
			Lead, Pb	mg/kg	1	57	23	50	69 ⑧
			Nickel, Ni	mg/kg	0.5	46	6.1	50	79
			Zinc, Zn	mg/kg	0.5	65	26	50	78

MATRIX SPIKE DUPLICATES

SE105013 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or Red with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Cyanide in soil by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

QC Sample	Sample Number	Parameter	Units	LOR	Duplicate
SE105002.001	LB013182.004	Total Cyanide	mg/kg	0.1	0.5

Total Phenolics in Soil

Method: ME-(AU)-[ENV]AN289

QC Sample	Sample Number	Parameter	Units	LOR	Duplicate
SE104976.005	LB013123.012	Total Phenols	mg/kg	0.1	2.4

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here:
http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf

*	Non-accredited analysis.
-	Sample not analysed for this analyte.
^	Analysis performed by external laboratory.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.
①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	Refer to Analytical Report comments for further information.

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
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email: info@geotech.com.au

TO: SGS ENVIRONMENTAL SERVICES
UNIT 16
33 MADDOX STREET
ALEXANDRIA NSW 2015

PH: 02 8594 0400 FAX: 02 8594 0499

ATTN: MS ANGELA MAMALICOS

Sampling By: AN

Job No: 12593/2

Project:

Project Manager: JX

Location: Mona Vale

Results required by: Friday 3 February 2012 (Normal TAT)

	Sampling details			Sample type										
	Location	Depth (m)	Date	Time	Soil	Water	Heavy Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	TOTAL PHENOLS	TOTAL CYANIDES	BTEX		KEEP SAMPLE
1	BH101	0.1-0.2	27/01/2012	-	SG		✓	✓	✓	✓	✓	✓	✓			YES
	BH101	0.25-0.35	27/01/2012	-	SG											YES
	BH101	0.7-0.8	27/01/2012	-	SG											YES
2	Duplicate D101	-	27/01/2012	-	SG		✓	✓	✓	✓	✓	✓	✓			YES
3	Rinsate R1	-	27/01/2012	-		WG	✓	✓	✓					✓		YES
4	Tripspike TS1	-		-	-											

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	30/01/2012			

Legend:
WG Water sample, glass bottle
WP Water sample, plastic bottle
SG Soil sample (glass jar)
SP Soil sample (plastic bag)
✓ Test required
* Purge & Trap

SAMPLE RECEIPT ADVICE

SE105013

CLIENT DETAILS

Contact	John Xu
Client	Geotechnique
Address	P.O. Box 880 PENRITH NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	john.xu@geotech.com.au
Project	**12593/2 - Mona Vale**
Order Number	(Not specified)
Samples	4

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Fri 27/1/2012
Report Due	Fri 3/2/2012
SGS Reference	**SE105013**

SUBMISSION DETAILS

This is to confirm that 4 samples were received on Friday 27/1/2012. Results are expected to be ready by Friday 3/2/2012. Please quote SGS reference SE105013 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	3 Soils, 1 Water	Type of documentation received	COC
Date documentation received	30/1/12@3:18pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	3.9°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

SAMPLE RECEIPT ADVICE

SE105013

CLIENT DETAILS

Client	Geotechnique	Project	12593/2 - Mona Vale

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in	PCBs in Soil	Total Cyanide in soil by Discrete Analyser	Total Phenolics in Soil	Total Recoverable Metals in Soil by ICPOES from	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	BH101_0.1-0.2	26	22	11	1	1	7	4	12	6
002	Duplicate D101	26	22	11	1	1	7	4	12	6
004	Tripspike TS1	-	-	-	-	-	-	-	12	-

CONTINUED OVERLEAF

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

SAMPLE RECEIPT ADVICE

SE105013

CLIENT DETAILS

Client	Geotechnique	Project	12593/2 - Mona Vale

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	Mercury in Soil	Metals in Water (Dissolved) by ICPOES	Moisture Content	PAH (Polynuclear Aromatic Hydrocarbons) in	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	BH101_0.1-0.2	-	1	-	1	-	-	-	-
002	Duplicate D101	-	1	-	1	-	-	-	-
003	Rinsate R1	1	-	7	-	22	4	12	6

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 68251

Client:
Geotechnique Pty Ltd
PO Box 880
Penrith
NSW 2751

Attention: John XU

Sample log in details:

Your Reference:	**12593/1, Mona Vale**
No. of samples:	1 Soil
Date samples received / completed instructions received	30/01/12 / 30/01/12

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:	3/02/12 / 3/02/12
Date of Preliminary Report:	Not Issued

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Nancy Zhang	Rhian Morgan	Nick Sarlamis
Chemist	Reporting Supervisor	Inorganics Supervisor

vTRH & BTEX in Soil		
Our Reference:	UNITS	68251-1
Your Reference	----------	S101
Date Sampled	----------	27/01/12
Type of sample		Soil
Date extracted	-	31/01/2012
Date analysed	-	01/02/2012
vTRH C_6 - C_9	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	91

sTRH in Soil (C10-C36)		
Our Reference:	UNITS	68251-1
Your Reference	----------	S101
Date Sampled	----------	27/01/12
Type of sample		Soil
Date extracted	-	31/01/2012
Date analysed	-	31/01/2012
$TRHC_{10}$ - C_{14}	mg/kg	<50
$TRHC_{15}$ - C_{28}	mg/kg	<100
$TRHC_{29}$ - C_{36}	mg/kg	<100
Surrogate o-Terphenyl	%	90

PAHs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ---------- 	68251-1 S101 27/01/12 Soil
Date extracted	-	31/01/2012
Date analysed	-	01/02/2012
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Surrogate p-Terphenyl-d_{14}	%	87

Organochlorine Pesticides Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ---------- 	68251-1 S101 27/01/12 Soil
Date extracted	-	31/01/2012
Date analysed	-	02/02/2012
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
DDE	mg/kg	<0.2
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
DDD	mg/kg	<0.2
Endosulfan II	mg/kg	<0.1
DDT	mg/kg	<0.2
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Surrogate TCLMX	%	88

PCBs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ---------- 	68251-1 S101 27/01/12 Soil
Date extracted	-	31/01/2012
Date analysed	-	02/02/2012
Arochlor 1016	mg/kg	<0.1
Arochlor 1221	mg/kg	<0.1
Arochlor 1232	mg/kg	<0.1
Arochlor 1242	mg/kg	<0.1
Arochlor 1248	mg/kg	<0.1
Arochlor 1254	mg/kg	<0.1
Arochlor 1260	mg/kg	<0.1
Surrogate TCLMX	%	88

Total Phenolics in Soil		
Our Reference:	UNITS	68251-1
Your Reference	----------	S101
Date Sampled	----------	27/01/12
Type of sample		Soil
Date extracted	-	01/02/2012
Date analysed	-	01/02/2012
Total Phenolics (as Phenol)	mg/kg	<5

Acid Extractable metals in soil		
Our Reference:	UNITS	68251-1
Your Reference	----------	S101
Date Sampled	----------	27/01/12
Type of sample		Soil
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.5
Chromium	mg/kg	5
Copper	mg/kg	5
Lead	mg/kg	2
Mercury	mg/kg	<0.1
Nickel	mg/kg	3
Zinc	mg/kg	5

Miscellaneous Inorg - soil		
Our Reference:	UNITS	68251-1
Your Reference	----------	S101
Date Sampled	----------	27/01/12
Type of sample		Soil
Date prepared	-	31/01/2012
Date analysed	-	31/01/2012
Total Cyanide	mg/kg	<0.5

Moisture		
Our Reference:	UNITS	68251-1
Your Reference	----------	S101
Date Sampled	----------	27/01/12
Type of sample		Soil
Date prepared	-	31/01/2012
Date analysed	-	01/02/2012
Moisture	%	18

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.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Inorg-030	Total Phenolics - determined colorimetrically following disitillation, based upon APHA 21st ED 5530 D.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-013	Cyanide - total determined colourimetrically after distillation, based on APHA 21st ED, 4500-CN_C,E. Free cyanide determined colourimetrically after filtration.
Inorg-008	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.

QUALITY CONTROL vTRH & BTEX in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/01/2012	[NT]	[NT]	LCS-2	31/01/20
Date analysed	-			01/02/2012	[NT]	[NT]	LCS-2	01/02/20
vTRH C_6 - C_9	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-2	102%
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	LCS-2	104%
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	LCS-2	103%
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-2	102%
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	LCS-2	101%
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-2	103%
Surrogate aaa-Trifluorotoluene	%		Org-016	93	[NT]	[NT]	LCS-2	106%

QUALITY CONTROL sTRH in Soil (C10-C36)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/01/2012	[NT]	[NT]	LCS-2	31/01/20
Date analysed	-			31/01/2012	[NT]	[NT]	LCS-2	31/01/20
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-2	133%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-2	127%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-2	113%
Surrogate o-Terphenyl	%		Org-003	97	[NT]	[NT]	LCS-2	137%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/01/2012	[NT]	[NT]	LCS-2	31/01/20
Date analysed	-			01/02/2012	[NT]	[NT]	LCS-2	01/02/20
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-2	121%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-2	113%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-2	111%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-2	111%
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-2	113%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-2	115%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	[NT]	[NT]	LCS-2	123%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		Org-012 subset	91	[NT]	[NT]	LCS-2	105%
QUALITY CONTROL Organochlorine Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/01/2012	[NT]	[NT]	LCS-2	31/01/20
Date analysed	-			01/02/2012	[NT]	[NT]	LCS-2	01/02/20
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	119%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	126%
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	114%
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	105%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	119%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
DDE	mg/kg	0.2	Org-005	<0.2	[NT]	[NT]	LCS-2	130%
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	122%
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	120%
DDD	mg/kg	0.2	Org-005	<0.2	[NT]	[NT]	LCS-2	138%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
DDT	mg/kg	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	121%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-005	98	[NT]	[NT]	LCS-2	99%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/01/2012	[NT]	[NT]	LCS-2	31/01/20
Date analysed	-			01/02/2012	[NT]	[NT]	LCS-2	01/02/20
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	LCS-2	124%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	98	[NT]	[NT]	LCS-2	103%
QUALITY CONTROL Total Phenolics in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			01/02/2012	[NT]	[NT]	LCS-1	01/02/20
Date analysed	-			01/02/2012	[NT]	[NT]	LCS-1	01/02/20
Total Phenolics (as Phenol)	mg/kg	5	Inorg-030	<5	[NT]	[NT]	LCS-1	111%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	LCS-2	107%
Cadmium	mg/kg	0.5	Metals-020 ICP-AES	<0.5	[NT]	[NT]	LCS-2	108%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-2	105%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-2	108%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-2	106%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	LCS-2	116%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-2	106%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-2	107%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			31/01/2012	[NT]	[NT]	LCS-1	31/01/20
Date analysed	-			31/01/2012	[NT]	[NT]	LCS-1	31/01/20
Total Cyanide	mg/kg	0.5	Inorg-013	<0.5	[NT]	[NT]	LCS-1	106%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			[NT]
Date analysed	-			[NT]
Moisture	%	0.1	Inorg-008	[NT]

Report Comments:

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

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

Quality Control Definitions

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

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

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

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

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

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

Job No: 68 251
Date Received: 30.01.12
Time Received: 15:05
Received by: DL
Temp: Cool/Ambient
Cooling: Ice/Gel Packs
Security: Intact/Broken/None

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750

P O Box 880
PENRITH NSW 2751

Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO: ENVIROLAB SERVICES PTY LD
12 ASHLEY STREET
CHATSWOOD NSW 2067

PH: 02 9910 6200 FAX: 02 9910 6201

ATTN: AILEEN HIE

Sampling By: AN
Job No: 12593/1
Project:
Project Manager: JX
Location: Mona Vale

Results required by: Friday 3 February 2012 (Normal TAT)

Sampling details				Sample type											
Location	Depth (m)	Date	Time	Soil	Water	Heavy Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn	TPH* & BTEX	PAH	OCP	PCB	TOTAL PHENOLS	TOTAL CYANIDES			KEEP SAMPLE
						Combination 9									
S101	-	27/01/2012	-	SG											YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
JOHN XU	jx	30/01/2012	D. Kondrowska	DL	30.01.12

Legend:
WG Water sample, glass bottle
WP Water sample, plastic bottle
SG Soil sample (glass jar)
SP Soil sample (plastic bag)
✓ Test required
* Purge & Trap

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client:
Geotechnique Pty Ltd
PO Box 880
Penrith NSW 2751

ph: 02 4722 2700
Fax: 02 4722 6161

Attention: John XU

Sample log in details:

Your reference:	**12593/1, Mona Vale**
Envirolab Reference:	**68251**
Date received:	30/01/12
Date results expected to be reported:	**3/02/12**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	1 Soil
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice Pack

Comments:
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples.

Contact details:
Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

ATTACHMENT D

ENVIRONMENTAL NOTES

IMPORTANT INFORMATION REGARDING YOUR ENVIRONMENTAL SITE ASSESSMENT

These notes have been prepared by Geotechnique Pty Ltd, using guidelines prepared by the ASFE (Associated Soil and Foundation Engineers). The notes are offered to assist in the interpretation of your environmental site assessment report.

REASONS FOR AN ENVIRONMENTAL ASSESSMENT

Environmental site assessments are typically, though not exclusively, performed in the following circumstances:

- As a pre-acquisition assessment on behalf of a purchaser or a vendor, when a property is to be sold
- As a pre-development assessment, when a property or area of land is to be redeveloped, or the land use has changed, e.g. from a factory to a residential subdivision
- As a pre-development assessment of greenfield sites, to establish baseline conditions and assess environmental, geological and hydrological constraints to the development of e.g. a landfill
- As an audit of the environmental effects of previous and present site usage

Each circumstance requires a specific approach to assessment of soil and groundwater contamination. In all cases the objective is to identify and if possible quantify the risks that unrecognised contamination poses to the ongoing proposed activity. Such risks may be financial (clean-up costs or limitations in site use) and physical (health risks to site users or the public).

ENVIRONMENTAL SITE ASSESSMENT LIMITATIONS

Although information provided by an environmental site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment might not detect all contamination within a site. Contaminants could be present in areas that were not surveyed or sampled, or migrate to areas that did not show signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant that may occur; only the most likely contaminants are screened.

AN ENVIRONMENTAL SITE ASSESSMENT REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS

In the following events and in order to avoid cost problems, you should ask your consultant to assess any changes in the conclusion and recommendations made in the assessment:

- When the nature of the proposed development is changed e.g. if a residential development is proposed, rather than a commercial development
- When the size or configuration of the proposed development is altered e.g. if a basement is added
- When the location or orientation of the proposed structure is modified
- When there is a change of land ownership, or
- For application to an adjacent site

ENVIRONMENTAL SITE ASSESSMENT FINDINGS ARE PROFESSIONAL ESTIMATES

Site assessment identifies actual sub-surface conditions only at those points where samples are taken, when they are taken. Data obtained from the sampling and subsequent laboratory analyses are interpreted by geologists, engineers or scientists and opinions are drawn about the overall sub-surface conditions, the nature and extent of contamination, the likely impact on any proposed development and appropriate remediation measures. Actual conditions may differ from those inferred, because no professional, no matter how qualified and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, however, steps can be taken to help minimise the impact. For this reason site owners should retain the services of their consultants throughout the development stages of the project in order to identify variances, conduct additional tests that may be necessary and to recommend solutions to problems encountered on site.

Soil and groundwater contamination is a field in which legislation and interpretation of legislation by government departments is changing rapidly. Whilst every attempt is made by Geotechnique Pty Ltd to be familiar with current policy, our interpretation of the investigation findings should not be taken to be that of the relevant authority. When approval from a statutory authority is required for a project, approval should be directly sought.

STABILITY OF SUB-SURFACE CONDITIONS
Sub-surface conditions can change by natural processes and site activities. As an environmental site assessment is based on conditions existing at the time of the investigation, project decisions should not be based on environmental site assessment data that may have been affected by time. The consultant should be requested to advise if additional tests are required.

ENVIRONMENTAL SITE ASSESSMENTS ARE PERFORMED FOR SPECIFIC PURPOSES AND CLIENTS
Environmental site assessments are prepared in response to a specific scope of work required to meet the specific needs of specific individuals e.g. an assessment prepared for a consulting civil engineer may not be adequate to a construction contractor or another consulting civil engineer.

An assessment should not be used by other persons for any purpose or by the client for a different purpose. No individual, other than the client, should apply an assessment, even for its intended purpose, without first conferring with the consultant. No person should apply an assessment for any purpose other than that originally contemplated, without first conferring with the consultant.

MISINTERPRETATION OF ENVIRONMENTAL SITE ASSESSMENTS
Costly problems can occur when design professionals develop plans based on misinterpretation of an environmental site assessment. In order to minimise problems, the environmental consultant should be retained to work with appropriate design professionals, to explain relevant findings and to review the adequacy of plans and specifications relative to contamination issues.

LOGS SHOULD NOT BE SEPARATED FROM THE REPORT
Borehole and test pit logs are prepared by environmental scientists, engineers or geologists, based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these would not be redrawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however, contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. Should this occur, delays and disputes, or unanticipated costs may result.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of sub-surface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations, such as contractors.

READ RESPONSIBILITY CLAUSES CLOSELY
An environmental site assessment is based extensively on judgement and opinion; therefore, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. In order to aid in prevention of this problem, model clauses have been developed for use in written transmittals. These are definitive clauses, designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment and you are encouraged to read them closely. Your consultant will be happy to give full and frank answers to any questions you may have.