Douglas Partners
Geotechnics • Environment • Groundwater

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REPORT
on
PHASE 2 CONTAMINATION ASSESSMENT

STAGE 1 - PROPOSED COCHLEAR GLOBAL HEADQUARTERS PROJECT
MACQUARIE UNIVERSITY CAMPUS, SOUTH PRECINCT

Prepared for
LACHLAN PROJECT DEVELOPMENT PTY LTD

Project 45298.02
June 2008

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PROPOSED COCHLEAR GLOBAL HEADQUARTERS
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1. INTRODUCTION

This report details the methodology and results of a Phase 2 Contamination Assessment undertaken by Douglas Partners Pty Ltd (DP), at the proposed global headquarters for Lachlan Project Development Pty Ltd, located on University Avenue, Macquarie University Campus, South Precinct. The investigation was commissioned by Lachlan Project Development Pty Ltd.

It is understood that the proposed development will include the construction of a six to seven-storey building with two levels of basement car parking. The lowest basement level (RL 58.3) may require excavation to a nominal depth of 10 m in the north-western corner of the site reducing to 3 m on the south-eastern corner of the site.

A geotechnical assessment and a Phase 1 Contamination Assessment of the site were undertaken previously in March 2008 by DP and the findings were presented in reports entitled *Report on Geotechnical Investigation* (DP reference 45298) and *Report on Phase 1 Contamination Assessment* (DP reference 45298.01) respectively.

The Phase 1 investigation included a review of available site history information and a limited soil and groundwater sampling and analytical programme targeting a range of common contaminants. Based on the site observations and the analytical results of the

Phase 1 Contamination Assessment, DP considered that the potential for contamination associated with the site is very low and the site is suitable for the proposed development from a chemical contamination perspective. However, it was noted that the adopted sampling regime, whilst appropriate for a Phase 1 assessment, did not meet the sampling density recommended by DECC to "characterise" the contamination status of the site. To meet the sampling density specified by DECC for site characterisation, a Phase 2 Contamination Assessment was thus undertaken, including additional soil and ground/surface water sampling and analysis.

The current Phase 2 investigation includes a review of the Phase 1 Contamination assessment findings, a supplementary soil and groundwater sampling and analytical programme targeting a range of common contaminants. The report presents the findings of the investigation and provides comments relating to the degree and extent of soil and groundwater contamination and the suitability of the site for the proposed development. This report also provides an *in situ* waste classification of the materials encountered.

2. SCOPE OF WORKS

The scope of the Phase 2 Contamination Assessment was as follows:-

- Drill 13 test bores using a solid flight auger to a nominal depth of 3 m, or prior refusal, Collect soil/filling samples from the 13 bores at broadly regular intervals, at changes in the strata or upon signs of contamination.
- Installation of two groundwater piezometers within the site to provide a supplementary assessment with respect to potential groundwater contamination ;
- Conduct laboratory analysis on selected soil samples (including 10% QA/QC) at a NATA accredited analytical laboratory for a combination of the following potential contaminants:
  - Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
  - Total recoverable hydrocarbons (TRH);
  - Monocyclic aromatic hydrocarbons (benzene, toluene, ethylbenzene and xylene – BTEX);

- Polycyclic aromatic hydrocarbons (PAH);
- Volatile Organic Compounds (VOCs);
- Phenols;
- Polychlorinated biphenyls (PCB);
- Organochlorine pesticides (OCP);
- Asbestos;
- TCLP (heavy metals, PAH) on selected samples for waste classification purposes.

- Groundwater sampling following well development and purging and analysis including the following potential contaminants
  - Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
  - TPH;
  - BTEX;
  - PAH;
  - VOCs;
  - Phenols;
  - PCB;
  - OCP;
  - pH; and
  - Hardness.
- Collection of three surface water samples from the up-, mid- and down-stream sections of the water course running along the south-eastern border of the site. The surface water samples were analysed for the same contaminants as per the groundwater samples.
- Provision of a Phase 2 Contamination Assessment Report, providing comments on the recorded level of contamination in the subsoils and groundwater and the suitability of the site for the proposed development. This report also includes a final waste classification of the materials encountered.
- Store remaining soil samples not analysed for a period of one month pending the need for further analysis.

3. SITE DESCRIPTION

3.1 Site Identification

The proposed development (referred to as 'the site' in this report) covers an area of approximately 12600 m^2 and is located on the eastern side of a larger triangular land parcel, which covers an area of approximately 34,000 m^2. It is noted that the boundary of the site has been finetuned and modified since the Phase 1 Contamination Assessment, such that the area of investigation was reduced from 1.9 ha to 1.26 ha. As a result, three of the test bores (Bore 2A, 14 and 17) drilled in the Phase 1 Assessment were located slightly off the modified southern boundary of the site. Having said that, given the proximity of these test bores to the site and the consistent nature of the subsurface conditions of the on-site bores it is considered that these slightly off-site test bores are still relevant to the current assessment. The large triangular area is identified as Lots 181-182 in Deposited Plan 1112777 and the site is part of the above mentioned Lots. A locality map is shown in Drawing 1 in Appendix A.

3.2 Site Description

The site is bounded by University Avenue to the north, the 'Gumnut Cottage' childcare centre to the west, the 'Waratah Occasional Care Centre' to the south and vacant grass covered land further to the south and east. An open water-course runs along the south-eastern boundary.

The site and surrounding area are located on a gentle south-east-facing hill which generally falls towards the water-course. Within the site, the ground surface generally falls to the south-east from approximately RL 69.0 to RL 61.0, relative to Australian Height Datum (AHD), at an average slope of approximately 2 to 3 degrees. Along the south-eastern boundary of the site the surface falls more steeply towards the water course at an average slope of approximately 10 degrees.

At the time of the investigation the site was generally covered with an asphaltic concrete paved car park, operated by Macquarie University. Based on the borehole data and topography it appears that the car park surface has been formed by previous filling on the down-slope (south-eastern) side of the site and possibly some excavation on the upslope (north-western) side of the site. A mound approximately 2 m to 3 m high is located along the northern boundary (adjacent to University Drive) and a mound approximately 2 m high is located at the south-eastern section of the site.

4. GEOLOGY

Reference to the Sydney 1:100 000 Series Geological Sheet indicates the site is underlain by Ashfield Shale and is close to the boundary with Hawkesbury Sandstone to the north and east of site. Ashfield Shale generally comprises black to dark grey shale and laminite (interbedded shale, siltstone and fine grained sandstone) and typically weathers to form clays of medium to high plasticity. Hawkesbury Sandstone generally comprises medium to coarse grained quartz sandstone with some shale bands or lenses. The geological mapping was confirmed by the field work which identified residual soils then laminite overlying sandstone bedrock. The laminite may be part of the Mittagong Formation which is a transitional rock unit between the Ashfield Shale and Hawkesbury Sandstone.

5. PHASE 1 CONTAMINATION ASSESSMENT FINDINGS

The scope of work for the Phase 1 contamination assessment comprised a site walkover inspection, review of site history, a limited soil and groundwater sampling regime and preliminary assessment of the material to be excavated for the purpose of potential reuse or disposal.

A review of historical information indicated that the site was previously located in a rural/agricultural area. Prior to the establishment of Macquarie University in 1967 the site was used for agricultural purposes possibly including orchard, market gardens and poultry farming since at least 1930. Since the establishment of Macquarie University all structures

related to the market gardens, farm sheds and orchards have been removed. The current site and surrounding land uses were not considered to possess significant risk in terms of the potential to adversely impact the site. The potential for contamination was generally considered to be low which was confirmed by the low level of contaminants in the samples analysed. There were no exceedances of the Site Assessment Criteria (SAC) [viz. the HIL for commercial/industrial sites] and the Provisional Phototoxicity Investigation Levels (PPIL) used for assessing the landscaped areas. The detected contaminant levels were also within the published background levels for the underlying natural clay material

Due to the likely former use of the site for poultry farming, there was a theoretical potential for biohazards associated with microbial impacts. However, no signs of poultry farm waste (e.g. carcasses) were noted in any part of the site.

A review of the Prospect/Parramatta River *Acid Sulphate Soils Risk Map* (Edition 2, DLWC, 1997) indicated that the site is located in an area of 'no known acid sulphate soil'. This is consistent with the geological characteristics observed and the high elevation of the site. The potential for Acid Sulphate Soils (ASS) to be present on site was therefore considered low.

Groundwater laboratory results for cadmium, chromium, copper and zinc exceeded the Groundwater Investigation levels (GIL). However, the detected levels were not considered to be significant as the chromium, copper and cadmium exceedances were only marginal. Zinc is commonly detected at levels above the ANZECC (2000) Guidelines in groundwater, particularly in urbanised areas, and it is considered that the elevated zinc concentration represented a residual background concentration.

Soil samples assessed against the Waste Classification Guidelines indicate that the fill material was provisionally classified as Inert Waste for the purposes of off-site disposal. Sample analysis in conjunction with on-site observations and bore records indicated that the material below the filling is natural and would be classifiable as VENM.

It was recommended that the actual waste classification of the material should be verified/checked prior to and/or during site excavation.

On the basis of the investigation findings, DP considered that the potential for contamination associated with the site is very low and the site is suitable for the proposed development from a chemical contamination perspective. However, it was noted that the Phase 1 Assessment adopted sampling regime did not technically meet the sampling density recommended by DECC to "characterise" the contamination status of the site. To meet the sampling density specified by DECC for site characterisation, additional soil and ground/surface water sampling and analyses were recommended.

6. POTENTIAL CONTAMINANTS

The potential soil contaminants on the subject site are likely to be associated with:

- The former agricultural uses of the site including market gardens, orchards and poultry farming. "Surficial application" of pesticides may have been conducted in agricultural areas.
- In addition, due to the likely former use of the site for poultry farming, there is a theoretical potential for biohazards associated with microbial impacts. The scope of the current assessment does not include the evaluation of biohazards. Having said this, no signs of poultry farm waste (e.g. carcasses) were noted in any of the test pits excavated in both assessments.
- Petroleum hydrocarbons associated with the storage of fuels for the use of plant and equipment are also potential contaminants (although there were no records of dangerous goods storage).
- Disturbance of the site associated with the development of Macquarie University and the time lapse since the previous agricultural uses ceased operation is likely to have reduced the overall impact.
- Another potential source of contamination is the filling of unknown origin used to form/landscape the site and to form the watercourse and parkland along the eastern boundary.

A broad range of commonly found organic and inorganic compounds were included in the analytical suite for soil, as follows:

- Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Total Petroleum Hydrocarbons (TPH);
- Monocyclic Aromatic Hydrocarbons (Benzene, Toluene, Ethylbenzene and Xylene – BTEX);
- Volatile Organic Compounds (VOCs);
- Polychlorinated Biphenyls (PCB);
- Phenols;
- Organochlorine Pesticides (OCP);
- Asbestos.

Similarly, the following suite of chemical contaminants for groundwater and surface water was assessed:

- Heavy metals;
- PAH;
- TPH;
- BTEX;
- VOCs
- Phenols;
- PCB;
- OCP;
- pH, hardness.

7. FIELD WORK

7.1 Data Quality Objectives

The data quality objectives (DQO) of the Preliminary Contamination Assessment have been developed to define the type and quality of the data to achieve the project objectives and were based broadly in accordance with the seven step data quality objective process, as defined in Australian Standard (AS) *Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-volatile and Semi-volatile Compounds* (AS 4482.1 – 2005). The DQO process is outlined in the AS and defined by:

- Stating the Problem;
- Identifying the Decision;
- Identifying Inputs to the Decision;
- Defining the Boundary of the Assessment;
- Developing a Decision Rule;
- Specifying Acceptable Limits on Decision Errors;
- Optimising the Design for Obtaining Data.

Data Quality Indicators (DQI) have been established for the project are summarised in Table 1.

Table 1 – Data Quality Indicators

Data Quality Objective	Report section where addressed
State the Problem	S1 Introduction S3 Site Description
Identify the Decision	S8 Site Assessment Criteria S10 Assessment of Laboratory Results S11 Conclusions and Recommendations
Identify Inputs to the Decision	S3 Site Description S4 Geology S6 Potential Contaminants S8 Site Assessment Criteria S9 Results of the Soil Investigation S10 Assessment of Laboratory Results
Define the Boundary of the Assessment	S3 Site Description, Appendix A
Develop a Decision Rule	S8 Site Assessment Criteria
Specify Acceptable Limits on Decision Errors	Appendix E
Optimise the Design for Obtaining Data.	S7 Field Work

7.2 Sampling Rationale

Soil samples were collected from the thirteen supplementary bores over the 1.26 ha site. The *EPA Contaminated Sites Sampling Design Guidelines* 1995 specifies in Table A that the minimum sampling density for a Phase 2 investigation on 1.26 ha is 22- 23 bores. As part of the Phase 1 Contamination Investigation 12 test bores were drilled (including three bores that were placed slightly beyond the new modified southern site boundary). Hence, thirteen additional test bores were drilled to supplement the initial Phase 1 Contamination Assessment. Based on site observations and the site history review, the sampling locations were placed broadly evenly over the site providing appropriate supplemental site coverage.

Soil samples were collected at broadly regular intervals, or based on field observations, including changes in strata and signs of contamination. Sampling locations are indicated on Drawing 1 in Appendix A.

7.3 Sampling Procedures

7.3.1 Soil Sampling

All sample locations were cleared for services and pipes using Dial-before-you-dig information and an electro-magnetic sweep by an accredited service locater.

For the purpose of contamination assessment and waste classification the fieldwork comprised the drilling of 13 bore holes with an auger drilling rig. Due to limited bobcat access, the two bores placed over the mound located at the south-eastern section of the site (Bore 20 and 21) and one of the bores adjacent to the open water course (Bore 18) were drilled using inclined auger with a maximum drilling depth of 3 m bgl.

All sampling data was recorded on DP Test Bore Reports with essential information included in the chain-of-custody sheets. The general sampling procedure is summarised below:-

- collect soil samples directly from the auger using disposable sampling equipment;
- transfer samples into laboratory-prepared glass jars, capping immediately and ensuring that the headspace within the sample jar is minimised;

- collect a split replicate at each location into a zip lock plastic bag;
- collect 10% replicate samples for QA/QC purposes;
- label sample containers with individual and unique identification, including project number, sample location and sample depth; and
- place the glass jars, with teflon lined lid, into a cooled, insulated and sealed container for transport to the laboratory.

A photoionisation detector (PID) was used to screen the headspace gases of the replicate samples placed in the sealed zip-lock bag. The PID provides an indication of the likely presence of volatile organic compounds in the soil. The PID had a 10.6eV lamp and was calibrated with isobutylene gas at 100 ppm prior to commencement of each day's field work.

Envirolab Services, a laboratory accredited by the National Association Testing Authorities (NATA), was employed to conduct the sample analysis. The laboratory is required to carry out routine in-house QC procedures.

7.3.2 Piezometer Installation and Groundwater Sampling Methods

In addition to the two piezometers included in the Phase 1 Assessment (Bore 1 and 7), two groundwater monitoring piezometers were installed, one in the down-gradient Bore 23 and one in the upgradient Bore 30, with depths extending to 3.0 m and 1.0 m (refusal on shale) respectively. Construction details for each piezometer are presented on the Test Bore Reports, Appendix C.

The piezometers were constructed using 50 mm diameter acid washed class 18 PVC casing and machine slotted well screen. Joints were screw threaded, thereby avoiding the use of glues and solvents which may contaminate the groundwater. The piezometers in Bore 23 was completed with a gravel pack extending to 0.5 m above the well screen and in Bore 30 to 0.25 m, a bentonite plug of at least 0.25 m thickness and backfilled with drill returns to the surface. The piezometers were finished with a gatic cover on the ground surface.

Free groundwater was observed during augering only in Bore 19 at depth of 3.0 m. Bore 19 was located broadly in the area where the previous piezometer (Bore 7) was located and as a result, it was not converted into an additional piezometer. Groundwater was not

encountered in the newly installed wells in Bores 23 and 30. The existing monitoring well in Bore 1 (installed during the Phase 1 investigation) appeared to be filled with silt below a depth of 8.1 m and therefore observation/measurement of groundwater below this depth was not possible. However, groundwater sampling from the existing piezometer in Bore 7 installed during the Phase 1 investigation was conducted. The water level within the groundwater monitoring well 7 was measured prior to purging on 9/04/08 and again prior to sampling on 10/04/08.

The well in Bore 7 was developed by removing three bore volumes of water using disposable bailer. The well was allowed to recharge and the groundwater sample was collected one day later. Following the development of the well and prior to sampling, the well was micro-purged and field parameters (pH, dissolved oxygen, Redox, electrical conductivity and temperature) monitored. The sample was collected after the field parameters had stabilised (see Section 9.3). The sample was obtained using bladder micro-purge pump and disposable tubing.

Three surface water samples were collected from up-, mid- and down-stream sections of the water course running along the south-eastern boarder of the site. Groundwater and surface water samples were field filtered through a 0.45 μm membrane filter prior to laboratory analysis for heavy metals. Collection of the groundwater and surface water samples was carried out in accordance with the methodology prescribed in the Standard DP field procedures.

Sample handling and transport was as set out below:-

- sample containers were labelled with individual and unique identification, including project number and sample number;
- samples were placed in insulated coolers and maintained at a temperature of approximately 4°C until transported to the analytical laboratory, and
- chain of custody documentation was maintained at all times and countersigned by the receiving laboratory on transfer of samples.

All samples were dispatched to Envirolab Services, a NATA accredited laboratory, for analysis.

7.4 Analytical Rationale

The analytical scheme (Table 2) was designed to assess the potential for contamination which may have arisen from current and past use of the site. A total of 32 selected soil samples (including 3 QA/QC replicates) were analysed for various combinations of the contaminants of concern. In addition, one groundwater and three surface water samples were also analysed as shown in Table 3.

Table 2 – Analytical Scheme for Soil Samples

Sample ID	Heavy metals	PAH	TRH	BTEX	VOC	Phenols	PCB	OCP	asbestos	TCLP
18/0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	
18/1.3-1.4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
18/2.9-3.0	✓	✓	✓	✓		✓	✓	✓		✓
19/0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	
19/0.6-0.7	✓	✓	✓	✓		✓	✓	✓	✓	
19/2.4-2.5	✓	✓	✓	✓		✓	✓	✓		
20/0.02-0.5	✓	✓	✓	✓		✓	✓	✓	✓	
20/0.8-1.0	✓	✓	✓	✓	✓					
20/1.8-2.0	✓	✓	✓	✓						✓
20/2.8-3.0	✓	✓	✓	✓						
21/0.3-0.5	✓	✓	✓	✓		✓	✓	✓	✓	
21/1.3-1.5	✓	✓	✓	✓	✓	✓	✓	✓		
22/0.2-0.3	✓	✓	✓	✓		✓	✓	✓	✓	
22/1.3-1.5	✓	✓	✓	✓						
22/3.8-4.0	✓	✓	✓	✓						
23/0.3-0.5	✓	✓	✓	✓		✓	✓	✓	✓	
23/0.8-1.0	✓	✓	✓	✓	✓					
23/2.8-3.0	✓	✓	✓	✓						
24/0.3-0.5	✓	✓	✓	✓		✓	✓	✓	✓	
24/2.3-2.5	✓	✓	✓	✓						
25/0.8-1.0	✓	✓	✓	✓						✓

Sample ID	Heavy metals	PAH	TRH	BTEX	VOC	Phenols	PCB	OCP	asbestos	TCLP
25/1.8-2.0	✓	✓	✓	✓	✓					
26/0.1-0.2	✓	✓	✓	✓		✓	✓	✓	✓	
26/1.4-1.6	✓	✓	✓	✓						
27/0.2-0.3	✓	✓	✓	✓		✓	✓	✓	✓	✓
28/0.1-0.2	✓	✓	✓	✓		✓	✓	✓	✓	✓
28/0.5-0.6	✓	✓	✓	✓		✓	✓	✓	✓	
29/0.1-0.2	✓	✓	✓	✓		✓	✓	✓	✓	
30/0.2-0.3	✓	✓	✓	✓		✓	✓	✓	✓	
BD1/070408	✓	✓								
30/0.9	✓	✓	✓	✓	✓					

Table 3 – Analytical Scheme for Groundwater and Surface Water Samples

Sample ID (Location)	Heavy Metals	TPH/ BTEX	PAH	VOC	Phenols	PCB/ OCP	pH	Hardness
GW7/100408	✓	✓	✓	✓	✓	✓	✓	✓
SW1/100408	✓	✓	✓	✓	✓	✓	✓	✓
SW2/100408	✓	✓	✓	✓	✓	✓	✓	✓
SW3/100408	✓	✓	✓	✓	✓	✓	✓	✓

8. SITE ASSESSMENT CRITERIA

8.1 Soils

Notwithstanding the fact that the site is located within the Macquarie University Campus, given the proposed development of the site as a commercial company's headquarters, the exposure scenario for contaminants in soils would be that of a commercial or industrial development. DP therefore considered the health-based investigation levels for a commercial land use are appropriate for this assessment (HIL Column 4, see Appendix II, from the Guidelines).

Due to the likely landscaped nature of the area surrounding the proposed building, provisional phototoxicity-based investigation levels (PPIL) were also considered for unpaved/unsealed areas. PPIL are sourced from Column 5, Appendix II of the Guidelines.

The adopted site assessment criteria are shown in Table 4, below.

A contaminant concentration in soil/filling material is considered to be significant if:

i) The concentration of the contaminant is more than 2.5 times the site assessment criteria (SAC). Any location more than 2.5 times the SAC is classified as a 'hotspot', requiring further assessment/ management.

ii) For a data of like material, with respect to the health-based criteria, the calculated 95% Upper Confidence Limit of average concentrations (excluding any 'hotspot' concentrations) exceeds the SAC.

iii) The standard deviation of the results is greater than 50% of the health-based investigation levels (HIL).

Note that the statistical analysis would only apply to HILs.

Table 4 – Site Assessment Criteria for Contamination

Contaminant	Adopted Criteria (SAC)		Source
TPH $C_6 – C_9$ $C_{10} – C_{36}$	 65 mg/kg 1000 mg/kg		NSW EPA[1] Contaminated Sites *Guidelines for Assessing Service Station Sites* (1994) threshold concentrations for sensitive land use-soils. Currently there are no other comprehensive, EPA endorsed investigation levels for petroleum hydrocarbons.
BTEX Benzene Toluene Ethylbenzene Xylene	 1 mg/kg 1.4 mg/kg 3.1 mg/kg 14 mg/kg		
Metals Arsenic (total) Cadmium Chromium Copper Lead Mercury Nickel Zinc	**HIL** 500 mg/kg 100 mg/kg 60,000 mg/kg 5000 mg/Kg 1,500 mg/Kg 75 mg/Kg 3,000 mg/Kg 35,000 mg/kg	**PPIL** 20 mg/Kg 3 mg/Kg 400 mg/Kg 100 mg/Kg 600 mg/Kg 1 mg/Kg 60 mg/Kg 200 mg/Kg	NSW EPA Contaminated Sites *Guidelines for the NSW Site Auditor Scheme* (2nd Edition) (2006) Soil Investigation Levels for Urban Redevelopment Sites in NSW Heath-based investigation levels outlined in Column 4 for Commercial/Industrial landuse, and Provisional phytotoxicity investigation levels outlined in Column 5.
Total Phenols	42,500 mg/kg		
PAH Total Benzo(a)Pyrene	 100 mg/kg 5 mg/kg		
PCB	20 mg/kg		
OCP Aldrin + dieldrin chlordane DDT (including DDD, DDE, DDT) Heptachlor	 50 mg/kg 250 mg/kg 1000 mg/kg 50 mg/kg		
VOC	Not specified		
Asbestos	No asbestos present in soil at the surface		Correspondence from NSW EPA Director of Contaminated Sites to Accredited Site Auditors

Providing that the 95% Upper Confidence Limit (UCL) of average concentrations is within the SAC (health-based), and no concentrations of the contaminants are at hotspot level, minor exceedances of the SAC may be considered to pose an insignificant human health risk under the proposed land-use.

8.2 Groundwater and Surface Water

Groundwater and surface water investigation levels (WILs) are sourced from the *Australian Water Quality Guidelines (ANZECC (2000)* (Table 5). Where applicable the 95% protection of freshwater species has been applied. The nearest receptor for groundwater is assessed to be Shrimptons Creek, which flows into Lane Cove River.

Table 5 – Groundwater and Surface Water Investigation Levels (WILs)

Contaminant	Adopted Criteria (WIL)	Source
TPH $C_6 – C_9$ $>C_9$	 150 µg/L 600 µg/L	Airport (Environment Protection) Regulations (1997), Schedule 2 Water Pollution Accepted Limits: Table 1.03 – Accepted limits of contamination have been adopted as screening thresholds [adopted due to the absence of high reliability NSW EPA or ANZECC guidelines for TPH]*
BTEX Benzene Toluene Ethylbenzene Xylene	 950 µg/L 300 µg/L 140 µg/L 550 µg/L	*ANZECC (2000) Australian Water Quality Guidelines for the protection of 95% of freshwater species* NSW EPA[1] Contaminated Sites *Guidelines for Assessing Service Station Sites* (1994) *Threshold concentrations for sensitive land use, Protection of Aquatic Ecosystem* is adopted in the absence of other comprehensive investigation levels for toluene or ethyl benzene in groundwater.
Metals Arsenic (V) Cadmium Chromium (VI) Copper Lead Mercury Nickel Zinc	 13 µg/L 0.2 µg/L 1 µg/L 1.4 µg/L 3.4 µg/L 0.6 µg/L 11 µg/L 8 µg/L	*ANZECC (2000) Australian Water Quality Guidelines for the protection of 95% of freshwater species*
PAH Total Benzo(a)Pyrene Naphthalene	 Not specified Not specified 0.016 µg/L	*ANZECC (2000) Australian Water Quality Guidelines for the protection of 95% of freshwater species*
Phenols	 320 µg/L	*ANZECC (2000) Australian Water Quality Guidelines for the protection of 95% of freshwater species*
OCP Chlordane DDT Endosulfan Endrin Heptaclor	 0.08 µg/L 0.01 µg/L 0.2 µg/L 0.02 µg/L 0.09 µg/L	*ANZECC (2000) Australian Water Quality Guidelines for the protection of 95% of freshwater species*
PCB Total Aroclor 1242 Aroclor 1254	 Not specified 0.6 µg/L 0.03 µg/L	*ANZECC (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Protection of 95% of freshwater species*
VOCs	1-20 µg/L	*ANZECC (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Protection of 95% of freshwater species* For reference purposes *Dutch Intervention Levels, Ministry of Housing, Spatial Planning and Environment, 2000* and the USEPA *Region IX Preliminary Remediation Goals* were used.

Note:

* Other than a 'low reliability' final chronic value of 7 µg/L for petroleum hydrocarbon, which is not routinely achievable by NATA laboratories due to inability to meet the required detection limits.

[1] NSW EPA is now part of the NSW Department of Environment and Climate Change (DECC).

8.3 Waste Classification

For the purpose of waste classification, analytical results have been compared with the threshold concentration guidelines as provided in NSW EPA's *Environmental Guidelines: Assessment Classification and Management of Liquid and Non- Liquid Wastes (2004)* for off-site disposal purposes.

In view of the absence of clear DECC guidelines on the assessment of Virgin Excavated Natural Material (VENM), the following guidelines were referenced:

- Environmental Soil Quality Guideline 'Background Ranges', as given in the *Schedule B(1) NEPC Guideline on the Investigation Levels for Soil and Groundwater (1999)* (for heavy metals).
- Australian and New Zealand Environment and Conservation Council/National Health and Medical Research Council (ANZECC/NHMRC): *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (1992)*, Environmental Soil Quality Guidelines Background A [ANZECC A] (background levels for some organic compounds).
- Practical Quantitation Limits (PQL) – for organic compounds in general.

9. RESULTS OF SOIL INVESTIGATION

9.1 Field Observations

9.1.1 Soils

Details of the sub-surface conditions encountered during the course of the investigation are included in the Test Bore Report Sheets (Appendix C). The bore locations are shown on Drawing 1, Appendix A.

Topsoil and pavements overlying filling to depths of approximately 0.5 m to 1.8 m on the north-western part of the site. The filling layer increasing to depths of approximately 2.5 m to 3.0 m along the south-western part of the site. The mound along the northern boundary

appears to be formed by filling placed over natural clay whilst the mound on the south-eastern side of the site is formed by filling only.

Filling generally comprised silty sand/sandy clay with substantial amount of gravel, some ironstone and sandstone fragments and generally exhibited no chemical odours or staining. Filling materials were underlain by natural silty clays.

Table 6 summarises the subsurface profile encountered during the current investigation.

Table 6 – Subsurface Profile (m bgl)

Sampling Location	Bitumen/ Roadbase	Topsoil	Filling	Silty clay/ Clay	Completion Depth
18		0-0.1	0.1-3.0		3.0
19		0-0.1	0.1-0.7	0.7-3.0	3.0
20		0-0.1	0.1-3.0		3.0
21		0-0.1	0.1-3.0		3.0
22	0-0.1		0.1-2.6	2.6-4.0	4.0
23	0-0.1		0.1-2.6	2.6-3.0	3.0
24	0-0.1		0.1-2.8	2.8-3.0	3.0
25	0-0.1		0.1-2.5	2.5-2.6	2.6
26		0-0.1	0.1-1.4	1.4-1.6	1.6
27		0-0.1	0.1-1.8	1.8-2.0	2.0
28	0-0.1		0.1-1.2	1.2-2.7	2.7
29	0-0.1			0.1-0.5	0.5
30	0-0.1			0.1-1.0	1.0

9.1.2 Groundwater and Surface Water

Groundwater sampling and analyses were conducted at Bore 7 on 10 April 2008 (sample GW7/100408). The groundwater level measured after the installation of the well and prior to sampling is 5.2 m bgl (55.9 AHD). Groundwater was not encountered in the newly installed wells in Bore 23 and 30 and in the previously installed well in Bore 1.

Three surface water samples were collected on 10 April 2008 from up-, mid- and down-stream sections of the water course running along the south-eastern boarder of the site, viz. sample SW1 (down stream), SW2 (mid-stream) and SW3 (up-stream) [The samples were identified with the date suffix /100408]. In order to verify the contamination detected, the surface water at SW1 and SW2 locations was re-sampled on 24 April 2008 (SW1-2/240408).

During the site investigations, a number of concrete drainage pipes were noted to be discharging water (noted to be stormwater) into the open water course.

Analytical results for groundwater and surface water are presented in Table 9.

9.2 Total Photoionisable Compounds (TOPIC) Results

The replicate soil samples collected in plastic bags were allowed to equilibrate under ambient temperatures before screening for Total Photoionisable Compounds (TOPIC) using a calibrated Photoionisation Detector (PID). Results of sample screening are shown in the Test Bore Reports in Appendix C. The PID readings were between 4 ppm and 34 ppm. It was noted that most of the samples were moist and there were no signs of contamination noted (i.e. no odours or stains). It was well recognised that PIDs would be affected by moisture and the slightly elevated PID readings could be attributed to the elevated moisture content in the samples.

9.3 Groundwater Field Parameters

On 10 April 2008 the piezometer in Bore 7 was purged and samples were collected using low-flow sampling techniques after stable readings were obtained for pH, electrical conductivity, Redox, dissolved oxygen and temperature presented in Table 7.

Table 7 - Groundwater readings prior to sampling

Time	pH	Electrical Conductivity (µS)	Dissolved Oxygen (ppm)	Redox (mV)	Temperature (°C)
8:25	3.9	671	0.85	330	19.3
8:26	3.9	671	0.78	327	19.3
8:27	3.9	666	0.71	333	19.4
8:28	3.9	667	0.67	332	19.4

9.4 Laboratory Results

The results of laboratory analysis of the soil and groundwater samples are summarised in Tables 8 and 9, with NATA Reports provided in Appendix D.

Table 8 – Results of Soil Laboratory Analysis

Sample ID	Fill/Natural	Heavy Metals																PAH				TRH		Benzene	Toluene	Ethyl-Benzene	Total Xylene	VOC [15]	Total Phenols	PCB [4]	OCP [4]	asbesto
		As		Cd		Cr [3]		Cu		Pb		Hg				Ni		Zn		Total PAH [4]		B(a)P [5]		C6-C9	C10-C36									
		total [1]	TCLP [2]	total [1]	TCLP [2]	total [1]	TCLP [2]	total [1]	TCLP [2]	total [1]	TCLP [2]	total [1]	TCLP [2]	total [1]		total [1]	TCLP [2]	total [1]	TCLP [2]	total [1]	TCLP [2]	total [1]	TCLP [2]	total [1]	total [1]	total [1]	total [1]	total [1]	total [1]	total [1]	total [1]	-
Phase 1 Contamination Assessment																																
3a/0.8-1.0	F	8.9	-	<1	-	60	<0.01	64	-	28	-	0.23	-			3.2	-	31	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	0.7	Nil
7a/1.0-1.2	F	<4	-	<1	-	9.1	-	18	-	42	<0.03	<0.1	-			5.5	<0.02	20	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
7a/2.8-3.0	F	7.4	-	<1	-	15	-	12	-	38	-	<0.1	-			2	-	11	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	Nil
11/0.8-1.0	F	5.9	-	<1	-	40	<0.01	8.1	-	25	<0.03	<0.1	-			2.6	-	15	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
12/0.8-1.0	F	4.9	-	<1	-	9	-	3	-	10	-	<0.1	-			<1	-	3.6	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
13/0.3-0.5	F	5	-	<1	-	13	-	6.7	-	24	-	<0.1	-			3.8	-	9.5	-	2.7	<0.002	0.3	<0.001	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
13/2.9-3.0	F	8.3	-	<1	-	36	-	54	-	43	-	0.26	-			2.2	-	38	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	0.1	-
14/0.3-0.5	F	5.3	-	<1	-	19	-	1.7	-	22	-	<0.1	-			1.2	-	2.9	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-
BD3/141207 [11]	F	6.4	-	<1	-	19	-	3.4	-	19	-	<0.1	-			4.9	-	5.4	-	<0.2	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-
16/0-0.2	F	<4	-	<1	-	19	<0.01	36	-	15	<0.03	<0.1	-			53	0.06	40	-	1.3	<0.002	0.1	<0.001	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	-	Nil
16/0.2-0.5	F	<4	-	<1	-	15	-	37	-	15	-	<0.1	-			49	-	38	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	-	Nil
17/0.2-0.5	F	5.2	-	<1	-	14	-	19	-	16	-	<0.1	-			27	-	19	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	-	Nil
7a/3.6-3.9	N	8.2	-	<1	-	21	-	12	-	23	-	<0.1	-			2.5	-	13	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	-
9a/0.3-0.5	N	6.8	-	<1	-	16	-	5.5	-	23	-	<0.1	-			9.3	-	5.4	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	Nil
10a/1.0-1.2	N	8.4	-	<1	-	20	-	20	-	25	-	<0.1	-			2.1	-	4.7	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-
BD2/141207 [11]	N	7	-	<1	-	19	-	17	-	24	-	<0.1	-			2.1	-	4.6	-	<0.2	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-
15/0.3-0.5	N	5.5	-	<1	-	16	-	20	-	71	-	<0.1	-			3	-	8.5	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-
Phase 2 Contamination Assessment																																
18/0.2-0.3	F	4.9	-	<1	-	29	-	19	-	20	-	<0.1	-			26	-	30	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	<PQL	<5	<0.1	<0.1	Nil
18/1.3-1.4	F	<4	-	<1	-	24	<0.01	21	-	28	0.03	<0.1	-			33	<0.02	35	-	3.8	<0.002	0.3	<0.001	<25	<250	<0.5	<0.5	<1	<3	<PQL	<5	<0.1	<0.1	Nil
18/2.9-3.0	F	<4	-	<1	-	21	<0.01	9.9	-	41	0.29	<0.1	-			16	0.02	30	-	6.6	0.006	0.5	<0.001	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	-
19/0.2-0.3	F	9.8	-	<1	-	14	-	14	-	21	-	<0.1	-			8.9	-	16	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	<PQL	<5	<0.1	<0.1	Nil
20/0.02-0.5	F	6.4	-	<1	-	28	-	23	-	13	-	<0.1	-			32	-	21	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
20/0.8-1.0	F	4.6	-	<1	-	7.7	-	5.1	-	19	-	<0.1	-			1.7	-	2.6	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	<PQL	-	-	-	-
20/1.8-2.0	F	8.4	-	<1	-	28	<0.01	43	-	110	**0.75**	<0.1	-			9.9	<0.02	14	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-
20/1.8-2.0-retest	F	-	-	-	-	-	-	-	-	-	**0.71**	-	-	-	-	-	-	-	-	<0.2	-	<0.05	-	-	-	-	-	-	-	-	-	-	-	-
20/1.8-2.0-retest	F	-	-	-	-	-	-	-	-	-	**1.1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20/2.8-3.0	F	6.6	-	<1	-	18	-	17	-	32	-	<0.1	-			17	-	19	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-
21/0.3-0.5	F	6.3	-	<1	-	22	-	24	-	21	-	<0.1	-			21	-	35	-	0.27	-	0.07	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
21/1.3-1.5	F	6.1	-	<1	-	18	-	10	-	36	-	<0.1	-			6.8	-	17	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	<PQL	<5	<0.1	<0.1	-
22/0.2-0.3	F	8.3	-	<1	-	27	-	10	-	26	-	<0.1	-			7.5	-	14	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
22/1.3-1.5	F	11	-	<1	-	21	-	16	-	**44**	0.12	<0.1	-			3.7	-	19	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-
23/0.3-0.5	F	6.4	-	<1	-	14	-	21	-	**75**	0.31	<0.1	-			1.4	-	65	-	0.7	-	0.1	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
23/0.8-1.0	F	4.3	-	<1	-	23	-	4	-	15	-	<0.1	-			4.1	-	14	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	<PQL	-	-	-	-
24/0.3-0.5	F	8	-	<1	-	16	-	18	-	**53**	0.09	<0.1	-			1.8	-	9.1	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
24/2.3-2.5	F	7.4	-	<1	-	20	-	2.6	-	20	-	<0.1	-			1.6	-	3.9	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-
25/0.8-1.0	F	13	<0.05	<1	-	32	<0.01	14	-	31	<0.03	<0.1	-			4.3	<0.02	30	-	4.8	0.002	0.4	<0.001	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-
25/1.8-2.0	F	8.3	-	<1	-	20	-	5.4	-	18	-	<0.1	-			2.2	-	4.1	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	<PQL	-	-	-	-
26/0.1-0.2	F	9.3	-	<1	-	16	-	25	-	27	-	<0.1	-			15	-	300	-	0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
27/0.2-0.3	F	11	<0.05	<1	-	56	<0.01	40	-	33	<0.03	<0.1	-			2.3	-	23	-	<0.2	-	0.06	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
28/0.1-0.2	F	<4	-	<1	-	27	<0.01	67	-	11	<0.03	<0.1	-			83	0.07	48	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
28/0.5-0.6	F	11	-	<1	-	32	-	4.2	-	21	-	<0.1	-			2.1	-	2.6	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
BD3/070408 [11]	F	11	-	<1	-	34	-	4.4	-	24	-	<0.1	-			3.1	-	3.9	-		-		-	-	-	-	-	-	-	-	-	-	-	-
19/0.6-0.7	N	<4	-	<1	-	11	-	3.6	-	13	-	<0.1	-			2.8	-	13	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
19/2.4-2.5	N	<4	-	<1	-	8	-	2.9	-	12	-	<0.1	-			<1	-	3.2	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	-
BD2/070408 [11]	N	<4	-	<1	-	8.5	-	2.7	-	12	-	<0.1	-			<1	-	2.9	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
22/3.8-4.0	N	9.7	-	<1	-	11	-	4.7	-	17	-	<0.1	-			<1	-	<1	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-
23/2.8-3.0	N	7.7	-	<1	-	27	-	21	-	21	-	<0.1	-			2.3	-	15	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-
26/1.4-1.6	N	11	-	<1	-	24	-	10	-	23	-	<0.1	-			4.7	-	24	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	-	-	-	-
29/0.1-0.2	N	6.4	-	<1	-	22	-	2.5	-	22	-	<0.1	-			2.3	-	2.2	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
30/0.2-0.3	N	<4	-	<1	-	12	-	5.9	-	18	-	<0.1	-			6	-	4.2	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	-	<5	<0.1	<0.1	Nil
BD1/070408 [11]	N	<4	-	<1	-	9.9	-	11	-	15	-	<0.1	-			9.6	-	5.6	-	<0.2	-	<0.05	-							-	-	-	-	-
30/0.9	N	<4	-	<1	-	8.8	-	4.9	-	16	-	<0.1	-			4.6	-	3.8	-	<0.2	-	<0.05	-	<25	<250	<0.5	<0.5	<1	<3	<PQL	-	-	-	-
Site Assessment Criteria [12]																																
SAC		500	-	100	-	60000	-	5000	-	1500	-	75	-			3000	-	35000	-	100	-	5	-	65	1000	1	1.4	3.1	14	-	42500	50	50/250/ 1000/50 [13]	Nil [14]
Provisional Phytotoxicity Investigation Levels [12]																																
PPIL		20	-	3	-	400	-	100	-	600	-	1	-			60	-	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste Classification Criteria for Filling [7]																																
Criteria for Inert Waste																																
CT1		10	-	2	-	10	-	1000 [8]	-	10	-	0.4	-	0.4		4	-	7000 [8]	-	-	-	0.08	-	-	-	1	28.8	60	100	-	28.8	-	-	Nil
SCC1		500	0.5	100	0.1	1900	0.5	-	-	1500	0.5	50	0.02	50		1050	0.2	-	-	200	-	1	0.004	650	5000	18	518	1080	1800	-	518	2	1	Nil
Criteria for Solid Waste																																
CT2		100	-	20	-	100	-	1000 [8]	-	100	-	4	-			40	-	7000 [8]	-	-	-	0.8	-	-	-	10	288	600	1000	-	288	-	-	-
SCC2		500	5	100	1	1900	5	-	-	1500	5	50	0.2			1050	2	-	-	200	-	10	0.04	650	10000	18	518	1080	1800	-	518	<50	<50	-
Background Criteria for Natural Material [9]																																
Published background		1-50	-	1	-	5-1000	-	2-100	-	2-200	-	0.03	-			5-500	-	10-300	-	0.95-5	-	-	-	-	-	0.05-1	0.1-1	-	-	-	0.03-0.5	0.02-0.1	<0.001-<0.05 [10]	-

Notes:

1 total values in mg/kg
2 TCLP values in mg/L
3 All Chromium are assumed to exist in the stable Cr(III) oxidation state, as Cr(VI) will be too reactive and unstable under the normal environment.
4 Results less than general Practical Quantitation Limit (PQL) quoted for individual compounds
5 benzo(a)pyrene
7 NSW EPA's Environmental Guidelines: Assessment Classification and Management of Liquid and Non-Liquid Wastes (1999): Table A3: Contaminant Threshold Values for Waste Classification of Non-Liquid wastes without doing the Leaching Test (CT); and Table A4: Leachable Concentration (TCLP) and Total Concentration Values for Non-Liquid Waste Classification (SCC) (as applicable)
8 As Waste Classification Criteria for Cu and Zn is not available, NSW DEC Contaminated Sites *Guidelines for the NSW Site Auditor Scheme 2nd edition* (2006) Soil Investigation Levels for Urban Redevelopment Sites in NSW Heath-based investigation levels for residential with gardens and accessible soil (HIL Column 1) were applied.
9 Published background levels sourced from NEPC (1999). National Environmental Protection (Assessment of Site Contamination) Measure Schedule B(1) Guidelines on the Investigation Levels for Soil and Groundwater, Background Ranges (for heavy metals) and Australian and New Zealand Environment and Conservation Council/National Health and Medical Research Council (ANZECC/NHMRC): Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (1992), Environmental Soil Quality Guidelines Background A [ANZECC A] (for organic compounds)
10 lowest threshold available, for aldrin
11 denotes replicate of the sample listed directly above
12 as per Table 4
13 SAC for OCP given in order aldrin+dieldrin/ chlordane/ DDT+DDD+DDE/ heptachlor
14 No asbestos present on the ground surface (Correspondence from NSW EPA Director of Contaminated Sites to Accredited Site Auditors).
15 All VOC compounds are below the Practical Quantitation Limit (PQL)
Bold result exceed Waste Classification Criteria
- not analysed/ not defined/ not applicable
natural material samples, analytical results and criteria

Table 9 - Laboratory Results of Groundwater and Surface Water Samples

Sample ID	hardness	Heavy Metals								PAH		TRH		Benzene	Toluene	Ethyl-Benzene	Xylene	VOC	pH	Phenols	PCB	OCP[2]
		As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	Total[1]	B(a)P	C6-C9	C10-C36									
units	$mgCaCO_3/L$	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pH Units	mg/L	mg/L	mg/L
Phase 1 Contamination Assessment																						
GW7/181207	56	2.3	**0.4**	**1.7**	**3**	1.4	<0.5	8.7	**140**	<1	<1	<10	<250	<1	<1	<1	<3	-	4.5	<0.05	<2	<0.2
Phase 2 Contamination Assessment																						
GW7/100408	43	<1	**0.6**	**1.2**	**15**	1.4	<0.5	**41**	**260**	<2	<1	<10	<250	<1	<1	<1	<3	<10	4	<0.05	<2	<0.2
SW1/100408	100	<1	<0.1	<1	**5.5**	<1	<0.5	<1	**25**	<2	<1	<10	**940**	<1	<1	<1	<3	<10	7.1	<0.05	<2	<0.2
SW1/240408	-	-	-	-	-	-	-	-	-	-	-	-	<250	-	-	-	-	-	-	-	-	-
SW2/100408	100	<1	<0.1	<1	**4.5**	<1	<0.5	<1	**22**	<2	<1	<10	**740**	<1	<1	<1	<3	<10	7	<0.05	<2	<0.2
SW2/240408	-	-	-	-	-	-	-	-	-	-	-	-	<250	-	-	-	-	-	-	-	-	-
SW3/100408	110	<1	<0.1	<1	1.9	<1	<0.5	<1	**27**	<2	<1	<10	250	<1	<1	<1	<3	<10	7	<0.05	<2	<0.2
Water Investigation Levels[2]																						
WIL	soft (0-59)	13.0	0.2	1.0	1.4	3.4	0.6	11.0	8.0	16, 5[3]	-	150	600	950	300	140	550	20	-	320	0.6/0.03[4]	0.08/0.01/0.2/0.02/0.09[5]
WIL	moderate (60-119)	13.0	0.5	2.5	3.5	13.6	0.6	27.5	20.0	16, 5[3]	-	150	600	950	300	140	550	20	-	320	0.6/0.03[4]	0.08/0.01/0.2/0.02/0.09[5]

Notes:

1	where results are above practical quantitation limit (PQL) sum of all results given, when below PQL results quoted as <PQL of majority of individual analytes
2	IL refer to Table 5
3	trigger value for naphthalene, phenanthrene other PAH's not defined
4	trigger values for clordane/DDT/endosulfan/endrin/heptaclor
5	trigger values for aroclor 1242/arochlor 1254
Bold	indicates exceedance of IL

10. ASSESSMENT OF LABORATORY RESULTS

10.1 Chemical Contaminants in Soil

Soil samples were assessed for a suite of potential contaminants of concern including heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn), TPH, BTEX, PAH, VOC, PCB, OCP, phenols and asbestos.

The laboratory results (Table 8) indicated that contaminant concentrations in the soil samples analysed were within the health-based SAC for commercial/ industrial land use and the PPIL, which are relevant for landscaped areas. The recorded contaminant levels were consistent with the Phase 1 Assessment findings.

10.2 Asbestos

Thirteen samples of filling were analysed for asbestos. Asbestos was not detected in these samples. Similarly, no asbestos was detected in the Phase 1 Assessment.

10.3 Groundwater and Surface Water Results

As part of the Phase 2 Contamination Assessment two groundwater wells were constructed at Bores 23 and 30. Groundwater was not encountered in these wells, and the previously constructed well at Bore 1 was blocked and hence not usable, therefore only one groundwater sample was collected from the existing down-gradient well at Bore 7. The sample was analysed for a suite of common contaminants.

Three surface water samples were collected from up-, mid- and down-stream sections of the water course at the site.

Groundwater laboratory results (Table 9) for arsenic, lead, mercury, toluene, benzene, ethyl benzene, xylene, PAH, TRH, VOCs, PCB, Phenols and OCP were below the adopted WIL with all organic concentrations less than practical quantitation limits.

Slight exceedances of the WIL were detected for cadmium (detected concentrations of 0.4 µg/L and 0.6 µg/L compared to a WIL value of 0.2 µg/L), chromium (1.7 µg/L and 1.2 µg/L over the WIL of 1.0 µg/L), copper (3 µg/L and 15 µg/L over the WIL of 1.4 µg/L), nickel (41 µg/L over the WIL of 11 µg/L) and zinc (140 µg/L and 260 µg/L over the WIL of 8.0 µg/L). However, the detected levels were not considered to be significant as the chromium, copper and cadmium exceedances were only marginal. It is also noted that various heavy metals, including nickel and zinc, are commonly detected at levels above the ANZECC (2000) Guidelines in groundwater, particularly in urbanised areas. Additionally, all metal concentrations detected in soil samples were low and are unlikely to be the source of the recorded contaminant levels in the groundwater. It is therefore considered that the above-mentioned elevated heavy metal concentrations do not represent unacceptable risk of harm to human health and the environment and are representative of the background concentrations of the area. All groundwater results were within the *Australian Drinking Water Guideline (2004)*.

Surface water laboratory results (Table 9) for arsenic, cadmium, chromium, lead, mercury, nickel, toluene, benzene, ethyl benzene, xylene, PAH, VOCs, PCB, Phenols and OCP were below the adopted WIL in all samples.

Slightly elevated levels of copper, zinc and TPH were detected in the following samples:

- Copper – generally elevated, with levels in samples SW1 and SW2 exceeding the hardness adjusted WIL (5.5 µg/L and 4.5 µg/L over the adjusted WIL of 3.5 µg/L);
- Zinc – Exceeded the WIL in all samples (SW1-3 recorded zinc levels of 25 µg/L, 22 µg/L and 27 µg/L respectively, all exceeding adjusted WIL of 20.0 µg/L); and
- TRH (C10-C36) – detected in all samples, with levels in SW2 and SW3 (940 µg/L and 740 µg/L) exceeding the screening WIL of 600 µg/L.

In regards to heavy metals, the detected levels were not considered to be significant as the copper and zinc exceedances are only marginal.

With regard to the relatively elevated TRH concentrations detected, there was no evidence of petroleum contamination (odour or sheen) in all water samples, although the samples

were silty and showed signs of (natural) organic loading. The issue was raised and discussed with Envirolab, the NATA accredited laboratory. Envirolab indicated that, based on the chromatograms obtained, the signal patterns of the samples did not match that the typical pattern of petroleum fuel. This is in agreement with the investigation results, which indicated that TPH were not detected in all soil samples collected in both phases of the assessment.

In order to further evaluate whether the recorded "TPH" values were due to organic matter (i.e. not fuel related) or petroleum fuel, a second round of sampling was undertaken at the locations of SW1 and SW2. The collected samples (SW1/240408 and SW2/240408) were subject to a silica gel clean up prior to TPH analysis to remove non-petroleum fuel related organic fractions in the samples. The results were below the Practical Quantitation Limit (PQL).

It is noted that the second round of sampling was conducted 14 days after the initial round of sampling, such that the quality of water in the water course could have changed or affected by external factors (eg weather, discharges from drains).

On the basis of the silica gel clean up analysis results, the "TPH" results obtained in the surface water samples was probably not of petroleum fuel origin, and in any case is transient in nature. Given the observed discharges from the drainage pipes along the water course, it is likely that the "TPH" results were attributed to the organic matters (rather than petroleum hydrocarbons) being discharged into the water.

It is thus considered that the detected "TPH" in the surface water are most likely due to organic matters in the water, probably associated with the various discharges into the water course. The detected TPH levels appeared to be transient in nature and were unlikely to be attributed to the site.

10.4 Waste Classification

10.4.1 Filling Material

Laboratory results were compared to NSW EPA's *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Waste* (1999) for Inert Waste Screening Threshold Values (NSW EPA 2004).

On the basis of the total and leachable (TCLP) concentrations, the filling material on site was classified as Inert Waste (Table 8), with the exception of sample 20/1.8-2.0, which registered a slight exceedance of the lead TCLP threshold for Inert Waste (0.75 mg/L, compared to the Inert Waste lead TCLP criteria of 0.5 mg/L).

Based on field observations and upon reviewing the test bore logs, the filling in Bore 20 was broadly similar to the general filling placed over the site. On this basis, a statistical analysis of the lead TCLP data set was conducted, using the USEPA ProUCL. The data set followed Gamma distribution with a result for approximate gamma UCL of 0.47 mg/L for lead TCLP, which is below the inert waste lead TCLP criteria of 0.5 mg/L.

Based on the total and leachable (TCLP) concentration results (and taking into account the Approximate Gamma UCL for lead TCLP), contaminants levels in filling materials were considered to be provisionally classified as Inert Waste.

It is recommended that the waste classification of the material should be verified/checked during site excavation.

10.4.2 Natural Material

The levels of potential contaminants detected in the natural material samples analysed were low and within expected background levels (Table 8).

On this basis, natural materials with no signs of contaminant impact, such as hydrocarbon odours or elevated levels of potential contaminants, are classifiable as Virgin Excavated Natural Materials (VENM).

11. CONCLUSIONS AND RECOMMENDATIONS

The scope of work for the current assessment comprised a supplementary soil and groundwater sampling regime and final assessment of the material to be excavated for the purpose of off-site disposal.

A review of historical information indicated that the site was previously in a rural/agricultural area. Prior to the establishment of Macquarie University in 1967 the site was used for agricultural purposes possibly including orchard, market gardens and poultry farming since at least 1930. Since the establishment of Macquarie University all structures related to the market gardens, farm sheds and orchards have been removed. The site is currently occupied by a car park and landscaped areas. The current site and surrounding land uses are not considered to be significant in terms of the potential to adversely impact the site. The potential for contamination is generally considered to be low which was confirmed by the low level of contaminants in the samples analysed. There were no exceedances of the SAC and PPIL used for the fill material and the published background levels for the underlying natural clay material.

Groundwater laboratory results for cadmium, chromium, copper, nickel and zinc exceeded the IL. However, the detected levels were not considered to be significant as the chromium, copper and cadmium exceedances are only marginal, whereas nickel and zinc (as well as the other metals) are commonly detected at levels above the ANZECC (2000) Guidelines in groundwater, particularly in urbanised areas, and it is considered that the elevated concentrations do not represent significant contamination risk and are representative of the background concentrations of the area.

Surface water laboratory results for copper, zinc and TRH (C10-C36) exceeded the IL. In regards to heavy metals, the detected levels were not considered to be significant as the copper and zinc exceedances are only marginal.

With regard to the relatively elevated TRH concentrations detected, there was no evidence of petroleum contamination (odour or sheen) in all water samples, although the samples were silty and showed signs of (natural) organic loading. The issue was raised and discussed with Envirolab, the NATA accredited laboratory. Envirolab indicated that, based

on the chromatograms obtained, the signal patterns of the samples did not match that the typical pattern of petroleum fuel. This is in agreement with the investigation results, which indicated that TPH were not detected in all soil samples collected in both phases of the assessment.

In order to further evaluate whether the recorded "TPH" values were due to organic matter (i.e. not fuel related) or petroleum fuel, a second round of sampling was undertaken at the locations of SW1 and SW2. The collected samples (SW1/240408 and SW2/240408) were subject to a silica gel clean up prior to TPH analysis to remove non-petroleum fuel related organic fractions in the samples. The results were below the Practical Quantitation Limit (PQL).

It is noted that the second round of sampling was conducted 14 days after the initial round of sampling, such that the quality of water in the water course could have changed or affected by external factors (eg weather, discharges from drains).

On the basis of the silica gel clean up analysis results, the "TPH" results obtained in the surface water samples was probably not of petroleum fuel origin, and in any case is transient in nature. Given the observed discharges from the drainage pipes along the water course, it is likely that the "TPH" results were attributed to the organic matters (rather than petroleum hydrocarbons) being discharged into the water.

It is thus considered that the detected "TPH" in the surface water are most likely due to organic matters in the water, probably associated with the various discharges into the water course. The detected TPH levels appeared to be transient in nature and were unlikely to be attributed to the site.

Based on the total and leachable (TCLP) concentration results (and taking into account the Approximate Gamma UCL for lead TCLP), the fill material is classified as Inert Waste for the purposes of off-site disposal. Sample analysis in conjunction with on-site observations and bore records indicates that the material below the filling is natural and would be classifiable as VENM.

It is recommended that the waste classification of the material should be verified/checked during site excavation.

On the basis of the investigation findings, DP considers the potential for contamination associated with the site is very low and the site is suitable for the proposed development from a chemical contamination perspective.

12. LIMITATIONS OF THIS REPORT

The scope of the site assessment activities and consulting services undertaken by DP were limited to those detailed in the proposal dated 25 March 2008 and accepted by Lachlan Project Development Pty Ltd.

DP's assessment is necessarily based upon the result of a limited site investigation and the restricted programme of surface and subsurface sampling, screening and chemical testing which was set out in the proposal. DP cannot provide unqualified warranties with regards to site contamination nor does DP assume any liability for site conditions not observed or accessible during the time of the investigations.

Despite all reasonable care and diligence, the ground conditions encountered and concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. In addition, site characteristics may change over time due to activities such as spillages of contaminating substances. These changes may occur subsequent to DP's investigations and assessment.

This report, its associated documentation and the information herein have been prepared solely for the use of Lachlan Project Development Pty Ltd. Any reliance assumed by third parties on this report shall be at such parties' own risk.

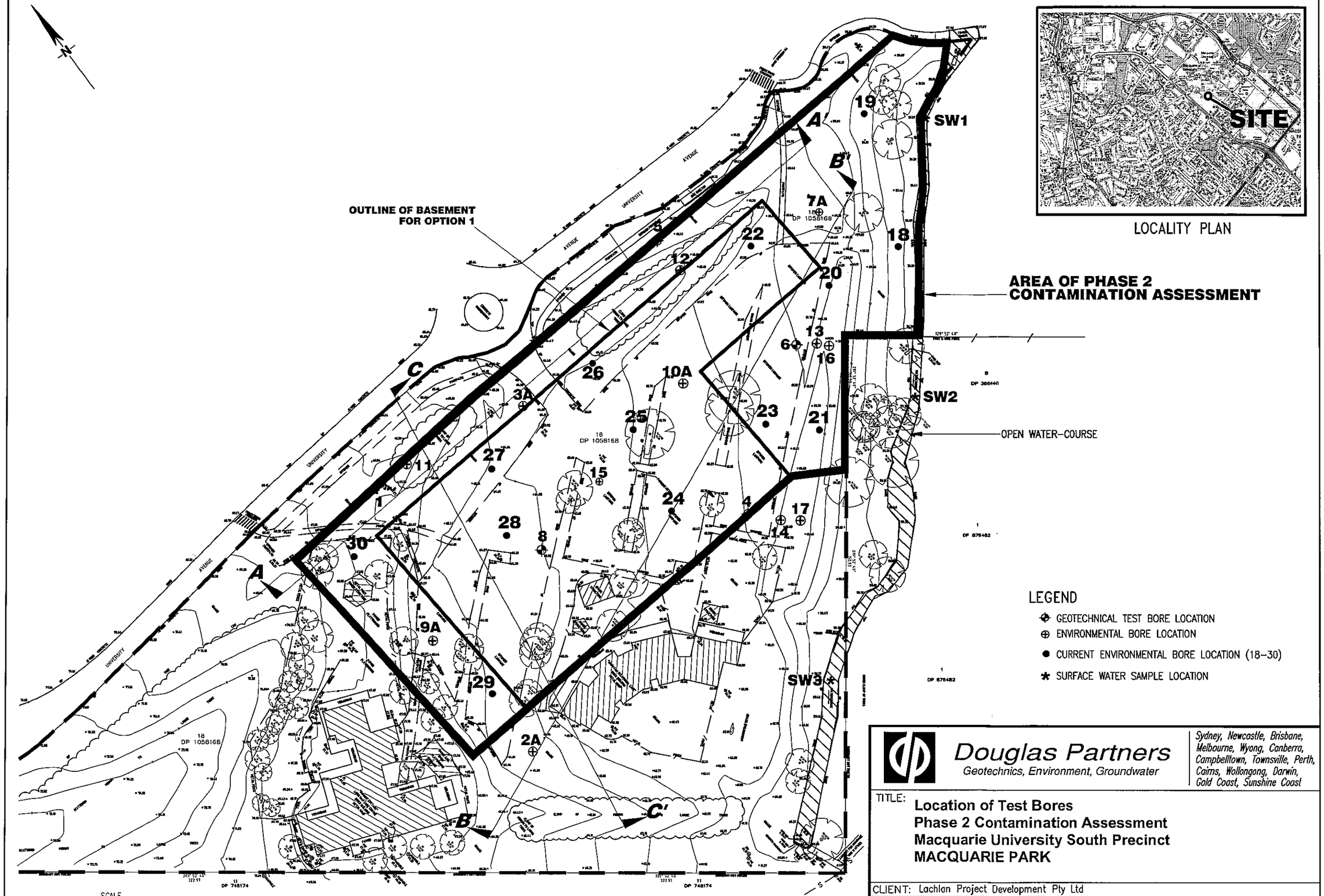
DOUGLAS PARTNERS PTY LTD

Galia Nikolaeva
Environmental Scientist

Reviewed by

Ronnie Tong
Principal

APPENDIX A
Site Drawing



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Sydney, Newcastle, Brisbane, Melbourne, Wyong, Canberra, Campbelltown, Townsville, Perth, Cairns, Wollongong, Darwin, Gold Coast, Sunshine Coast

TITLE: **Location of Test Bores**
Phase 2 Contamination Assessment
Macquarie University South Precinct
MACQUARIE PARK

CLIENT: Lachlan Project Development Pty Ltd			
DRAWN BY: PSCH	SCALE: As shown	PROJECT No: 45298.02	OFFICE: SYDNEY
APPROVED BY: STE		DATE: 16.4.2008	DRAWING No: 1

P:\45298.02 MACQUARIE UNIVERSITY, Phase 2 Contamination Assessment STE\Drawings\45298.02-1.dwg, 4/30/2008 10:10:03 AM

APPENDIX B
Site Photographs

Photo 1: General view of the north section of the site adjacent to University Avenue

Photo 2: General view of the eastern section of the site adjacent to the artificial watercourse

Phase 2 Contamination Assessment University Avenue, Macquarie University, South Precinct	**Project 45298.02**	**April 2008**	**Plate 1**

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Photo 3: General view of the southern section of the site

Phase 2 Contamination Assessment University Avenue, Macquarie University, South Precinct	**Project 45298.02**	**April 2008**	**Plate 2**

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APPENDIX C
Test Bore Reports and Notes Relating to this Report

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NOTES RELATING TO THIS REPORT

Introduction

These notes have been provided to amplify the geotechnical report in regard to classification methods, specialist field procedures and certain matters relating to the Discussion and Comments section. Not all, of course, are necessarily relevant to all reports.

Geotechnical reports are based on information gained from limited subsurface test boring and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, Geotechnical Site Investigations Code. In general, descriptions cover the following properties - strength or density, colour, structure, soil or rock type and inclusions.

Soil types are described according to the predominating particle size, qualified by the grading of other particles present (eg. sandy clay) on the following bases:

Soil Classification	Particle Size
Clay	less than 0.002 mm
Silt	0.002 to 0.06 mm
Sand	0.06 to 2.00 mm
Gravel	2.00 to 60.00 mm

Cohesive soils are classified on the basis of strength either by laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Undrained Shear Strength kPa
Very soft	less than 12
Soft	12—25
Firm	25—50
Stiff	50—100
Very stiff	100—200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone penetrometer tests (CPT) as below:

Relative Density	SPT "N" Value (blows/300 mm)	CPT Cone Value (q_c — MPa)
Very loose	less than 5	less than 2
Loose	5—10	2—5
Medium dense	10—30	5—15
Dense	30—50	15—25
Very dense	greater than 50	greater than 25

Rock types are classified by their geological names. Where relevant, further information regarding rock classification is given on the following sheet.

Sampling

Sampling is carried out during drilling to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing with a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling are given in the report.

Drilling Methods.

The following is a brief summary of drilling methods currently adopted by the Company and some comments on their use and application.

Test Pits — these are excavated with a backhoe or a tracked excavator, allowing close examination of the in-situ soils if it is safe to descent into the pit. The depth of penetration is limited to about 3 m for a backhoe and up to 6 m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Large Diameter Auger (eg. Pengo) — the hole is advanced by a rotating plate or short spiral auger, generally 300 mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube sampling.

Continuous Sample Drilling — the hole is advanced by pushing a 100 mm diameter socket into the ground and withdrawing it at intervals to extrude the sample. This is the most reliable method of drilling in soils, since moisture content is unchanged and soil structure, strength, etc. is only marginally affected.

Continuous Spiral Flight Augers — the hole is advanced using 90—115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow

sampling or in-situ testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are very disturbed and may be contaminated. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability, due to remoulding, contamination or softening of samples by ground water.

Non-core Rotary Drilling — the hole is advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from 'feel' and rate of penetration.

Rotary Mud Drilling — similar to rotary drilling, but using drilling mud as a circulating fluid. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (eg. from SPT).

Continuous Core Drilling — a continuous core sample is obtained using a diamond-tipped core barrel, usually 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in very weak rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation.

Standard Penetration Tests

Standard penetration tests (abbreviated as SPT) are used mainly in non-cohesive soils, but occasionally also in cohesive soils as a means of determining density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" — Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of say 4, 6 and 7

  as 4, 6, 7
  N = 13

- In the case where the test is discontinued short of full penetration, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm

  as 15, 30/40 mm.

The results of the tests can be related empirically to the engineering properties of the soil.

Occasionally, the test method is used to obtain samples in 50 mm diameter thin walled sample tubes in clays. In such circumstances, the test results are shown on the borelogs in brackets.

Cone Penetrometer Testing and Interpretation

Cone penetrometer testing (sometimes referred to as Dutch cone — abbreviated as CPT) described in this report has been carried out using an electrical friction cone penetrometer. The test is described in Australian Standard 1289, Test 6.4.1.

In the tests, a 35 mm diameter rod with a cone-tipped end is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the friction resistance on a separate 130 mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are connected by electrical wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20 mm per second) the information is plotted on a computer screen and at the end of the test is stored on the computer for later plotting of the results.

The information provided on the plotted results comprises: —

- Cone resistance — the actual end bearing force divided by the cross sectional area of the cone — expressed in MPa.
- Sleeve friction — the frictional force on the sleeve divided by the surface area — expressed in kPa.
- Friction ratio — the ratio of sleeve friction to cone resistance, expressed in percent.

There are two scales available for measurement of cone resistance. The lower scale (0—5 MPa) is used in very soft soils where increased sensitivity is required and is shown in the graphs as a dotted line. The main scale (0—50 MPa) is less sensitive and is shown as a full line.

The ratios of the sleeve friction to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1%—2% are commonly encountered in sands and very soft clays rising to 4%—10% in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:—

q_c (MPa) = (0.4 to 0.6) N (blows per 300 mm)

In clays, the relationship between undrained shear strength and cone resistance is commonly in the range:—

q_c = (12 to 18) c_u

Interpretation of CPT values can also be made to allow estimation of modulus or compressibility values to allow calculation of foundation settlements.

Inferred stratification as shown on the attached reports is assessed from the cone and friction traces and from experience and information from nearby boreholes, etc. This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties, and where precise information on

soil classification is required, direct drilling and sampling may be preferable.

Hand Penetrometers

Hand penetrometer tests are carried out by driving a rod into the ground with a falling weight hammer and measuring the blows for successive 150 mm increments of penetration. Normally, there is a depth limitation of 1.2 m but this may be extended in certain conditions by the use of extension rods.

Two relatively similar tests are used.

- Perth sand penetrometer — a 16 mm diameter flat-ended rod is driven with a 9 kg hammer, dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.
- Cone penetrometer (sometimes known as the Scala Penetrometer) — a 16 mm rod with a 20 mm diameter cone end is driven with a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). The test was developed initially for pavement subgrade investigations, and published correlations of the test results with California bearing ratio have been published by various Road Authorities.

Laboratory Testing

Laboratory testing is carried out in accordance with Australian Standard 1289 "Methods of Testing Soil for Engineering Purposes". Details of the test procedure used are given on the individual report forms.

Bore Logs

The bore logs presented herein are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable, or possible to justify on economic grounds. In any case, the boreholes represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes, the frequency of sampling and the possibility of other than 'straight line' variations between the boreholes.

Ground Water

Where ground water levels are measured in boreholes, there are several potential problems;

- In low permeability soils, ground water although present, may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report.
- The use of water or mud as a drilling fluid will mask any ground water inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Engineering Reports

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building), the information and interpretation may not be relevant if the design proposal is changed (eg. to a twenty storey building). If this happens, the Company will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface condition, discussion of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- unexpected variations in ground conditions — the potential for this will depend partly on bore spacing and sampling frequency
- changes in policy or interpretation of policy by statutory authorities
- the actions of contractors responding to commercial pressures.

If these occur, the Company will be pleased to assist with investigation or advice to resolve the matter.

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the Company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed than at some later stage, well after the event.

Reproduction of Information for Contractual Purposes

Attention is drawn to the document "Guidelines for the Provision of Geotechnical Information in Tender Documents", published by the Institution of Engineers,

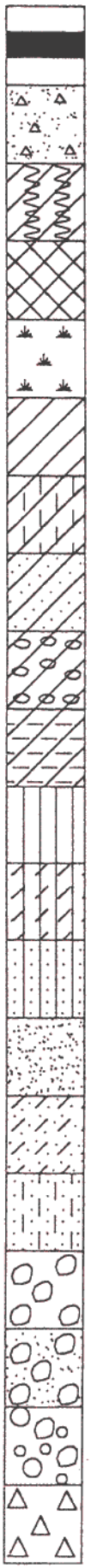
Australia. Where information obtained from this investigation is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The Company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

GRAPHIC SYMBOLS FOR SOIL & ROCK

SOIL



BITUMINOUS CONCRETE

CONCRETE

TOPSOIL

FILLING

PEAT

CLAY

SILTY CLAY

SANDY CLAY

GRAVELLY CLAY

SHALY CLAY

SILT

CLAYEY SILT

SANDY SILT

SAND

CLAYEY SAND

SILTY SAND

GRAVEL

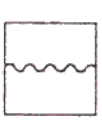
SANDY GRAVEL

COBBLES/BOULDERS

TALUS

SEAMS

SEAM >10mm



SEAM <10mm

SEDIMENTARY ROCK

BOULDER CONGLOMERATE

CONGLOMERATE

CONGLOMERATIC SANDSTONE

SANDSTONE FINE GRAINED

SANDSTONE COARSE GRAINED

SILTSTONE

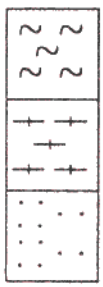
LAMINITE

MUDSTONE, CLAYSTONE, SHALE

COAL

LIMESTONE

METAMORPHIC ROCK

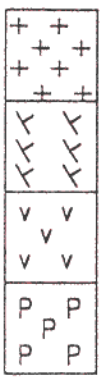


SLATE, PHYLLITE, SCHIST

GNEISS

QUARTZITE

IGNEOUS ROCK



GRANITE

DOLERITE, BASALT

TUFF

PORPHYRY

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 18
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	TOPSOIL - brown sandy clay filling, with some roots, organic matter							
		FILLING - brown sandy clay filling, with substantial amount of gravel		A	0.2 0.3		PID=2ppm		
	1								1
		- bitumen and sandstone inclusions		A	1.3 1.4		PID=18ppm		
	2								2
	3			A	2.9		PID=4ppm		
	3.0	Bore discontinued at 3.0m - limit of incline anguering			3.0				3
	4								4

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased
TYPE OF BORING:
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U,	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials: STE
Date: 13/6/08

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 19
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	TOPSOIL - brown sandy clay filling, with roots and organic matter							
		FILLING - brown sandy clay filling, with substantial amount of gravel		A	0.2 0.3		PID=4ppm		
				A	0.6		PID=6ppm		
	0.7	CLAY - brown clay, moist (possibly filling)			0.7				
	1								1
	1.8	SILTY CLAY - orange silty clay, moist							
	2								2
				A*	2.4 2.5		PID=8ppm		
		- mottled grey clay, saturated		A	2.9		PID=5ppm	▼	
	3 3.0	Bore discontinued at 3.0m - target depth reached			3.0				3
	4								4

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased

TYPE OF BORING:

WATER OBSERVATIONS: Free groundwater observed at 3.0m during drilling

REMARKS: *Field replicate BD2/070408 of sample 19/2.4-2.5m collected

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U,	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials: STE
Date: 3/4/08

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 20
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	TOPSOIL - brown silty sand filling, with root, organic matter			0.02				
		FILLING - brown silty sand filling, with substantial amount of gravel		A			PID=7ppm		
	0.5	FILLING - brown mottled orange and grey sandy clay filling, with substantial amount of gravel			0.5				
	1			A	0.8		PID=25ppm		1
					1.0				
				A	1.4		PID=14ppm		
					1.5				
	2			A	1.8		PID=5ppm		2
					2.0				
				A	2.3		PID=11ppm		
					2.5				
	3			A	2.8		PID=34ppm		3
	3.0	Bore discontinued at 3.0m - limit of incline anguering			3.0				
	4								4

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased
TYPE OF BORING:
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U,	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials: STE
Date: 13/6/08

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 21
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	TOPSOIL - brown silty sand filling, with roots, organic matter							
		FILLING - brown mottled orange sandy clay filling, with substantial amount of gravel, moist		A	0.3		PID=4ppm		
					0.5				
	1								1
				A	1.3		PID=3ppm		
		- bitumen cobbles inclusions			1.5				
	2								2
		- mottled grey and orange clay filling, moist							
				A	2.8		PID=4ppm		
	3 3.0	Bore discontinued at 3.0m - limit of incline anguering			3.0				3
	4								4

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased

TYPE OF BORING:

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ⋿ Water level

CHECKED
Initials: STE
Date: 13/6/08

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 22
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	ASPHALT							
	0.1	ROADBASE GRAVEL							
		FILLING - brown to orange clay filling, with substantial amount of gravel		A	0.2 0.3		PID=8ppm		
	1								1
				A	1.3 1.5		PID=9ppm		
	2								2
	2.6	SILTY CLAY - brown silty clay, moist							
				A	2.8 3.0		PID=3ppm		
	3								3
		- mottled grey clay		A	3.8		PID=6ppm		
	4 4.0	Bore discontinued at 4.0m - refusal on ironstone, shale			4.0				4

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased
TYPE OF BORING:
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials: STE
Date: 13/6/08

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 23
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	ASPHALT							Gatic cover
	0.1	ROADBASE GRAVEL							Backfill
		FILLING - brown mottled orange sandy clay filling, with some gravel and traces of ironstone			0.3				Bentonite
				A			PID=14ppm		
					0.5				
					0.8				
				A			PID=2ppm		Backfilled with gravel
1		- brown mottled grey and orange clay, moist			1.0				1
					1.8				
				A			PID=8ppm		
2					2.0				2 Machine slotted PVC screen
	2.6	SILTY CLAY - brown silty clay, moist							
					2.8				
				A			PID=7ppm		
3	3.0	Bore discontinued at 3.0m - refusal on mudstone			3.0				3 End cap
4									4

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased
TYPE OF BORING:
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▽ Water level

CHECKED
Initials: STE
Date: 17/6/08

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 24
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	ASPHALT							
	0.1	ROADBASE GRAVEL							
		FILLING - brown sandy clay filling, with substantial amount of gravel		A	0.3		PID<1ppm		
					0.5				
	1								1
				A	1.3		PID=2ppm		
					1.5				
	2								2
				A	2.3		PID=5ppm		
					2.5				
	2.8	SILTY CLAY - brown mottled orange and yellow silty clay		A	2.8		PID<1ppm		
	3 3.0	Bore discontinued at 3.0m - refusal on shale			3.0				3
	4								4

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased
TYPE OF BORING:
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U,	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials: STE
Date: 13/6/08

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 25
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	ASPHALT							
	0.1	ROADBASE GRAVEL							
		FILLING - brown sandy clay filling, with some gravel			0.3				
				A			PID=14ppm		
					0.5				
					0.8				
				A			PID=11ppm		
1		- mottled orange clay			1.0				1
					1.8				
				A			PID=24ppm		
2					2.0				2
	2.5	SILTY CLAY - orange silty clay		A	2.5		PID=3ppm		
	2.6	Bore discontinued at 2.6m - refusal on shale and ironstone			2.6				
3									3
4									4

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased
TYPE OF BORING:
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials: STE
Date: 13/6/08

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 26
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	TOPSOIL - brown sandy clay filling with some roots, organic matter		A	0.1		PID=4ppm		
		FILLING - brown sandy clay filling, with some gravel			0.2				
	1.4	SILTY CLAY - orange silty clay		A	1.4		PID=6ppm		
	1.6	Bore discontinued at 1.6m - refusal on shale			1.6				

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased

TYPE OF BORING:

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials: STE
Date: 13/6/08

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 27
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	TOPSOIL - brown sandy clay filling with some roots and organic matter							
		FILLING - brown sandy clay filling, with some gravel		A	0.2 0.3		PID=11ppm		
	1								1
	1.8	SILTY CLAY - orange silty clay		A	1.8		PID=7ppm		
	2 2.0	Bore discontinued at 2.0m - refusal on shale			2.0				2
	3								3
	4								4

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased
TYPE OF BORING:
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U$_x$	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials: 13/6/08
Date: SJE

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 28
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	ASPHALT							
	0.1	ROADBASE		A	0.1		PID=8ppm		
	0.2	FILLING - brown silty sand filling, with some gravel			0.2				
		FILLING - brown sandy clay filling, with some gravel							
				A*	0.5		PID=12ppm		
					0.6				
	1.2	SILTY CLAY - orange mottled yellow and grey silty clay, moist		A	1.2		PID=8ppm		
					1.3				
					2.5				
				A			PID=4ppm		
	2.7	Bore discontinued at 2.7m - refusal on shale			2.7				

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased

TYPE OF BORING:

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate BD3/070408 of sample 28/0.5-0.6m collected

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U$_x$	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials: STE
Date: 13/6/08

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 29
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	ASPHALT							
	0.1	ROADBASE GRAVEL		A	0.1 0.2		PID=5ppm		
		SILTY CLAY - orange silty clay							
	0.5	Bore discontinued at 0.5m - refusal on shale							
	1								
	2								
	3								
	4								

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased

TYPE OF BORING:

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▽ Water level

CHECKED
Initials: STE
Date: 13/6/08

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BOREHOLE LOG

CLIENT: Lachlan Project Development Pty Ltd
PROJECT: Phase 2 Contamination Assessment
LOCATION: University Avenue, Macquarie University

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 30
PROJECT No: 45298.02
DATE: 03 Apr 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	ASPHALT							Gatic cover
	0.1	ROADBASE GRAVEL							Backfill
		SILTY CLAY - orange mottled grey silty clay		A*	0.2 0.3		PiD=2ppm		Bentonite Backfilled with gravel
				A	0.9		PID=4ppm		Machine slotted PVC screen
1	1.0	Bore discontinued at 1.0m - refusal on shale							End cap
2									
3									
4									

RIG: 100mm diameter auger **DRILLER:** SG **LOGGED:** GN **CASING:** Uncased

TYPE OF BORING:

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate BD1/070408 of sample 30/0.2-0.3m collected

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials: STE
Date: 13/6/08

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APPENDIX D
Laboratory Reports and Chain of Custody Documentation

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 18386

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Galia Nikolaeva

Sample log in details:

Your Reference:	**45298.02, Macquarie University**
No. of samples:	33 Soils
Date samples received:	07/04/08
Date completed instructions received:	07/04/08

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:	14/04/08
Date of Preliminary Report:	Not issued
Issue Date:	14/04/08

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Results Approved By:

Jacinta Hurst
Operations Manager

Joshua Lim
Chemist

ACCREDITED FOR TECHNICAL COMPETENCE

VOC's in soil Our Reference: Your Reference Type of sample	UNITS --- ---	18386-1 18/0.2-0.3 Soil	18386-2 18/1.3-1.4 Soil	18386-4 19/0.2-0.3 Soil	18386-8 20/0.8-1.0 Soil	18386-11 21/1.3-1.5 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	11/04/2008	11/04/2008	11/04/2008	11/04/2008	11/04/2008
Dichlorodifluoromethane	mg/kg	<10	<10	<10	<10	<10
Chloromethane	mg/kg	<10	<10	<10	<10	<10
Vinyl Chloride	mg/kg	<10	<10	<10	<10	<10
Bromomethane	mg/kg	<10	<10	<10	<10	<10
Chloroethane	mg/kg	<10	<10	<10	<10	<10
Trichlorofluoromethane	mg/kg	<10	<10	<10	<10	<10
1,1-Dichloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-dichloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
bromochloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
chloroform	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2,2-dichloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dichloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1-trichloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-dichloropropene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
carbon tetrachloride	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
dibromomethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dichloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
trichloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
bromodichloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,3-dichloropropene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
cis-1,3-dichloropropene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2-trichloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
dibromochloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dibromoethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
tetrachloroethene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,1,2-tetrachloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
chlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
bromoform	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
styrene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-tetrachloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0

VOC's in soil Our Reference: Your Reference Type of sample	UNITS --- ---	18386-1 18/0.2-0.3 Soil	18386-2 18/1.3-1.4 Soil	18386-4 19/0.2-0.3 Soil	18386-8 20/0.8-1.0 Soil	18386-11 21/1.3-1.5 Soil
1,2,3-trichloropropane*	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
isopropylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
bromobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
n-propyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2-chlorotoluene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
4-chlorotoluene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,3,5-trimethyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
tert-butyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-trimethyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-dichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
sec-butyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-dichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
4-isopropyl toluene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
n-butyl benzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-dibromo-3-chloropropane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-trichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
napthalene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
hexachlorobutadiene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,3-trichlorobenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluorometha	%	96	103	92	96	97
Surrogate aaa-Trifluorotoluene	%	68	75	82	82	80
Surrogate Toluene-d8	%	95	95	95	94	95
Surrogate 4-Bromofluorobenzene	%	75	78	73	81	78

VOC's in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-16 23/0.8-1.0 Soil	18386-21 25/1.8-2.0 Soil	18386-30 30/0.9 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	11/04/2008	11/04/2008	11/04/2008
Dichlorodifluoromethane	mg/kg	<10	<10	<10
Chloromethane	mg/kg	<10	<10	<10
Vinyl Chloride	mg/kg	<10	<10	<10
Bromomethane	mg/kg	<10	<10	<10
Chloroethane	mg/kg	<10	<10	<10
Trichlorofluoromethane	mg/kg	<10	<10	<10
1,1-Dichloroethene	mg/kg	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	mg/kg	<1.0	<1.0	<1.0
1,1-dichloroethane	mg/kg	<1.0	<1.0	<1.0
cis-1,2-dichloroethene	mg/kg	<1.0	<1.0	<1.0
bromochloromethane	mg/kg	<1.0	<1.0	<1.0
chloroform	mg/kg	<1.0	<1.0	<1.0
2,2-dichloropropane	mg/kg	<1.0	<1.0	<1.0
1,2-dichloroethane	mg/kg	<1.0	<1.0	<1.0
1,1,1-trichloroethane	mg/kg	<1.0	<1.0	<1.0
1,1-dichloropropene	mg/kg	<1.0	<1.0	<1.0
carbon tetrachloride	mg/kg	<1.0	<1.0	<1.0
Benzene	mg/kg	<0.5	<0.5	<0.5
dibromomethane	mg/kg	<1.0	<1.0	<1.0
1,2-dichloropropane	mg/kg	<1.0	<1.0	<1.0
trichloroethene	mg/kg	<1.0	<1.0	<1.0
bromodichloromethane	mg/kg	<1.0	<1.0	<1.0
trans-1,3-dichloropropene	mg/kg	<1.0	<1.0	<1.0
cis-1,3-dichloropropene	mg/kg	<1.0	<1.0	<1.0
1,1,2-trichloroethane	mg/kg	<1.0	<1.0	<1.0
Toluene	mg/kg	<0.5	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1.0	<1.0	<1.0
dibromochloromethane	mg/kg	<1.0	<1.0	<1.0
1,2-dibromoethane	mg/kg	<1.0	<1.0	<1.0
tetrachloroethene	mg/kg	<1.0	<1.0	<1.0
1,1,1,2-tetrachloroethane	mg/kg	<1.0	<1.0	<1.0
chlorobenzene	mg/kg	<1.0	<1.0	<1.0
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0
bromoform	mg/kg	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0
styrene	mg/kg	<1.0	<1.0	<1.0
1,1,2,2-tetrachloroethane	mg/kg	<1.0	<1.0	<1.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0

VOC's in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-16 23/0.8-1.0 Soil	18386-21 25/1.8-2.0 Soil	18386-30 30/0.9 Soil
1,2,3-trichloropropane*	mg/kg	<1.0	<1.0	<1.0
isopropylbenzene	mg/kg	<1.0	<1.0	<1.0
bromobenzene	mg/kg	<1.0	<1.0	<1.0
n-propyl benzene	mg/kg	<1.0	<1.0	<1.0
2-chlorotoluene	mg/kg	<1.0	<1.0	<1.0
4-chlorotoluene	mg/kg	<1.0	<1.0	<1.0
1,3,5-trimethyl benzene	mg/kg	<1.0	<1.0	<1.0
tert-butyl benzene	mg/kg	<1.0	<1.0	<1.0
1,2,4-trimethyl benzene	mg/kg	<1.0	<1.0	<1.0
1,3-dichlorobenzene	mg/kg	<1.0	<1.0	<1.0
sec-butyl benzene	mg/kg	<1.0	<1.0	<1.0
1,4-dichlorobenzene	mg/kg	<1.0	<1.0	<1.0
4-isopropyl toluene	mg/kg	<1.0	<1.0	<1.0
1,2-dichlorobenzene	mg/kg	<1.0	<1.0	<1.0
n-butyl benzene	mg/kg	<1.0	<1.0	<1.0
1,2-dibromo-3-chloropropane	mg/kg	<1.0	<1.0	<1.0
1,2,4-trichlorobenzene	mg/kg	<1.0	<1.0	<1.0
napthalene	mg/kg	<1.0	<1.0	<1.0
hexachlorobutadiene	mg/kg	<1.0	<1.0	<1.0
1,2,3-trichlorobenzene	mg/kg	<1.0	<1.0	<1.0
Surrogate Dibromofluorometha	%	87	88	87
Surrogate aaa-Trifluorotoluene	%	89	85	94
Surrogate Toluene-d8	%	95	92	97
Surrogate 4-Bromofluorobenzene	%	77	79	80

vTPH & BTEX in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-1 18/0.2-0.3 Soil	18386-2 18/1.3-1.4 Soil	18386-3 18/2.9-3.0 Soil	18386-4 19/0.2-0.3 Soil	18386-5 19/0.6-0.7 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	11/04/2008	11/04/2008	11/04/2008	11/04/2008	11/04/2008
vTPH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	8.0	75	92	82	104

vTPH & BTEX in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-6 19/2.4-2.5 Soil	18386-7 20/0.02-0.5 Soil	18386-8 20/0.8-1.0 Soil	18386-9 20/2.8-3.0 Soil	18386-10 21/0.3-0.5 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	11/04/2008	11/04/2008	11/04/2008	11/04/2008	11/04/2008
vTPH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	88	100	82	95	90

vTPH & BTEX in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-11 21/1.3-1.5 Soil	18386-12 22/0.2-0.3 Soil	18386-13 22/1.3-1.5 Soil	18386-14 22/3.8-4.0 Soil	18386-15 23/0.3-0.5 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	11/04/2008	11/04/2008	11/04/2008	11/04/2008	11/04/2008
vTPH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	80	91	103	111	111

vTPH & BTEX in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-16 23/0.8-1.0 Soil	18386-17 23/2.8-3.0 Soil	18386-18 24/0.3-0.5 Soil	18386-19 24/2.3-2.5 Soil	18386-20 25/0.8-1.0 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	11/04/2008	11/04/2008	11/04/2008	11/04/2008	11/04/2008
vTPH C6 - C9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	89	125	103	93	109

vTPH & BTEX in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-21 25/1.8-2.0 Soil	18386-22 26/0.1-0.2 Soil	18386-23 26/1.4-1.6 Soil	18386-24 27/0.2-0.3 Soil	18386-25 20/1.8-2.0 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	11/04/2008	11/04/2008	11/04/2008	11/04/2008	11/04/2008
vTPH C6 - C9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	85	95	111	116	117

vTPH & BTEX in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-26 28/0.1-0.2 Soil	18386-27 28/0.5-0.6 Soil	18386-28 29/0.1-0.2 Soil	18386-29 30/0.2-0.3 Soil	18386-30 30/0.9 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	11/04/2008	11/04/2008	11/04/2008	11/04/2008	11/04/2008
vTPH C6 - C9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
m + p-Xylene	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
o-Xylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	100	114	111	97	94

vTPH & BTEX in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-32 TB/070408 Soil	18386-33 TS/070408 Soil
Date extracted	-	9/04/2008	9/04/2008
Date analysed	-	11/04/2008	11/04/2008
Benzene	mg/kg	<0.5	36%
Toluene	mg/kg	<0.5	72%
Ethylbenzene	mg/kg	<1.0	109%
m + p-Xylene	mg/kg	<2.0	115%
o-Xylene	mg/kg	<1.0	124%
Surrogate aaa-Trifluorotoluene	%	123	96

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	18386-1	18386-2	18386-3	18386-4	18386-5
Your Reference	----------	18/0.2-0.3	18/1.3-1.4	18/2.9-3.0	19/0.2-0.3	19/0.6-0.7
Type of sample	----------	Soil	Soil	Soil	Soil	Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
TPH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TPH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TPH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	94	96	97	93	89

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	18386-6	18386-7	18386-8	18386-9	18386-10
Your Reference	----------	19/2.4-2.5	20/0.02-0.5	20/0.8-1.0	20/2.8-3.0	21/0.3-0.5
Type of sample	----------	Soil	Soil	Soil	Soil	Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
TPH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TPH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TPH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	91	94	92	90	94

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	18386-11	18386-12	18386-13	18386-14	18386-15
Your Reference	----------	21/1.3-1.5	22/0.2-0.3	22/1.3-1.5	22/3.8-4.0	23/0.3-0.5
Type of sample	----------	Soil	Soil	Soil	Soil	Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
TPH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TPH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TPH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	95	91	91	90	99

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	18386-16	18386-17	18386-18	18386-19	18386-20
Your Reference	----------	23/0.8-1.0	23/2.8-3.0	24/0.3-0.5	24/2.3-2.5	25/0.8-1.0
Type of sample	----------	Soil	Soil	Soil	Soil	Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
TPH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TPH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TPH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	97	92	92	91	93

sTPH in Soil (C10-C36) Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-21 25/1.8-2.0 Soil	18386-22 26/0.1-0.2 Soil	18386-23 26/1.4-1.6 Soil	18386-24 27/0.2-0.3 Soil	18386-25 20/1.8-2.0 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
TPH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TPH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TPH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	95	91	91	89	92

sTPH in Soil (C10-C36) Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-26 28/0.1-0.2 Soil	18386-27 28/0.5-0.6 Soil	18386-28 29/0.1-0.2 Soil	18386-29 30/0.2-0.3 Soil	18386-30 30/0.9 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
TPH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TPH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TPH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	89	96	89	88	93

PAHs in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-1 18/0.2-0.3 Soil	18386-2 18/1.3-1.4 Soil	18386-3 18/2.9-3.0 Soil	18386-4 19/0.2-0.3 Soil	18386-5 19/0.6-0.7 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.5	0.8	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.8	1.2	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.7	1.2	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.3	0.5	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.3	0.6	<0.1	<0.1
Benzo(b,k)fluoranthene	mg/kg	<0.2	0.5	0.9	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.3	0.5	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.2	0.3	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	0.3	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	106	94	98	100	93

PAHs in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-6 19/2.4-2.5 Soil	18386-7 20/0.02-0.5 Soil	18386-8 20/0.8-1.0 Soil	18386-9 20/2.8-3.0 Soil	18386-10 21/0.3-0.5 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	0.07
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	95	93	99	95	98

PAHs in Soil Our Reference: Your Reference Type of sample	UNITS --- ---	18386-11 21/1.3-1.5 Soil	18386-12 22/0.2-0.3 Soil	18386-13 22/1.3-1.5 Soil	18386-14 22/3.8-4.0 Soil	18386-15 23/0.3-0.5 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Benzo(b,k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	99	96	96	97	96

PAHs in Soil Our Reference: Your Reference Type of sample	UNITS --- ---	18386-16 23/0.8-1.0 Soil	18386-17 23/2.8-3.0 Soil	18386-18 24/0.3-0.5 Soil	18386-19 24/2.3-2.5 Soil	18386-20 25/0.8-1.0 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.3
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	1.0
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	1.0
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.4
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.5
Benzo(b,k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	0.7
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	0.4
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.3
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Surrogate p-Terphenyl-d_{14}	%	94	100	94	97	96

PAHs in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-21 25/1.8-2.0 Soil	18386-22 26/0.1-0.2 Soil	18386-23 26/1.4-1.6 Soil	18386-24 27/0.2-0.3 Soil	18386-25 20/1.8-2.0 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	0.06	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	93	95	92	94	94

PAHs in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-26 28/0.1-0.2 Soil	18386-27 28/0.5-0.6 Soil	18386-28 29/0.1-0.2 Soil	18386-29 30/0.2-0.3 Soil	18386-30 30/0.9 Soil
Date extracted	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	99	98	93	95	92

PAHs in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-31 BD1/070408 Soil
Date extracted	-	9/04/2008
Date analysed	-	9/04/2008
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}	%	91

Organochlorine Pesticides in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-1 18/0.2-0.3 Soil	18386-2 18/1.3-1.4 Soil	18386-3 18/2.9-3.0 Soil	18386-4 19/0.2-0.3 Soil	18386-5 19/0.6-0.7 Soil
Date extracted	-	8/04/2008	8/04/2008	8/04/2008	8/04/2008	8/04/2008
Date analysed	-	8/04/2008	8/04/2008	8/04/2008	8/04/2008	8/04/2008
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	113	76	79	76	73

Organochlorine Pesticides in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-6 19/2.4-2.5 Soil	18386-7 20/0.02-0.5 Soil	18386-10 21/0.3-0.5 Soil	18386-11 21/1.3-1.5 Soil	18386-12 22/0.2-0.3 Soil
Date extracted	-	8/04/2008	8/04/2008	8/04/2008	8/04/2008	8/04/2008
Date analysed	-	8/04/2008	11/04/2008	11/04/2008	11/04/2008	11/04/2008
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	72	76	76	76	73

Organochlorine Pesticides in soil Our Reference: Your Reference Type of sample	UNITS --- ---	18386-15 23/0.3-0.5 Soil	18386-18 24/0.3-0.5 Soil	18386-22 26/0.1-0.2 Soil	18386-24 27/0.2-0.3 Soil	18386-26 28/0.1-0.2 Soil
Date extracted	-	8/04/2008	8/04/2008	8/04/2008	8/04/2008	8/04/2008
Date analysed	-	11/04/2008	11/04/2008	11/04/2008	11/04/2008	11/04/2008
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	75	76	73	73	73

Organochlorine Pesticides in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-27 28/0.5-0.6 Soil	18386-28 29/0.1-0.2 Soil	18386-29 30/0.2-0.3 Soil
Date extracted	-	8/04/2008	8/04/2008	8/04/2008
Date analysed	-	11/04/2008	11/04/2008	11/04/2008
HCB	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	76	70	72

PCBs in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-1 18/0.2-0.3 Soil	18386-2 18/1.3-1.4 Soil	18386-3 18/2.9-3.0 Soil	18386-4 19/0.2-0.3 Soil	18386-5 19/0.6-0.7 Soil
Date extracted	-	8/04/2008	8/04/2008	8/04/2008	8/04/2008	8/04/2008
Date analysed	-	8/04/2008	8/04/2008	8/04/2008	8/04/2008	8/04/2008
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	113	76	79	76	73

PCBs in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-6 19/2.4-2.5 Soil	18386-7 20/0.02-0.5 Soil	18386-10 21/0.3-0.5 Soil	18386-11 21/1.3-1.5 Soil	18386-12 22/0.2-0.3 Soil
Date extracted	-	8/04/2008	8/04/2008	8/04/2008	8/04/2008	8/04/2008
Date analysed	-	8/04/2008	11/04/2008	11/04/2008	11/04/2008	11/04/2008
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	72	76	76	76	73

PCBs in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-15 23/0.3-0.5 Soil	18386-18 24/0.3-0.5 Soil	18386-22 26/0.1-0.2 Soil	18386-24 27/0.2-0.3 Soil	18386-26 28/0.1-0.2 Soil
Date extracted	-	8/04/2008	8/04/2008	8/04/2008	8/04/2008	8/04/2008
Date analysed	-	11/04/2008	11/04/2008	11/04/2008	11/04/2008	11/04/2008
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	75	76	73	73	73

PCBs in Soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-27 28/0.5-0.6 Soil	18386-28 29/0.1-0.2 Soil	18386-29 30/0.2-0.3 Soil
Date extracted	-	8/04/2008	8/04/2008	8/04/2008
Date analysed	-	11/04/2008	11/04/2008	11/04/2008
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	76	70	72

Total Phenolics in Soil						
Our Reference:	UNITS	18386-1	18386-2	18386-3	18386-4	18386-5
Your Reference	----------	18/0.2-0.3	18/1.3-1.4	18/2.9-3.0	19/0.2-0.3	19/0.6-0.7
Type of sample	----------	Soil	Soil	Soil	Soil	Soil
Date extracted	-	10/04/2008	10/04/2008	10/04/2008	10/04/2008	10/04/2008
Date analysed	-	10/04/2008	10/04/2008	10/04/2008	10/04/2008	10/04/2008
Total Phenolics (as Phenol)	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0

Total Phenolics in Soil						
Our Reference:	UNITS	18386-6	18386-7	18386-10	18386-11	18386-12
Your Reference	----------	19/2.4-2.5	20/0.02-0.5	21/0.3-0.5	21/1.3-1.5	22/0.2-0.3
Type of sample	----------	Soil	Soil	Soil	Soil	Soil
Date extracted	-	10/04/2008	10/04/2008	10/04/2008	10/04/2008	10/04/2008
Date analysed	-	10/04/2008	10/04/2008	10/04/2008	10/04/2008	10/04/2008
Total Phenolics (as Phenol)	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0

Total Phenolics in Soil						
Our Reference:	UNITS	18386-15	18386-18	18386-22	18386-24	18386-26
Your Reference	----------	23/0.3-0.5	24/0.3-0.5	26/0.1-0.2	27/0.2-0.3	28/0.1-0.2
Type of sample	----------	Soil	Soil	Soil	Soil	Soil
Date extracted	-	10/04/2008	10/04/2008	10/04/2008	10/04/2008	10/04/2008
Date analysed	-	10/04/2008	10/04/2008	10/04/2008	10/04/2008	10/04/2008
Total Phenolics (as Phenol)	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0

Total Phenolics in Soil				
Our Reference:	UNITS	18386-27	18386-28	18386-29
Your Reference	----------	28/0.5-0.6	29/0.1-0.2	30/0.2-0.3
Type of sample	----------	Soil	Soil	Soil
Date extracted	-	10/04/2008	10/04/2008	10/04/2008
Date analysed	-	10/04/2008	10/04/2008	10/04/2008
Total Phenolics (as Phenol)	mg/kg	<5.0	<5.0	<5.0

Acid Extractable metals in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-1 18/0.2-0.3 Soil	18386-2 18/1.3-1.4 Soil	18386-3 18/2.9-3.0 Soil	18386-4 19/0.2-0.3 Soil	18386-5 19/0.6-0.7 Soil
Date digested	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	10/04/2008	10/04/2008	10/04/2008	10/04/2008	10/04/2008
Arsenic	mg/kg	4.9	<4.0	<4.0	9.8	<4.0
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/kg	29	24	21	14	11
Copper	mg/kg	19	21	9.9	14	3.6
Lead	mg/kg	20	28	41	21	13
Mercury	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	mg/kg	26	33	16	8.9	2.8
Zinc	mg/kg	30	35	30	16	13

Acid Extractable metals in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-6 19/2.4-2.5 Soil	18386-7 20/0.02-0.5 Soil	18386-8 20/0.8-1.0 Soil	18386-9 20/2.8-3.0 Soil	18386-10 21/0.3-0.5 Soil
Date digested	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	10/04/2008	10/04/2008	10/04/2008	10/04/2008	10/04/2008
Arsenic	mg/kg	<4.0	6.4	4.6	6.6	6.3
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/kg	8.0	28	7.7	18	22
Copper	mg/kg	2.9	23	5.1	17	24
Lead	mg/kg	12	13	19	32	21
Mercury	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	mg/kg	<1.0	32	1.7	17	21
Zinc	mg/kg	3.2	21	2.6	19	35

Acid Extractable metals in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-11 21/1.3-1.5 Soil	18386-12 22/0.2-0.3 Soil	18386-13 22/1.3-1.5 Soil	18386-14 22/3.8-4.0 Soil	18386-15 23/0.3-0.5 Soil
Date digested	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	10/04/2008	10/04/2008	10/04/2008	10/04/2008	10/04/2008
Arsenic	mg/kg	6.1	8.3	11	9.7	6.4
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/kg	18	27	21	11	14
Copper	mg/kg	10	10	16	4.7	21
Lead	mg/kg	36	26	44	17	75
Mercury	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	mg/kg	6.8	7.5	3.7	<1.0	1.4
Zinc	mg/kg	17	14	19	<1.0	65

Acid Extractable metals in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-16 23/0.8-1.0 Soil	18386-17 23/2.8-3.0 Soil	18386-18 24/0.3-0.5 Soil	18386-19 24/2.3-2.5 Soil	18386-20 25/0.8-1.0 Soil
Date digested	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	10/04/2008	10/04/2008	10/04/2008	10/04/2008	10/04/2008
Arsenic	mg/kg	4.3	7.7	8.0	7.4	13
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/kg	23	27	16	20	32
Copper	mg/kg	4.0	21	18	2.6	14
Lead	mg/kg	15	21	53	20	31
Mercury	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	mg/kg	4.1	2.3	1.8	1.6	4.3
Zinc	mg/kg	14	15	9.1	3.9	30

Acid Extractable metals in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-21 25/1.8-2.0 Soil	18386-22 26/0.1-0.2 Soil	18386-23 26/1.4-1.6 Soil	18386-24 27/0.2-0.3 Soil	18386-25 20/1.8-2.0 Soil
Date digested	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	10/04/2008	10/04/2008	10/04/2008	10/04/2008	10/04/2008
Arsenic	mg/kg	8.3	9.3	11	11	8.4
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/kg	20	16	24	56	28
Copper	mg/kg	5.4	25	10	40	43
Lead	mg/kg	18	27	23	33	110
Mercury	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	mg/kg	2.2	15	4.7	2.3	9.9
Zinc	mg/kg	4.1	300	24	23	14

Acid Extractable metals in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-26 28/0.1-0.2 Soil	18386-27 28/0.5-0.6 Soil	18386-28 29/0.1-0.2 Soil	18386-29 30/0.2-0.3 Soil	18386-30 30/0.9 Soil
Date digested	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	10/04/2008	10/04/2008	10/04/2008	10/04/2008	10/04/2008
Arsenic	mg/kg	<4.0	11	6.4	<4.0	<4.0
Cadmium	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	mg/kg	27	32	22	12	8.8
Copper	mg/kg	67	4.2	2.5	5.9	4.9
Lead	mg/kg	11	21	22	18	16
Mercury	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel	mg/kg	83	2.1	2.3	6.0	4.6
Zinc	mg/kg	48	2.6	2.2	4.2	3.8

Acid Extractable metals in soil Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-31 BD1/070408 Soil
Date digested	-	9/04/2008
Date analysed	-	10/04/2008
Arsenic	mg/kg	<4.0
Cadmium	mg/kg	<1.0
Chromium	mg/kg	9.9
Copper	mg/kg	11
Lead	mg/kg	15
Mercury	mg/kg	<0.10
Nickel	mg/kg	9.6
Zinc	mg/kg	5.6

Moisture Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-1 18/0.2-0.3 Soil	18386-2 18/1.3-1.4 Soil	18386-3 18/2.9-3.0 Soil	18386-4 19/0.2-0.3 Soil	18386-5 19/0.6-0.7 Soil
Date prepared	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Moisture	%	11	9.5	10	14	21

Moisture Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-6 19/2.4-2.5 Soil	18386-7 20/0.02-0.5 Soil	18386-8 20/0.8-1.0 Soil	18386-9 20/2.8-3.0 Soil	18386-10 21/0.3-0.5 Soil
Date prepared	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Moisture	%	17	8.7	9.3	17	11

Moisture Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-11 21/1.3-1.5 Soil	18386-12 22/0.2-0.3 Soil	18386-13 22/1.3-1.5 Soil	18386-14 22/3.8-4.0 Soil	18386-15 23/0.3-0.5 Soil
Date prepared	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Moisture	%	13	20	20	14	14

Moisture Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-16 23/0.8-1.0 Soil	18386-17 23/2.8-3.0 Soil	18386-18 24/0.3-0.5 Soil	18386-19 24/2.3-2.5 Soil	18386-20 25/0.8-1.0 Soil
Date prepared	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Moisture	%	13	15	12	13	14

Moisture Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-21 25/1.8-2.0 Soil	18386-22 26/0.1-0.2 Soil	18386-23 26/1.4-1.6 Soil	18386-24 27/0.2-0.3 Soil	18386-25 20/1.8-2.0 Soil
Date prepared	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Moisture	%	13	9.3	13	17	13

Moisture Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-26 28/0.1-0.2 Soil	18386-27 28/0.5-0.6 Soil	18386-28 29/0.1-0.2 Soil	18386-29 30/0.2-0.3 Soil	18386-30 30/0.9 Soil
Date prepared	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008	9/04/2008	9/04/2008	9/04/2008
Moisture	%	12	20	12	14	12

Moisture Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-31 BD1/070408 Soil	18386-32 TB/070408 Soil
Date prepared	-	9/04/2008	9/04/2008
Date analysed	-	9/04/2008	9/04/2008
Moisture	%	14	<0.10

Asbestos ID - soils						
Our Reference:	UNITS	18386-1	18386-2	18386-4	18386-5	18386-7
Your Reference	----------	18/0.2-0.3	18/1.3-1.4	19/0.2-0.3	19/0.6-0.7	20/0.02-0.5
Type of sample	----------	Soil	Soil	Soil	Soil	Soil
Date analysed	-	11/04/2008	11/04/2008	11/04/2008	11/04/2008	11/04/2008
Sample Description	-	30g soil	30g soil	30g soil	30g soil	30g soil
Asbestos ID in soil	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	18386-10	18386-12	18386-15	18386-18	18386-22
Your Reference	----------	21/0.3-0.5	22/0.2-0.3	23/0.3-0.5	24/0.3-0.5	26/0.1-0.2
Type of sample	----------	Soil	Soil	Soil	Soil	Soil
Date analysed	-	11/04/2008	11/04/2008	11/04/2008	11/04/2008	14/04/2008
Sample Description	-	30g soil	30g soil	30g soil	30g soil	30g soil
Asbestos ID in soil	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	18386-24	18386-26	18386-27	18386-28	18386-29
Your Reference	----------	27/0.2-0.3	28/0.1-0.2	28/0.5-0.6	29/0.1-0.2	30/0.2-0.3
Type of sample	----------	Soil	Soil	Soil	Soil	Soil
Date analysed	-	14/04/2008	14/04/2008	14/04/2008	14/04/2008	14/04/2008
Sample Description	-	30g soil	30g soil	30g soil	30g soil	30g soil
Asbestos ID in soil	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Method ID	Methodology Summary
GC.14	Soil samples extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
GC.16	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.
GC.3	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
GC.12	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
GC-5	Soil samples are extracted with hexane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
GC-6	Soil samples are extracted with hexane/acetone and waters with dichloromethane and analysed by GC-ECD.
LAB.30	Total Phenolics - determined colorimetrically following disitillation.
Metals.20 ICP-AES	Determination of various metals by ICP-AES.
Metals.21 CV-AAS	Determination of Mercury by Cold Vapour AAS.
LAB.8	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.
AS4964-2004	Qualitative identification of asbestos type fibres in bulk using Polarised Light Microscopy and Dispersion Staining Techniques.

QUALITY CONTROL VOC's in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			9/4/08	18386-1	9/04/2008 || 9/04/2008	LCS-4	9/4/08%
Date analysed	-			11/4/08	18386-1	11/04/2008 || 11/04/2008	LCS-4	11/4/08%
Dichlorodifluoromethane	mg/kg	10	GC.14	<10	18386-1	<10 || <10	[NR]	[NR]
Chloromethane	mg/kg	10	GC.14	<10	18386-1	<10 || <10	[NR]	[NR]
Vinyl Chloride	mg/kg	10	GC.14	<10	18386-1	<10 || <10	[NR]	[NR]
Bromomethane	mg/kg	10	GC.14	<10	18386-1	<10 || <10	[NR]	[NR]
Chloroethane	mg/kg	10	GC.14	<10	18386-1	<10 || <10	[NR]	[NR]
Trichlorofluoromethane	mg/kg	10	GC.14	<10	18386-1	<10 || <10	[NR]	[NR]
1,1-Dichloroethene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
trans-1,2-dichloroethene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,1-dichloroethane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	LCS-4	100%
cis-1,2-dichloroethene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
bromochloromethane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
chloroform	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	LCS-4	86%
2,2-dichloropropane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,2-dichloroethane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	LCS-4	88%
1,1,1-trichloroethane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	LCS-4	83%
1,1-dichloropropene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
carbon tetrachloride	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
Benzene	mg/kg	0.5	GC.14	<0.5	18386-1	<0.5 || <0.5	[NR]	[NR]
dibromomethane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,2-dichloropropane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
trichloroethene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	LCS-4	84%
bromodichloromethane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	LCS-4	91%
trans-1,3-dichloropropene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
cis-1,3-dichloropropene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,1,2-trichloroethane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
Toluene	mg/kg	0.5	GC.14	<0.5	18386-1	<0.5 || <0.5	[NR]	[NR]
1,3-dichloropropane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
dibromochloromethane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	LCS-4	90%
1,2-dibromoethane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
tetrachloroethene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	LCS-4	83%
1,1,1,2-tetrachloroethane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
chlorobenzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
Ethylbenzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
bromoform	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
m + p-Xylene	mg/kg	2	GC.14	<2.0	18386-1	<2.0 || <2.0	[NR]	[NR]
styrene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,1,2,2-tetrachloroethane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
o-Xylene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]

QUALITY CONTROL VOC's in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
1,2,3-trichloropropane*	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
isopropylbenzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
bromobenzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
n-propyl benzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
2-chlorotoluene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
4-chlorotoluene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,3,5-trimethyl benzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
tert-butyl benzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,2,4-trimethyl benzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,3-dichlorobenzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
sec-butyl benzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,4-dichlorobenzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
4-isopropyl toluene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,2-dichlorobenzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
n-butyl benzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,2-dibromo-3-chloropropane	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,2,4-trichlorobenzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
napthalene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
hexachlorobutadiene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
1,2,3-trichlorobenzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	[NR]	[NR]
Surrogate Dibromofluorometha	%		GC.14	126	18386-1	96 || 100 || RPD: 4	LCS-4	111%
Surrogate aaa-Trifluorotoluene	%		GC.14	69	18386-1	68 || 72 || RPD: 6	LCS-4	73%
Surrogate Toluene-d8	%		GC.14	115	18386-1	95 || 96 || RPD: 1	LCS-4	93%
Surrogate 4-Bromofluorobenzene	%		GC.14	77	18386-1	75 || 72 || RPD: 4	LCS-4	73%

QUALITY CONTROL vTPH & BTEX in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			9/4/08	18386-1	9/04/2008 || 9/04/2008	LCS-4	9/4/08%
Date analysed	-			11/4/08	18386-1	11/04/2008 || 11/04/2008	LCS-4	11/4/08%
vTPH C_6 - C_9	mg/kg	25	GC.16	<25	18386-1	<25 || <25	LCS-4	113%
Benzene	mg/kg	0.5	GC.14	<0.5	18386-1	<0.5 || <0.5	LCS-4	114%
Toluene	mg/kg	0.5	GC.14	<0.5	18386-1	<0.5 || <0.5	LCS-4	126%
Ethylbenzene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	LCS-4	100%
m + p-Xylene	mg/kg	2	GC.14	<2.0	18386-1	<2.0 || <2.0	LCS-4	113%
o-Xylene	mg/kg	1	GC.14	<1.0	18386-1	<1.0 || <1.0	LCS-4	111%
Surrogate aaa-Trifluorotoluene	%		GC.14	69	18386-1	8.0 || 72 || RPD: 160	LCS-4	85%
QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			9/4/08	18386-1	9/04/2008 || 9/04/2008	LCS-4	9/4/08%
Date analysed	-			9/4/08	18386-1	9/04/2008 || 9/04/2008	LCS-4	9/4/08%
TPH C_{10} - C_{14}	mg/kg	50	GC.3	<50	18386-1	<50 || <50	LCS-4	86%
TPH C_{15} - C_{28}	mg/kg	100	GC.3	<100	18386-1	<100 || <100	LCS-4	84%
TPH C_{29} - C_{36}	mg/kg	100	GC.3	<100	18386-1	<100 || <100	LCS-4	93%
Surrogate o-Terphenyl	%		GC.3	92	18386-1	94 || 92 || RPD: 2	LCS-4	93%
QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			[NT]	18386-1	9/04/2008 || 9/04/2008	LCS-4	9/4/08%
Date analysed	-			[NT]	18386-1	9/04/2008 || 9/04/2008	LCS-4	9/4/08%
Naphthalene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	LCS-4	99%
Acenaphthylene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	LCS-4	97%
Phenanthrene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	LCS-4	99%
Anthracene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	LCS-4	96%
Pyrene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	LCS-4	98%
Benzo(a)anthracene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	LCS-4	106%
Benzo(b,k)fluoranthene	mg/kg	0.2	GC.12	<0.2	18386-1	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	GC.12	<0.05	18386-1	<0.05 || <0.05	LCS-4	100%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	GC.12	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		GC.12	[NT]	18386-1	106 || 109 || RPD: 3	LCS-4	92%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			8/4/08	18386-1	8/04/2008 || 8/04/2008	LCS-3	8/4/08%
Date analysed	-			8/4/08	18386-1	8/04/2008 || 8/04/2008	LCS-3	8/4/08%
HCB	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	LCS-3	126%
gamma-BHC	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	LCS-3	124%
Heptachlor	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	LCS-3	133%
delta-BHC	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	LCS-3	125%
Heptachlor Epoxide	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	LCS-3	128%
gamma-Chlordane	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	LCS-3	120%
Dieldrin	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	LCS-3	124%
Endrin	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	LCS-3	114%
pp-DDD	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	LCS-3	133%
Endosulfan II	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	LCS-3	105%
Methoxychlor	mg/kg	0.1	GC-5	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		GC-5	74	18386-1	113 || 144 || RPD: 24	LCS-3	79%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			8/4/08	18386-1	8/04/2008 || 8/04/2008	LCS-3	8/4/08%
Date analysed	-			8/4/08	18386-1	8/04/2008 || 8/04/2008	LCS-3	8/4/08%
Arochlor 1016	mg/kg	0.1	GC-6	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	GC-6	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	GC-6	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	GC-6	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	GC-6	<0.1	18386-1	<0.1 || <0.1	LCS-3	105%
Arochlor 1260	mg/kg	0.1	GC-6	<0.1	18386-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		GC-6	74	18386-1	113 || 144 || RPD: 24	LCS-3	138%
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	-			10/4/08	18386-1	10/04/2008 || 10/04/2008	LCS-1	10/4/08%
Date analysed	-			10/4/08	18386-1	10/04/2008 || 10/04/2008	LCS-1	10/4/08%
Total Phenolics (as Phenol)	mg/kg	5	LAB.30	<5.0	18386-1	<5.0 || <5.0	LCS-1	94%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			09/04/08	18386-1	9/04/2008 || 9/04/2008	LCS-4	09/04/08%
Date analysed	-			10/04/08	18386-1	10/04/2008 || 10/04/2008	LCS-4	10/04/08%
Arsenic	mg/kg	4	Metals.20 ICP-AES	<4.0	18386-1	4.9 || 5.1 || RPD: 4	LCS-4	101%
Cadmium	mg/kg	1	Metals.20 ICP-AES	<1.0	18386-1	<1.0 || <1.0	LCS-4	102%
Chromium	mg/kg	1	Metals.20 ICP-AES	<1.0	18386-1	29 || 31 || RPD: 7	LCS-4	103%
Copper	mg/kg	1	Metals.20 ICP-AES	<1.0	18386-1	19 || 19 || RPD: 0	LCS-4	101%
Lead	mg/kg	1	Metals.20 ICP-AES	<1.0	18386-1	20 || 17 || RPD: 16	LCS-4	100%
Mercury	mg/kg	0.1	Metals.21 CV-AAS	<0.10	18386-1	<0.10 || <0.10	LCS-4	116%
Nickel	mg/kg	1	Metals.20 ICP-AES	<1.0	18386-1	26 || 22 || RPD: 17	LCS-4	102%
Zinc	mg/kg	1	Metals.20 ICP-AES	<1.0	18386-1	30 || 30 || RPD: 0	LCS-4	102%

QUALITY CONTROL **Moisture**	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results **Base II Duplicate II %RPD**
Date prepared	-			9/4/08	18386-1	9/04/2008 || 9/04/2008
Date analysed	-			9/4/08	18386-1	9/04/2008 || 9/04/2008
Moisture	%	0.1	LAB.8	<0.10	18386-1	11 || 11 || RPD: 0

QUALITY CONTROL Asbestos ID - soils	UNITS	PQL	METHOD	Blank
Date analysed	-			[NT]

QUALITY CONTROL VOC's in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	18386-2	9/4/08%
Date analysed	-	[NT]	[NT]	18386-2	11/4/08%
Dichlorodifluoromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Chloromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Vinyl Chloride	mg/kg	[NT]	[NT]	[NR]	[NR]
Bromomethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Chloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Trichlorofluoromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1-Dichloroethene	mg/kg	[NT]	[NT]	[NR]	[NR]
trans-1,2-dichloroethene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1-dichloroethane	mg/kg	[NT]	[NT]	18386-2	94%
cis-1,2-dichloroethene	mg/kg	[NT]	[NT]	[NR]	[NR]
bromochloromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
chloroform	mg/kg	[NT]	[NT]	18386-2	84%
2,2-dichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dichloroethane	mg/kg	[NT]	[NT]	18386-2	86%
1,1,1-trichloroethane	mg/kg	[NT]	[NT]	18386-2	79%
1,1-dichloropropene	mg/kg	[NT]	[NT]	[NR]	[NR]
carbon tetrachloride	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
dibromomethane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
trichloroethene	mg/kg	[NT]	[NT]	18386-2	81%
bromodichloromethane	mg/kg	[NT]	[NT]	18386-2	93%
trans-1,3-dichloropropene	mg/kg	[NT]	[NT]	[NR]	[NR]
cis-1,3-dichloropropene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1,2-trichloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Toluene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3-dichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
dibromochloromethane	mg/kg	[NT]	[NT]	18386-2	93%

QUALITY CONTROL VOC's in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
1,2-dibromoethane	mg/kg	[NT]	[NT]	[NR]	[NR]
tetrachloroethene	mg/kg	[NT]	[NT]	18386-2	82%
1,1,1,2-tetrachloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
chlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
Ethylbenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
bromoform	mg/kg	[NT]	[NT]	[NR]	[NR]
m + p-Xylene	mg/kg	[NT]	[NT]	[NR]	[NR]
styrene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1,2,2-tetrachloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
o-Xylene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,3-trichloropropane*	mg/kg	[NT]	[NT]	[NR]	[NR]
isopropylbenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
bromobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
n-propyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
2-chlorotoluene	mg/kg	[NT]	[NT]	[NR]	[NR]
4-chlorotoluene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3,5-trimethyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
tert-butyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,4-trimethyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3-dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
sec-butyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,4-dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
4-isopropyl toluene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
n-butyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dibromo-3-chloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,4-trichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
napthalene	mg/kg	[NT]	[NT]	[NR]	[NR]
hexachlorobutadiene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,3-trichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluorometha	%	[NT]	[NT]	18386-2	121%
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	18386-2	72%
Surrogate Toluene-d8	%	[NT]	[NT]	18386-2	100%
Surrogate 4-Bromofluorobenzene	%	[NT]	[NT]	18386-2	68%

QUALITY CONTROL vTPH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	18386-11	9/04/2008 || 9/04/2008	LCS-5	9/4/08%
Date analysed	-	18386-11	11/04/2008 || 11/04/2008	LCS-5	11/4/08%
vTPH C_6 - C_9	mg/kg	18386-11	<25 || <25	LCS-5	113%
Benzene	mg/kg	18386-11	<0.5 || <0.5	LCS-5	128%
Toluene	mg/kg	18386-11	<0.5 || <0.5	LCS-5	116%
Ethylbenzene	mg/kg	18386-11	<1.0 || <1.0	LCS-5	102%
m + p-Xylene	mg/kg	18386-11	<2.0 || <2.0	LCS-5	110%
o-Xylene	mg/kg	18386-11	<1.0 || <1.0	LCS-5	110%
Surrogate aaa-Trifluorotoluene	%	18386-11	80 || 93 || RPD: 15	LCS-5	87%
QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	18386-11	9/04/2008 || 9/04/2008	LCS-5	9/4/08%
Date analysed	-	18386-11	9/04/2008 || 9/04/2008	LCS-5	9/4/08%
TPH C_{10} - C_{14}	mg/kg	18386-11	<50 || <50	LCS-5	87%
TPH C_{15} - C_{28}	mg/kg	18386-11	<100 || <100	LCS-5	82%
TPH C_{29} - C_{36}	mg/kg	18386-11	<100 || <100	LCS-5	93%
Surrogate o-Terphenyl	%	18386-11	95 || 92 || RPD: 3	LCS-5	97%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	18386-11	9/04/2008 || 9/04/2008	LCS-5	9/4/08%
Date analysed	-	18386-11	9/04/2008 || 9/04/2008	LCS-5	9/4/08%
Naphthalene	mg/kg	18386-11	<0.1 || <0.1	LCS-5	105%
Acenaphthylene	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	18386-11	<0.1 || <0.1	LCS-5	103%
Phenanthrene	mg/kg	18386-11	<0.1 || <0.1	LCS-5	103%
Anthracene	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	18386-11	<0.1 || <0.1	LCS-5	99%
Pyrene	mg/kg	18386-11	<0.1 || <0.1	LCS-5	103%
Benzo(a)anthracene	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	18386-11	<0.1 || <0.1	LCS-5	113%
Benzo(b,k)fluoranthene	mg/kg	18386-11	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	18386-11	<0.05 || <0.05	LCS-5	116%
Indeno(1,2,3-c,d)pyrene	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%	18386-11	99 || 94 || RPD: 5	LCS-5	93%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	18386-11	8/04/2008 || 8/04/2008	18386-2	8/4/08%
Date analysed	-	18386-11	11/04/2008 || 11/04/2008	18386-2	8/4/08%
HCB	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	18386-11	<0.1 || <0.1	18386-2	114%
gamma-BHC	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	18386-11	<0.1 || <0.1	18386-2	111%
Heptachlor	mg/kg	18386-11	<0.1 || <0.1	18386-2	119%
delta-BHC	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	18386-11	<0.1 || <0.1	18386-2	104%
Heptachlor Epoxide	mg/kg	18386-11	<0.1 || <0.1	18386-2	111%
gamma-Chlordane	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	18386-11	<0.1 || <0.1	18386-2	105%
Dieldrin	mg/kg	18386-11	<0.1 || <0.1	18386-2	108%
Endrin	mg/kg	18386-11	<0.1 || <0.1	18386-2	105%
pp-DDD	mg/kg	18386-11	<0.1 || <0.1	18386-2	114%
Endosulfan II	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	18386-11	<0.1 || <0.1	18386-2	89%
Methoxychlor	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	18386-11	76 || 73 || RPD: 4	18386-2	74%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	18386-11	8/04/2008 || 8/04/2008	18386-2	8/4/08%
Date analysed	-	18386-11	11/04/2008 || 11/04/2008	18386-2	8/4/08%
Arochlor 1016	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	18386-11	<0.1 || <0.1	18386-2	89%
Arochlor 1260	mg/kg	18386-11	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	18386-11	76 || 73 || RPD: 4	18386-2	135%
QUALITY CONTROL Total Phenolics in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	18386-12	10/04/2008 || 10/04/2008	18386-2	10/4/08%
Date analysed	-	18386-12	10/04/2008 || 10/04/2008	18386-2	10/4/08%
Total Phenolics (as Phenol)	mg/kg	18386-12	<5.0 || <5.0	18386-2	95%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	18386-11	9/04/2008 || 9/04/2008	LCS-5	09/04/08%
Date analysed	-	18386-11	10/04/2008 || 10/04/2008	LCS-5	10/04/08%
Arsenic	mg/kg	18386-11	6.1 || 5.8 || RPD: 5	LCS-5	96%
Cadmium	mg/kg	18386-11	<1.0 || <1.0	LCS-5	96%
Chromium	mg/kg	18386-11	18 || 17 || RPD: 6	LCS-5	99%
Copper	mg/kg	18386-11	10 || 15 || RPD: 40	LCS-5	99%
Lead	mg/kg	18386-11	36 || 38 || RPD: 5	LCS-5	96%
Mercury	mg/kg	18386-11	<0.10 || <0.10	LCS-5	99%
Nickel	mg/kg	18386-11	6.8 || 6.4 || RPD: 6	LCS-5	97%
Zinc	mg/kg	18386-11	17 || 18 || RPD: 6	LCS-5	98%

QUALITY CONTROL Moisture	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	18386-11	9/04/2008 || 9/04/2008
Date analysed	-	18386-11	9/04/2008 || 9/04/2008
Moisture	%	18386-11	13 || 13 || RPD: 0

QUALITY CONTROL vTPH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	18386-21	9/04/2008 || 9/04/2008	18386-2	9/4/08%
Date analysed	-	18386-21	11/04/2008 || 11/04/2008	18386-2	11/4/08%
vTPH C_6 - C_9	mg/kg	18386-21	<25 || <25	18386-2	85%
Benzene	mg/kg	18386-21	<0.5 || <0.5	18386-2	87%
Toluene	mg/kg	18386-21	<0.5 || <0.5	18386-2	97%
Ethylbenzene	mg/kg	18386-21	<1.0 || <1.0	18386-2	72%
m + p-Xylene	mg/kg	18386-21	<2.0 || <2.0	18386-2	84%
o-Xylene	mg/kg	18386-21	<1.0 || <1.0	18386-2	85%
Surrogate aaa-Trifluorotoluene	%	18386-21	85 || 75 || RPD: 12	18386-2	79%

QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	18386-21	9/04/2008 || 9/04/2008	18386-2	9/4/08%
Date analysed	-	18386-21	9/04/2008 || 9/04/2008	18386-2	9/4/08%
TPH C_{10} - C_{14}	mg/kg	18386-21	<50 || <50	18386-2	91%
TPH C_{15} - C_{28}	mg/kg	18386-21	<100 || <100	18386-2	85%
TPH C_{29} - C_{36}	mg/kg	18386-21	<100 || <100	18386-2	93%
Surrogate o-Terphenyl	%	18386-21	95 || 92 || RPD: 3	18386-2	94%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	18386-21	9/04/2008 || 9/04/2008	18386-2	9/4/08%
Date analysed	-	18386-21	9/04/2008 || 9/04/2008	18386-2	9/4/08%
Naphthalene	mg/kg	18386-21	<0.1 || <0.1	18386-2	84%
Acenaphthylene	mg/kg	18386-21	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	18386-21	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	18386-21	<0.1 || <0.1	18386-2	99%
Phenanthrene	mg/kg	18386-21	<0.1 || <0.1	18386-2	94%
Anthracene	mg/kg	18386-21	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	18386-21	<0.1 || <0.1	18386-2	90%
Pyrene	mg/kg	18386-21	<0.1 || <0.1	18386-2	89%
Benzo(a)anthracene	mg/kg	18386-21	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	18386-21	<0.1 || <0.1	18386-2	92%
Benzo(b,k)fluoranthene	mg/kg	18386-21	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	18386-21	<0.05 || <0.05	18386-2	94%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Indeno(1,2,3-c,d)pyrene	mg/kg	18386-21	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	18386-21	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	18386-21	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%	18386-21	93 || 95 || RPD: 2	18386-2	80%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	18386-21	9/04/2008 || 9/04/2008	18386-2	09/04/08%
Date analysed	-	18386-21	10/04/2008 || 10/04/2008	18386-2	10/04/08%
Arsenic	mg/kg	18386-21	8.3 || 11 || RPD: 28	18386-2	97%
Cadmium	mg/kg	18386-21	<1.0 || <1.0	18386-2	91%
Chromium	mg/kg	18386-21	20 || 30 || RPD: 40	18386-2	91%
Copper	mg/kg	18386-21	5.4 || 11 || RPD: 68	18386-2	100%
Lead	mg/kg	18386-21	18 || 24 || RPD: 29	18386-2	96%
Mercury	mg/kg	18386-21	<0.10 || <0.10	18386-2	117%
Nickel	mg/kg	18386-21	2.2 || 3.2 || RPD: 37	18386-2	86%
Zinc	mg/kg	18386-21	4.1 || 15 || RPD: 114	18386-2	92%
QUALITY CONTROL Moisture	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD		
Date prepared	-	18386-21	9/04/2008 || 9/04/2008		
Date analysed	-	18386-21	9/04/2008 || 9/04/2008		
Moisture	%	18386-21	13 || 13 || RPD: 0		
QUALITY CONTROL vTPH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	18386-22	9/4/08%
Date analysed	-	[NT]	[NT]	18386-22	11/4/08%
vTPH C_6 - C_9	mg/kg	[NT]	[NT]	18386-22	103%
Benzene	mg/kg	[NT]	[NT]	18386-22	87%
Toluene	mg/kg	[NT]	[NT]	18386-22	119%
Ethylbenzene	mg/kg	[NT]	[NT]	18386-22	92%
m + p-Xylene	mg/kg	[NT]	[NT]	18386-22	108%
o-Xylene	mg/kg	[NT]	[NT]	18386-22	106%
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	18386-22	97%

QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	18386-22	9/4/08%
Date analysed	-	[NT]	[NT]	18386-22	9/4/08%
TPH C_{10} - C_{14}	mg/kg	[NT]	[NT]	18386-22	89%
TPH C_{15} - C_{28}	mg/kg	[NT]	[NT]	18386-22	85%
TPH C_{29} - C_{36}	mg/kg	[NT]	[NT]	18386-22	95%
Surrogate o-Terphenyl	%	[NT]	[NT]	18386-22	89%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	18386-22	9/4/08%
Date analysed	-	[NT]	[NT]	18386-22	9/4/08%
Naphthalene	mg/kg	[NT]	[NT]	18386-22	84%
Acenaphthylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	[NT]	[NT]	18386-22	101%
Phenanthrene	mg/kg	[NT]	[NT]	18386-22	124%
Anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	[NT]	[NT]	18386-22	#
Pyrene	mg/kg	[NT]	[NT]	18386-22	#
Benzo(a)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	[NT]	[NT]	18386-22	#
Benzo(b,k)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	[NT]	[NT]	18386-22	#
Indeno(1,2,3-c,d)pyrene	mg/kg	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%	[NT]	[NT]	18386-22	93%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	18386-22	09/04/08%
Date analysed	-	[NT]	[NT]	18386-22	10/04/08%
Arsenic	mg/kg	[NT]	[NT]	18386-22	90%
Cadmium	mg/kg	[NT]	[NT]	18386-22	91%
Chromium	mg/kg	[NT]	[NT]	18386-22	101%
Copper	mg/kg	[NT]	[NT]	18386-22	113%
Lead	mg/kg	[NT]	[NT]	18386-22	92%
Mercury	mg/kg	[NT]	[NT]	18386-22	114%
Nickel	mg/kg	[NT]	[NT]	18386-22	100%
Zinc	mg/kg	[NT]	[NT]	18386-22	#2

Report Comments:

PAH's in soil: # Percent recovery not available due to sample matrix.

Trace Elements: High duplicate RPD due to inhomogeneity of sample 21 for Cu and Zn.

Trace elements #2; Accurate spike not possible due to imhomogeneity of sample for Zn.

Asbestos was analysed by Approved Identifier: Steven Dale

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

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:

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. Surrogates: 60-140% is acceptable for general organics and 10-140% for SVOC and speciated phenols.

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CHAIN OF CUSTODY

Project Name: Macquarie University - Phase 2 Assess
Project No: 45298.02 Sampler: G.N.J
Project Mgr: SE Mob. Phone:
Email: galia.nikolaeva@douglaspartners.com.au
Date Required: Standard Lab Quote No.:

To: Envirolab Services
54 Frenchs Rd, Willoughby NSW 2068
Attn: Tania Notaras
Phone: 02 9958 5801 Fax: 02 9958 5803
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: BTEX	TPH/BTEX	PAH	OCP/PCB	Phenols	VOC	As (asbestos)		Notes
18	0.2-0.3	1							✓	✓	✓	✓		
18	1.3-1.4	2							✓	✓	✓	✓		
18	2.9-3.0	3							✓	✓				
19	0.2-0.3	4							✓	✓	✓	✓		
19	0.6-0.7	5							✓	✓		✓		
19	2.4-2.5	6							✓	✓				
20	0.02-0.5	7							✓	✓		✓		
20	0.8-1.0	8									✓			
20	2.8-3.0	9												
21	0.3-0.5	10							✓	✓		✓		
21	1.3-1.5	11							✓	✓	✓			

Envirolab Services
54 Frenchs Rd
Willoughby NSW 2068
Ph: 9958 5801
Job No: 18386
Date received: 7/4/08
Received by: SS
Time: 5:16
Temp: Cool/Ambient
Security: Intact/Broken/None

Lab Report No.:
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114
Phone: (02) 9809 0666
Fax: (02) 9809 4095

Relinquished by: G. Nikolaeva	Signed:	Date & Time: 7/4/08	Received By:	Date & Time:
Relinquished by:	Signed:	Date & Time:	Received By:	Date & Time:

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: .....
Project No: ..... Sampler: .....
Project Mgr: ..... Mob. Phone: .....
Email: .....
Date Required: ..... Lab Quote No. .....

To: Envirolab Services
54 Frenchs Rd, Willoughby NSW 2068
Attn: Tania Notaras
Phone: 02 9958 5801 Fax: 02 9958 5803
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: HM18	TPH/BTEX	PAH	OCP/PCB	Phenols	VOC	Asbestos		Notes
22	0.2-0.3	12							✓	✓		✓		
22	1.3-1.5	13												
22	3.8-4.0	14							✓	✓		✓		
23	0.3-0.5	15									✓			
23	0.8-1.0	16												
23	2.8-3.0	17							✓	✓		✓		
24	0.3-0.5	18												
24	2.3-2.5	19												
25	0.8-1.0	20									✓			
25	1.8-2.0	21							✓	✓		✓		
26	0.1-0.2	22												
26	1.4-1.6	23												

Lab Report No. .....
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114 Phone: (02) 9809 0666 Fax: (02) 9809 4095
Relinquished by: G. Nikolaeva Signed: Date & Time: 7/4/08 Received By: Date & Time:
Relinquished by: Signed: Date & Time: Received By: Date & Time:

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: .....
Project No: ..... Sampler: .....
Project Mgr: ..... Mob. Phone: .....
Email: .....
Date Required: ..... Lab Quote No. .....

To: Envirolab Services
54 Frenchs Rd, Willoughby NSW 2068
Attn: Tania Notaras
Phone: 02 9958 5801 Fax: 02 9958 5803
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: 8HM	TPH/BTEX	PAH	OCP/PCB	Phenols	VOC	Asbestos		Notes
27	0.2-0.3	24							✓	✓		✓		
28	1.8-2.0	25							✓	✓		✓		
28	0.1-0.2	26							✓	✓		✓		
28	0.5-0.6	27							✓	✓		✓		
29	0.1-0.2	28							✓	✓		✓		
30	0.2-0.3	29									✓			
30	0.9	30				✓		✓						
BD1	070408	31					BTEX only							
TB	070408	32					BTEX only							
TS	070408	33												

Lab Report No. .....

Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114

Phone: (02) 9809 0666
Fax: (02) 9809 4095

Relinquished by: G. Nicolaou Signed: Date & Time: 7/4/08 Received By: Date & Time:

Relinquished by: Signed: Date & Time: Received By: Date & Time:

Page ___ of ___

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 18386-A

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Galia Nikolaeva

Sample log in details:

Your Reference:	**45298.02, Macquarie University**
No. of samples:	Additional Testing on 6 Soils
Date samples received:	07/04/08
Date completed instructions received:	15/04/08

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:	22/04/08
Date of Preliminary Report:	Not issued
Issue Date:	18/04/08

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

Results Approved By:

Jacinta Hurst
Operations Manager

Metals in TCLP Our Reference: Your Reference Type of sample	UNITS --- ---	18386-A-2 18/1.3-1.4 Soil	18386-A-3 18/2.9-3.0 Soil	18386-A-20 25/0.8-1.0 Soil	18386-A-24 27/0.2-0.3 Soil	18386-A-25 20/1.8-2.0 Soil
Date extracted	-	16/04/2008	16/04/2008	16/04/2008	16/04/2008	16/04/2008
Date analysed	-	17/04/2008	17/04/2008	17/04/2008	17/04/2008	17/04/2008
pH of soil for fluid# determ.	pH units	6.80	8.00	7.60	7.60	7.10
pH of soil for fluid # determ. (acid)	pH units	1.50	1.60	1.50	1.50	1.30
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.20	5.30	5.10	5.10	5.20
Arsenic in TCLP	mg/L	[NA]	[NA]	<0.05	<0.05	[NA]
Chromium in TCLP	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Lead in TCLP	mg/L	0.03	0.29	<0.03	<0.03	0.75
Nickel in TCLP	mg/L	<0.02	0.02	<0.02	[NA]	<0.02

Metals in TCLP Our Reference: Your Reference Type of sample	UNITS --- ---	18386-A-26 28/0.1-0.2 Soil
Date extracted	-	16/04/2008
Date analysed	-	17/04/2008
pH of soil for fluid# determ.	pH units	9.00
pH of soil for fluid # determ. (acid)	pH units	1.40
Extraction fluid used	-	1
pH of final Leachate	pH units	5.20
Chromium in TCLP	mg/L	<0.01
Lead in TCLP	mg/L	<0.03
Nickel in TCLP	mg/L	0.07

PAHs in TCLP (USEPA 1311) Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-A-2 18/1.3-1.4 Soil	18386-A-3 18/2.9-3.0 Soil	18386-A-20 25/0.8-1.0 Soil
Date extracted	-	17/04/2008	17/04/2008	17/04/2008
Date analysed	-	17/04/2008	17/04/2008	17/04/2008
Naphthalene	mg/L	<0.001	0.002	0.001
Acenaphthylene	mg/L	<0.001	0.001	<0.001
Acenaphthene	mg/L	<0.001	<0.001	<0.001
Fluorene	mg/L	<0.001	<0.001	0.001
Phenanthrene	mg/L	<0.001	0.003	<0.001
Anthracene	mg/L	<0.001	<0.001	<0.001
Fluoranthene	mg/L	<0.001	<0.001	<0.001
Pyrene	mg/L	<0.001	<0.001	<0.001
Benzo(a)anthracene	mg/L	<0.001	<0.001	<0.001
Chrysene	mg/L	<0.001	<0.001	<0.001
Benzo(b,k)fluoranthene	mg/L	<0.002	<0.002	<0.002
Benzo(a)pyrene	mg/L	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene	mg/L	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene	mg/L	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene	mg/L	<0.001	<0.001	<0.001
Surrogate p-Terphenyl-d_{14}	%	105	76	115

Method ID	Methodology Summary
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Metals.20 ICP-AES	Determination of various metals by ICP-AES.
GC.12	Leachates are extracted with Dichloromethane and analysed by GC-MS.
GC.12	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

QUALITY CONTROL Metals in TCLP	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/4/08	[NT]	[NT]	LCS-W1	16/4/08%
Date analysed	-			17/4/08	[NT]	[NT]	LCS-W1	17/4/08%
Arsenic in TCLP	mg/L	0.05	Metals.20 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	99%
Chromium in TCLP	mg/L	0.01	Metals.20 ICP-AES	<0.01	[NT]	[NT]	LCS-W1	93%
Lead in TCLP	mg/L	0.03	Metals.20 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	92%
Nickel in TCLP	mg/L	0.02	Metals.20 ICP-AES	<0.02	[NT]	[NT]	LCS-W1	91%
QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/4/08	[NT]	[NT]	LCS-W1	17/4/08%
Date analysed	-			17/4/08	[NT]	[NT]	LCS-W1	17/4/08%
Naphthalene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	LCS-W1	107%
Acenaphthylene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	LCS-W1	109%
Phenanthrene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	LCS-W1	108%
Anthracene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	LCS-W1	102%
Pyrene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	LCS-W1	106%
Benzo(a)anthracene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(b,k)fluoranthene	mg/L	0.002	GC.12	<0.002	[NT]	[NT]	LCS-W1	116%
Benzo(a)pyrene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	[NR]	[NR]
Indeno(1,2,3-c,d)pyrene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	LCS-W1	80%
Dibenzo(a,h)anthracene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/L	0.001	GC.12	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		GC.12	97	[NT]	[NT]	LCS-W1	104%

Report Comments:

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

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

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:

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. Surrogates: 60-140% is acceptable for general organics and 10-140% for SVOC and speciated phenols.

Aileen Hie

From: Jacinta Hurst
Sent: Tuesday, 15 April 2008 11:36 AM
To: Aileen Hie
Subject: FW: Results for registration '18386 - 45298.02, Macquarie University'

Regards

Jacinta Hurst
Envirolab Services Pty Ltd
12 Ashley Street Chatswood NSW 2067
ph 02 9910 6200 mob 0407 003 037

From: Galia Nikolaeva [mailto:Galia.Nikolaeva@douglaspartners.com.au]
Sent: Tuesday, 15 April 2008 10:59
To: Jacinta Hurst
Subject: RE: Results for registration '18386 - 45298.02, Macquarie University'

Jacinta,
May I please have the following TSLP tests done:
18/1.3-1.4 and 18/2.9-3.0 PAH, Cr, Pb, Ni
25/0.8-1.0 - PAH, Ar, Cr, Pb, Ni
28/0.1-0.2 and 20/1.8-2.0 Cr, Pb, Ni
27/0.2-0.3 - As, Cr, Pb

Thanks

Envirolab Ref: 18386A
Due: 22/4/08
Std TAT.

Galia Nikolaeva
Environmental Scientist
Douglas Partners
Ph: 8878 0607
Fax: 9809 4095
Mob: 0418651227
email: galia.nikolaeva@douglaspartners.com.au

From: Jacinta Hurst [mailto:JHurst@envirolabservices.com.au]
Sent: Monday, 14 April 2008 1:03 PM
To: Galia Nikolaeva
Subject: Results for registration '18386 - 45298.02, Macquarie University'

Announcement
Envirolab Services has moved to new premises as of 25th March
The new address is 12 Ashley St Chatswood 2067
The main number is 02 9910 6200. New direct indial numbers will be issued soon.

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the Invoice
a copy of the COC

an excel file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:
Jacinta Hurst on jhurst@envirolabservices.com.au
or
David Springer on dspringer@envirolabservices.com.au
or
Tania Notaras on tnotaras@envirolabservices.com.au

Regards

Envirolab Services
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
email enquiries@envirolabservices.com.au
www.envirolabservices.com.au

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 18386-B

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Galia Nikolaeva

Sample log in details:

Your Reference:	**45298.02, Macquarie University**
No. of samples:	Additional Testing on 4 Soils
Date samples received:	07/04/08
Date completed instructions received:	21/04/08

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:	23/04/08
Date of Preliminary Report:	Not issued
Issue Date:	23/04/08

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Tests not covered by NATA are denoted with *.

Results Approved By:

Jacinta Hurst
Operations Manager

Metals in TCLP Our Reference: Your Reference Type of sample	UNITS ---------- ----------	18386-B-13 22/1.3-1.5 Soil	18386-B-15 23/0.3-0.5 Soil	18386-B-18 24/0.3-0.5 Soil	18386-B-25 20/1.8-2.0 Soil
Date extracted	-	21/04/2008	21/04/2008	21/04/2008	21/04/2008
Date analysed	-	22/4/08	22/4/08	22/4/08	22/4/08
pH of soil for fluid# determ.	pH units	5.60	6.30	5.50	6.00
pH of soil for fluid # determ. (acid)	pH units	1.40	1.40	1.50	1.40
Extraction fluid used	-	1	1	1	1
pH of final Leachate	pH units	4.90	4.90	4.90	4.90
Lead in TCLP	mg/L	0.12	0.31	0.09	0.71

Method ID	Methodology Summary
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Metals.20 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL Metals in TCLP	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			21/4/08	18386-B-25	21/04/2008 || 21/04/2008	LCS-W1	21/4/08%
Date analysed	-			22/4/08	18386-B-25	22/4/08 || 22/4/08	LCS-W1	22/4/08%
Lead in TCLP	mg/L	0.03	Metals.20 ICP-AES	<0.03	18386-B-25	0.71 || 1.1 || RPD: 43	LCS-W1	101%

Report Comments:

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

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

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:

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. Surrogates: 60-140% is acceptable for general organics and 10-140% for SVOC and speciated phenols.

Aileen Hie

From: Jacinta Hurst
Sent: Monday, 21 April 2008 12:35 PM
To: Aileen Hie
Subject: FW: Results for registration '18386-A - 45298.02, Macquarie University'

Regards

Envirolab Ref: 18386B
Due: 23/4/08
48hr TAT.

Jacinta Hurst
Envirolab Services Pty Ltd
12 Ashley Street Chatswood NSW 2067
ph 02 9910 6200 mob 0407 003 037

From: Galia Nikolaeva [mailto:Galia.Nikolaeva@douglaspartners.com.au]
Sent: Monday, 21 April 2008 08:39
To: Jacinta Hurst
Subject: RE: Results for registration '18386-A - 45298.02, Macquarie University'

Jacinta, -25
Could you please retest Pb TCLP twice on sample 20/1.8-2.0
and test Pb TCLP on samples 22/1.3-1.5, 23/0.3-0.5 and 24/0.3-0.5
Thanks 13 15 18

PS How did you go with the water samples of this job (your number 18483)

Galia Nikolaeva
Environmental Scientist
Douglas Partners
Ph: 8878 0607
Fax: 9809 4095
Mob: 0418651227
email: galia.nikolaeva@douglaspartners.com.au

From: Jacinta Hurst [mailto:JHurst@envirolabservices.com.au]
Sent: Friday, 18 April 2008 2:56 PM
To: Galia Nikolaeva
Subject: Results for registration '18386-A - 45298.02, Macquarie University'

Announcement
Envirolab Services has moved to new premises as of 25th March
The new address is 12 Ashley St Chatswood 2067
The main number is 02 9910 6200. New direct indial numbers will be issued soon.

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC
an excel file containing the results

Please note that a hard copy will not be posted.

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 18833

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Galia Nikolaeva

Sample log in details:

Your Reference:	**45298.02, Macquarie University Phase 2**
No. of samples:	2 Waters
Date samples received:	24/04/08
Date completed instructions received:	24/04/08

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:	24/04/08
Date of Preliminary Report:	Not Issued
Issue Date:	24/04/08

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Tests not covered by NATA are denoted with *.

Results Approved By:

Jacinta Hurst
Operations Manager

sTPH in Water (C10-C36)			
Our Reference:	UNITS	18833-1	18833-2
Your Reference	----------	SW1/240408	SW2/240408
Date Sampled	----------	24/04/2008	24/04/2008
Type of sample		Water	Water
Date extracted	-	24/04/2008	24/04/2008
Date analysed	-	24/04/2008	24/04/2008
TPH C_{10} - C_{14}	µg/L	<50	<50
TPH C_{15} - C_{28}	µg/L	<100	<100
TPH C_{29} - C_{36}	µg/L	<100	<100
Surrogate o-Terphenyl	%	84	81

Method ID	Methodology Summary
GC.3	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.

QUALITY CONTROL sTPH in Water (C10-C36)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			24/04/08	[NT]	[NT]	LCS-W1	24/04/08%
Date analysed	-			24/04/08	[NT]	[NT]	LCS-W1	24/04/08%
TPH C_{10} - C_{14}	µg/L	50	GC.3	<50	[NT]	[NT]	LCS-W1	89%
TPH C_{15} - C_{28}	µg/L	100	GC.3	<100	[NT]	[NT]	LCS-W1	96%
TPH C_{29} - C_{36}	µg/L	100	GC.3	<100	[NT]	[NT]	LCS-W1	101%
Surrogate o-Terphenyl	%		GC.3	100	[NT]	[NT]	LCS-W1	99%

Report Comments:

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

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

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:

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. Surrogates: 60-140% is acceptable for general organics and 10-140% for SVOC and speciated phenols.

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CERTIFICATE OF ANALYSIS 18901

Client:
Douglas Partners
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Galia Nikolaeva

Sample log in details:

Your Reference:	**45298.02, Phase 2 Mac Uni**
No. of samples:	2 Soils
Date samples received:	29/04/08
Date completed instructions received:	29/04/08

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:	30/04/08
Date of Preliminary Report:	Not Issued
Issue Date:	30/04/08

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This document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025.
Tests not covered by NATA are denoted with *.

Results Approved By:

Giovanni Agosti
Technical Manager

Acid Extractable metals in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ---------- 	18901-1 BD2/070408 7/04/2008 Soil	18901-2 BD3/070408 7/04/2008 Soil
Date digested	-	29/04/2008	29/04/2008
Date analysed	-	30/04/2008	30/04/2008
Arsenic	mg/kg	<4.0	11
Cadmium	mg/kg	<1.0	<1.0
Chromium	mg/kg	8.5	34
Copper	mg/kg	2.7	4.4
Lead	mg/kg	12	24
Mercury	mg/kg	<0.10	<0.10
Nickel	mg/kg	<1.0	3.1
Zinc	mg/kg	2.9	3.9

Moisture Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	18901-1 BD2/070408 7/04/2008 Soil	18901-2 BD3/070408 7/04/2008 Soil
Date prepared	-	29/04/2008	29/04/2008
Date analysed	-	29/04/2008	29/04/2008
Moisture	%	17	24

Method ID	Methodology Summary
Metals.20 ICP-AES	Determination of various metals by ICP-AES.
Metals.21 CV-AAS	Determination of Mercury by Cold Vapour AAS.
LAB.8	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			29/4/08	18901-1	29/04/2008 || 29/04/2008	LCS-1	29/4/08%
Date analysed	-			30/4/08	18901-1	30/04/2008 || 30/04/2008	LCS-1	30/4/08%
Arsenic	mg/kg	4	Metals.20 ICP-AES	<4.0	18901-1	<4.0 || <4.0	LCS-1	96%
Cadmium	mg/kg	1	Metals.20 ICP-AES	<1.0	18901-1	<1.0 || <1.0	LCS-1	99%
Chromium	mg/kg	1	Metals.20 ICP-AES	<1.0	18901-1	8.5 || 9.7 || RPD: 13	LCS-1	98%
Copper	mg/kg	1	Metals.20 ICP-AES	<1.0	18901-1	2.7 || 3.0 || RPD: 11	LCS-1	100%
Lead	mg/kg	1	Metals.20 ICP-AES	<1.0	18901-1	12 || 13 || RPD: 8	LCS-1	96%
Mercury	mg/kg	0.1	Metals.21 CV-AAS	<0.10	18901-1	<0.10 || <0.10	LCS-1	104%
Nickel	mg/kg	1	Metals.20 ICP-AES	<1.0	18901-1	<1.0 || <1.0	LCS-1	95%
Zinc	mg/kg	1	Metals.20 ICP-AES	<1.0	18901-1	2.9 || 3.3 || RPD: 13	LCS-1	97%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD
Date prepared	-			29/4/08	18901-1	29/04/2008 || 29/04/2008
Date analysed	-			29/4/08	18901-1	29/04/2008 || 29/04/2008
Moisture	%	0.1	LAB.8	<0.10	18901-1	17 || 17 || RPD: 0

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	LCS-2	29/4/08%
Date analysed	-	[NT]	[NT]	LCS-2	30/4/08%
Arsenic	mg/kg	[NT]	[NT]	LCS-2	95%
Cadmium	mg/kg	[NT]	[NT]	LCS-2	95%
Chromium	mg/kg	[NT]	[NT]	LCS-2	104%
Copper	mg/kg	[NT]	[NT]	LCS-2	104%
Lead	mg/kg	[NT]	[NT]	LCS-2	94%
Mercury	mg/kg	[NT]	[NT]	LCS-2	103%
Nickel	mg/kg	[NT]	[NT]	LCS-2	93%
Zinc	mg/kg	[NT]	[NT]	LCS-2	95%

Report Comments:

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

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

Quality Control Definitions

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Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY

Project Name: Phase 2 - Mac. Uni
Project No: 45298.02 Sampler: GN
Project Mgr: SE Mob. Phone:
Email: galic nikolaeva @ douglaspartners.com.au
Date Required: 24 h turnaround Lab Quote No.:

To: Envirolab Services
54 Frenchs Rd, Willoughby NSW 2068
Attn: Tania Notaras
Phone: 02 9958 5801 Fax: 02 9958 5803
Email: tnotaras@envirolabservices.com.au

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type S - soil W - water	Container type	Analytes: 8 HM								Notes
BD2/070408			07/04/08	S	G	1								
BD3/070408			07/04/08	S	G	1								

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: 9910 6200

Job No: 18901
Date received: 29/4/08
Time received: 17
Received by: SS
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Lab Report No.:
Send Results to: Douglas Partners Address: 96 Hermitage Road, West Ryde 2114
Phone: (02) 9809 0666
Fax: (02) 9809 4095

Relinquished by: G. Nikolaeva	Signed:	Date & Time: 29/4/08	Received By: SS	Date & Time: 29/4/08	
Relinquished by:	Signed:	Date & Time:	Received By:	Date & Time:	

APPENDIX E
Quality Assurance/Quality Control Procedures and Results

QA/QC PROCEDURES AND RESULTS

Quality assurance and control formed an integral part of this assessment. The results of the QA/QC assessments are detailed below.

The Data Quality Indicators (DQI's) have been addressed within the report as follows in Table E1.

Table E1 – DQIs and Evaluation Procedures

DQI	Evaluation Procedure
Documentation completeness	Completion of field and laboratory documentation including chain of custody, test bore reports.
Data completeness	Sampling density appropriate for preliminary assessment, analysis of appropriate contaminants, analysis of appropriate soil horizons, analysis of appropriate QA samples etc
Data comparability	Use of NATA accredited analytical methods, use of consistent sampling technique, commitment to equipment decontamination, field sample storage techniques etc.
Data representativeness	Sampling from targeted areas and a broad grid pattern across the site in order to obtain samples representative of contamination present.
Precision and accuracy for sampling and analysis	Use of NATA accredited analytical methods, achievement of 30-50% RPD for replicate analysis (as appropriate) and achievement of laboratory QC criteria.

As indicated above, the DQIs for sampling and analysis were achieved and the quality of the data satisfactorily meets the objectives of the current assessment.

FIELD QUALITY ASSURANCE AND QUALITY CONTROL

The field QC procedures for sampling as prescribed in Douglas Partners *Field Procedures Manual* were followed at all times during the validation assessment. Field sampling comprised replicate sampling, at a rate of approximately one replicate sample for every ten original samples and one trip blank.

Rinsate Sample

Rinsate (Field Blank) samples are used to provide an indication of any cross contamination which may occur between samples. Disposable sampling equipment was used during this assessment, eliminating the chance of cross contamination, and therefore no need for rinsate samples.

Trip Blank

A laboratory prepared trip blank was taken out to the field unopened, subjected to the same preservation methods as the field samples, and then analysed for volatile contaminants (BTEX) for the purposes of determining the transfer of contaminants into the blank sample incurred prior to reaching the laboratory. The results of the laboratory analysis for the trip blank are shown in Table E2.

Table E2 - Results of Laboratory Analysis for Trip Blank Samples (mg/kg)

Sample ID	Media	Date	Benzene	Toluene	Ethyl-Benzene	Xylene
TB/100408	soil	10/04/08	<0.5	<0.5	<1	<3

Levels of analytes were all below detection limits, indicating that cross contamination of volatile contaminants (BTEX) had not occurred during the course of the round trip from the site to the laboratory.

Trip Spike Samples

According to the *NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (1997)*, laboratory prepared trip spikes are to be taken into the field, subjected to the same preservation methods as the field samples, then analysed, for the purposes of determining the losses in volatile organics incurred prior to reaching the laboratory.

The practicalities of trip spikes are currently being debated and a detailed procedure is yet to be finalised. The laboratory prepared the trip spike which was preserved in the standard manner and taken into the field unopened. At this stage, the laboratory has no standard acceptance limits in recovery rates as results from in-house laboratory controls often vary.

With respect to the subject site, it is noted that the contaminants of concern (heavy metals, TPH and PAH) are not volatile in nature, and as such the value of trip spike samples is limited. Results are presented in Table E3 and indicated that the percentage loss for BTEX during the trip is minimal.

Table E3 - Results of Laboratory Analysis for Trip Spike Sample (% recovery)

Sample ID	Media	Date	Benzene	Toluene	Ethyl-Benzene	m+p-Xylene	o-Xylene
TS/100408	soil	10/04/08	36%	72%	109%	115%	124%

Relative Percentage Difference

Thirty samples were selected for analytical analysis, including one replicate sample. A measure of the consistency of results is derived by the calculation of relative percentage differences (RPDs) for replicate samples. A RPD of ± 30% is generally considered acceptable by the EPA, although some exceptions apply. The comparative results of analysis were included in Table E4.

Table E4 – Comparative Results of Replicate Sample Analysis for Heavy Metals and PAH's

Sample ID	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	B(a)P	PAH
30/0.2-0.3	<4	<1	12	5.9	18	<0.1	6	4.2	<0.2	<0.05
BD1/070408	<4	<1	9.9	11	15	<0.1	9.6	5.6	<0.2	<0.05
Difference	0	0	2.1	5.1	3	0	3.6	1.4	0	0
RPD (%)	**0**	**0**	**19**	**60**	**18**	**0**	**46**	**29**	**0**	**0**
19/2.4-2.5	<4	<1	8	2.9	12	<0.1	<1	3.2	-	-
BD2/070408	<4	<1	8.5	2.7	12	<0.1	<1	2.9	-	-
Difference	0	0	0.5	0.2	0	0	0	0.3	-	-
RPD (%)	**0**	**0**	**6**	**7**	**0**	**0**	**0**	**10**	-	-
28/0.5-0.6	11	<1	32	4.2	21	<0.1	2.1	2.6	-	-
BD3/070408	11	<1	34	4.4	24	<0.1	3.1	3.9	-	-
Difference	0	0	2	0.2	3	0	1	1.3	-	-
RPD (%)	**0**	**0**	**6**	**5**	**13**	**0**	**38**	**40**	-	-

Notes:
1 field replicate of sample above
Bold RPD greater than ± 30%

All the RPD results for heavy metals fall within the typical acceptable range (± 30%) with the exception of:

- Cu (60%) and Ni (46%) for sample 30/0.2-0.3 and its replicate BD1/070408
- Ni (38%) and Zn (40%) for sample 28/0.5-0.6 and its replicate BD3/070408

However, it is considered that the elevated RPD's do not materially compromise the analytical results obtained, as:

- The actual concentration differences in the majority of the replicate pairs are small;
- The detected levels of contaminants were well within the site assessment criteria;
- Replicate samples were collected instead of duplicate samples to minimise the loss of volatiles; and
- The heterogeneous nature of the filling.

It is therefore considered that the results indicate an acceptable consistency between the sample and its replicate and indicate suitable field sampling methodology was adopted and laboratory precision was achieved.

Laboratory QA/QC Procedures

The analytical laboratory is accredited by the National Association of Testing Authorities (NATA) and is required to conduct in-house QA/QC procedures. These are normally incorporated into every analytical run and include the following:-

Reagent Blank

A reagent blank sample is prepared and analysed at the beginning of every analytical run, following calibration of the analytical apparatus. The laboratory results for reagent blanks for soil analysis indicated that concentrations of all analytes were below respective laboratory practical quantitation (detection) limits. These results are included in the laboratory report in Appendix D.

Spike Recovery

This is a sample replicate prepared by adding a known amount of analyte prior to analysis, and then treated exactly the same as all other samples. The recovery result indicates the

proportion of the known concentration of the analyte that is detected during analysis. These results are included in the laboratory report in Appendix D.

The spike recovery rates are compared with limits as specified in Envirolab Services Quality Control System, and any exceedances are highlighted in the report.

As no exceedances and no comments were noted on the report, it is considered that the results indicate that the analytical results are not significantly affected by matrix interference.

Surrogate Recovery

This sample is prepared by adding a known amount of surrogate, which behaves similarly to the analyte, prior to analysis to each sample. The recovery result indicates the proportion of the known concentration of the surrogate that is detected during analysis.

As no exceedances and no comments were noted on the report, it is considered that the results indicate that the analytical results are not significantly affected by matrix interference.

Duplicates

These are additional portions of a sample which are analysed in exactly the same manner as all other samples. The duplicate sample results are included in the laboratory results in Appendix D.

In overall terms, therefore, the data quality objectives have been attained and the quality of the investigation data is considered acceptable.